TRANSPORT AND COMMUNICATIONS IN INDUSTRIAL MOBILITY: THE UK EXPERIENCE WITH PARTICULAR REFERENCE TO SCOTLAND AND NORTHERN IRELAND

by

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ABSTRACT

Induced interregional industrial mobility has been at the heart of UK regional policy almost from the beginning. A fundamental difference of opinion has emerged recently over the extent to which mobility is affected by transport and communications considerations and, a cognate point, the proper role of infrastructure in regional policy. According to one line of reasoning, distance costs for most types of industry have largely lost whatever locational significance they may once have had, infrastructural expenditure is essentially permissive rather than stimulatory, and historical deficiencies in the peripheral areas' stock of transport capital have, with possibly a few more or less trifling exceptions, been eliminated. Others hold that migrant-generators attach a great deal of significance to the adequacy of the transport and communications facilities in potential destination areas, a state of affairs insufficiently recognised heretofore by regional policymakers with the result that transport and communications infrastructure in the official 'areas for expansion' has been in chronically short supply. Not only is the issue sketched here highly topical, it has strong political overtones. Its exploration is the purpose of this study.

Three hypotheses, based upon commonsense and previous work in the field, are set forth in order to focus the research effort. It is postulated first that good transport and communications systems are essential to the success of most interregional industrial movements, secondly that private distance costs are not an important constraint on interregional industrial mobility for most types of manufacturing industry, and thirdly that the quality of intra-firm communications and organisational flexibility can often be more critical to the long-term viability of industrial migrants than distance costs.

In essence, the study comprises an appraisal of relevant economic theory, a detailed look at the evolution of regional policy in Great Britain and Northern Ireland focussing on the role assigned to transport and communications, a selective evaluation of previous UK research on industrial mobility, an original analysis of industrial survey questionnaires sent out in 1960 under the auspices of the Toothill Committee, an examination of postwar industrial migrant flows to Scotland and NI, extensive analyses of the transport and communications cost data from the 1963 Census of Production distinguishing between the UK as a whole and its

Scottish and NI members, and six case studies of postwar industrial migration to Scotland.

That private transport costs have been much more of a constraint on postwar interregional industrial mobility than generally realised is the most important single conclusion to emerge from the study. In contrast to this unexpected verdict, ample support is presented for the other two hypotheses suggesting that potential migrant-generators may exaggerate the adverse transport cost implications of a peripheral location while underestimating the significance of non-cost communications considerations. It is also concluded that existing theory is of remarkably little value in pragmatic terms, that transport and communications were virtually ignored by regional policymakers between 1934 when policy began and 1963, that the emphasis upon improved infrastructure by successive governments both nationally and in NI since about 1963 has not been misplaced, that the integration of regional with transport and communications policies has not yet gone as far as it should, that scope remains for further expenditure on transport and communications in pursuance of regional objectives, and that more research is needed on a host of germane topics.

CHAPTER 1

Introduction

The Issue

A continuing handicap to the economic development of the United Kingdom's several peripheral regions, in the traditional view, has been their relative inaccessibility and remoteness from important supply sources, contacts and markets in the South. The result for manufacturers in these areas has been increased costs and diminished external economies. This has been particularly true of Scotland and Northern Ireland, the most peripheral parts of the country. Since the mid-1930s, successive national governments have attempted to offset these problems by means of an increasingly sophisticated blend of regional policy measures. By 1968-69, such measures were costing over £265m a year. In addition, a large (but not easily determinable) sum was being spent on transport and communications links designed as much to stimulate economic activity in the peripheral regions as to accommodate previous growth although they were not formally part of regional policy.

In March 1969, the Scottish Council (Development & Industry), perhaps the most prominent unofficial body of its type in Britain with roots stretching back to 1931, raised the spectre of Scotland becoming "a poor country in 20 years' time" unless full advantage were taken of new technical developments in the transport and communications fields.[1] A few months earlier, the Confederation of British Industry, the respected amalgam of three older employers' organisations,[2] argued in

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[1] Scottish Council, Centralisation: Scotland's 20th Century Nine of Diamonds? (Edinburgh: Scottish Council (Development & Industry), 1969). This pamphlet led to the convening of an international forum at Aviemore in November 1970. The cryptic sub-title relates to the infamous Glencoe massacre of 1692.

[2] The Federation of British Industries, the British Employers' Confederation, and the National Association of British Manufacturers. Mr John Davies, the CBI's first Director-General (and currently (May 1971) Minister for Trade & Industry), was paid £20,000 a year. This figure is a revealing measure of the CBI's ambitions as a lobbyist.

complementary regional policy statements[1] not only that good communications were a sine qua non of regional development, but that expenditure on improved communications was a more efficacious form of positive incentive than cognate measures because it was relatively permanent in its effects.

In contrast to these (and similar[2]) views, postwar case studies of actual location decisions by manufacturing firms in the UK suggest that transport and communication costs for many types of industry are no longer very significant as location factors. This supposition is strengthened by recent developments in location theory which have led to a weakening in the stress placed upon transport costs by early theorists.[3] Furthermore, a growing feeling can be detected in civil service circles that not all transport and communications plans and investments in the past have been subjected to adequate economic analysis with the result that chronic under-utilisation is now a real danger in some cases.[4]

Thus, we have here a major difference of opinion between two sets of protagonists, the lobbyists and, a less homogeneous group, a de facto academic/civil servant coalition, concerning the future role of transport and communications in regional development. This situation is not readily explicable. At the same time, it is much too important to be left unclarified for long. Does it reflect dated empirical evidence, irrelevant theory, and an occasional failure historically to temper the politician's zeal for spending? Or, as the Scottish Council has argued, are fundamental changes underway, changes which may not have been apparent until recently? This thesis sets out to explore the issue outlined above with a view to delimiting the area of seeming disagreement more clearly, assessing its real magnitude, and tracing some of the implications for regional policy and future research. Our particular interest is the extent to which transport and communications are important in interregional industrial mobility. As will be obvious

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[1] CBI Evidence to the Hunt Committee on Intermediate Areas and CBI Regional Study: Regional Development and Distribution of Industry Policy (London: CBI, 1968).

[2] See ch. 3.

[3] See ch. 2.

[4] For example, see ch. 6.

from the working hypotheses presented below, this interest has been the crucial consideration governing and moulding the exploration process. It stems from a belief that the peripheral regions' main hope lies more in attracting new industry than in encouraging the existing stock to expand, although indigenous developments will not be unimportant. Furthermore, they will likely increase in significance over time.

A Definitive Problem

While transport is reasonably unequivocal in meaning, communications is not. Relevant definitions of 'communication' in The Shorter Oxford English Dictionary include "The action of communicating. Now rare of material things." and "Access or means of access between two or more persons or places . . .". In other words, it seems clear that the modern view excludes the movement of goods. On the other hand, it encompasses the means of transport, i.e., transport facilities and services. Sometimes, however, 'communications' is used in a narrower sense synonymous with the postal and telecommunications services. That is to say, a number of people see communications as being a Post Office monopoly; they draw a distinction between transport and communications facilities, especially when investment is involved. In the context of regional development, 'communications' not uncommonly has been taken to include air passenger but not other transport facilities. In light of the foregoing, we have felt it desirable to establish unambiguously what we mean by 'communications'.

In fact, we use the term in two ways. The first is identical with modern dictionary usage. The second reflects certain cost items in the 1963 Census of Production, viz., outlays on postage and telephone, telegram and cable expenditures. Unless stated otherwise, the expression, communication costs, which appearsfrequently below, refers exclusively to the variables just enumerated.

Hypotheses

Research should always be guided by theory, by one or more hypotheses, to ensure that effort is focussed, that relevant questions are asked, and that findings can be fitted into a meaningful framework. As Myrdal has written:

> Theory is necessary not only to organise the findings of research so that they make sense but, more basically, to determine what questions are to be asked. Scientific knowledge

> never emerges by itself, so to speak, from empirical research in the raw, but only as solutions to problems raised . . ."[1]

A corollary is that theories should be made explicit.

Our work has been guided and shaped by three main hypotheses:

1) a good interregional communications network is essential to the success of most long-distance industrial movements, the exceptions being movements by local market-oriented firms

2) private transport and communication (or collectively, distance) costs are not an important constraint on interregional industrial mobility within the UK for most types of manufacturing industry

3) the quality of intra-firm communications and organisational flexibility can often be more critical to the long-term viability of industrial migrants than distance costs.

From a comparison between these hypotheses and the disagreement noted earlier over the future relevance of transport and communications to regional development, it will be evident that we have postulated truth in the viewpoints of both protagonists. It follows that neither set of beliefs is comprehensive enough in itself and that the two are complementary rather than antithetical.

The Areas

As suggested above, Scotland and NI have been singled out for special attention in this study because they are the UK's most peripheral regions and thus the most likely to suffer from distance problems. Here we provide a sketch of their relative economic situations.

NI during the postwar years has had the highest unemployment rate, the second-highest rate of net emigration, and the lowest per capita income level of any region in the UK. Contrarily, at least until the recent period of civil unrest, it has had the fastest-growing economy. Scotland, Wales and the Northern Region of England have traditionally vied for second place in the unemployment league although the Scots have been handicapped by the kingdom's highest net emigration rate. This rate on the other hand has helped to keep the level of per capita income in Scotland relatively high. But overall, the region's economic growth record has been only middling.

McCrone, writing early in 1968, concluded that the economic

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[1] Gunnar Myrdal, Economic Theory and Under-Developed Regions (London: Gerald Duckworth & Co. Ltd., 1957), p.160.

situations of Scotland and NI towards the end of the 1960s would have been much worse except for regional policy. Indeed, he argued that governmental measures had enabled Scotland to maintain its relative economic position within the country while NI's economy had shown a relative improvement.[1] Since 1968 unemployment in Britain has risen to a postwar high. Inevitably, Scotland and NI have been hard hit. Yet a recent analysis by the Economist suggests that McCrone's conclusions remain valid.[2] Prevailing opinion seems to be then that Scotland and NI have been adversely affected by their peripheral locations, that regional policy has prevented matters from deteriorating, and that NI's relative economic situation, while still far worse than Scotland's, has improved somewhat over the postwar period.

It is also worth mentioning here Colin Clark's concept of economic potential, a device for measuring the relative attractiveness of a region to footloose industry, as it pertains to Scotland and NI. The concept rests on two assumptions: 1) private distance costs (transport outlays plus communication costs defined very broadly) are important to footloose manufacturers, 2) ceteris paribus, firms would like to locate as close to major markets as possible. Clark's 1966 article[3] contained a map showing economic potential values or scores for different parts of Great Britain. Central Scotland's score averaged about 1,000 (completely arbitrary units) compared to about 1,350 for Birmingham and 1,400+ for London. NI did not appear on the map but it can be inferred that its score was less than 900. In other words, because of its peripheral location, Central Scotland was only about 7/10ths as attractive to footloose industry as the London area in Clarkian terms while NI was perhaps only 6/10ths as attractive.

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[1] Gavin McCrone, Regional Policy in Britain, University of Glasgow Social and Economic Studies, No. 15 (London: George Allen & Unwin Ltd., 1969), ch. VI. This book is the most recent comprehensive study of UK regional policy and a worthy successor to Professor S.R. Dennison's excellent but now badly dated pioneering effort, The Location of Industry and the Depressed Areas (London: Humphrey Milford for the Oxford University Press, 1939).

[2] "Unemployment: On, On, Up and Up," Economist, 24 Apr 71, pp.62-63.

[3] Colin Clark, "Industrial Location and Economic Potential," Lloyds Bank Review, No. 82 (October 1966), 1-17.

Approaches

Our first hypothesis would appear to possess little novelty per se. Indeed, it can be argued that its validity has become almost self-evident. Few promotional campaigns on behalf of the Development Areas (DAs) today fail to extol the excellence of their communications networks. Yet, as we have seen, anxiety is being expressed that regional policymakers are not doing enough in the transport and communications fields. It follows that greater efforts would stimulate interregional industrial mobility, the widely-accepted panacea for the DAs' economic ailments. Why then are those efforts not being made? We examine this issue in three ways. First, we look at the received theories on regional development and industrial location. Next, we present the lobbyists' viewpoints. Finally, we trace the evolution of regional policy in Great Britain and Northern Ireland, focussing particularly on the role of transport and communications, on relevant research findings, and on the degree to which these findings have influenced policy.

Neither can we claim a great deal of novelty for our second hypothesis. Variants have been argued before and indeed proven to many people's satisfaction. Yet, quite apart from opposing arguments such as that advanced by Clark(1966), uncertainty remains concerning the number of manufacturing industries to which it applies. We try to reduce this uncertainty by means of a three-stage methodology. First, we look at postwar industrial migrant flows to Scotland and NI, grouping the migrants according to the 1958 Standard Industrial Classification (SIC). Then we analyze the transport and communication cost statistics in the 1963 Census of Production with a view to identifying the relative sensitivity of manufacturing industries to each of these two cost variables. Thirdly, we compare and contrast the migrant and Census data to see if any patterns emerge. Not only are we able to assess the extent to which migrants have been relatively sensitive or insensitive to transport and communication costs, but we can also readily detect any dissimilarities in the experiences of Scotland and NI.

In contrast to its predecessors, our third hypothesis is quite novel in the sense that it has not previously been tested in depth although others have stated it as a conclusion. There has also been at least one attempt to test it as a premise (see ch. 6) but the testing procedure employed - a mail questionnaire - was not really suited to the task. Our testing procedure features detailed case studies of

migration. There are six in total; all of them relate to Scotland. They are presented in full together with an analytical review of their contents. A valuable by-product is the light they shed on the other hypotheses.

As a result of the foregoing, we are able to draw a number of conclusions. Some pertain to the central issue mentioned initially. Others relate to specific hypotheses. We also indicate where more research is required.

CHAPTER 2

Received Theory: The Role of Communications in Regional Development and Industrial Location.

Three types of theory are distinguished here as being relevant to our purposes: 1) the theory of regional economic development, 2) location theory, and 3) the theory of the firm. The former is macro in nature and positive; the latter two are micro and normative. All have a long history. Yet none is in a very satisfactory state at the moment in the sense that there exists a widespread favourable consensus concerning one particular version. Indeed, partisan positions abound in the literature. Since we are interested only in the role of communications, it has been possible to extract from the vast quantity of material available a reasonably concise statement of current viewpoints while providing some insight into the essence of the historical debates. The reason for this brief review of the literature is to place our hypotheses in a theoretical perspective. Ensuing chapters, in contrast, are essentially pragmatic in orientation.

Theory of Regional Economic Development

Regional development theory is an offshoot of the theory of economic development but only in part.[1] By development we mean not only endogenous change, i.e., change generated from within,[2] but also

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[1] Meyer, in what has become a standard introduction to regional economics, prescribes four theoretical roots for the subject: 1) location theory, 2)international and interregional multiplier theory, 3) inter-industry input-output analysis, and 4) mathematical programming. J.R. Meyer, "Regional Economics: A Survey," in Regional Analysis: Selected Readings, ed. by L. Needleman (Harmondsworth, Mddx.: Penguin Books, 1968), p.32. He should also have mentioned economic development theory, particularly as it applies to under-developed countries. Cf. Myrdal (1957).

[2] Schumpeter's theory of economic development, for example, relates solely and specifically to endogenous change within a capitalist society. See Joseph A. Schumpeter, The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest and the Business Cycle, translated from the German by Redvers Opie, Harvard Economic Studies, Vol. XLVI (Cambridge, Mass.: Harvard University Press, 1949). The essence of this book, which first appeared (in German) in 1911, is contained in Schumpeter's "The Instability of Capitalism," Economic Journal, XXXVIII (September 1928), 361-86.

growth which we, in contradistinction to Brewis and Paquet[1] for instance, define as expansion with both endogenous and exogenous change. Communications are an example of infrastructure or social overhead capital (SOC). As will become apparent, SOC occupies a prominent place in the thinking of many development economists and planners.

What is SOC?

Capital is commonly divided into three categories:

1) directly productive
2) inventories and goods in process
3) infrastructure or SOC.

SOC is a much-used term but one whose precise meaning has normally been left vague. Part of the problem has been the addition of the word, 'social', to the more basic concept, overhead capital. While we have not yet defined SOC, it will be obvious that not all overhead capital (OC) has a purely social purpose - far from it. Indeed, most OC has a dual role - economic and social.[2] Whereas it might be possible in particular circumstances to divide some of a given stock of OC into separate economic and social groupings, one would not likely proceed very far with the exercise before abandoning it as useless unless a procedure were adopted akin to that employed in censuses of production, and each individual item of OC was labelled either economic or social on the basis of its principal purpose. Granted the technical feasibility of such a procedure, would it be of any real value? One would think not, if only because of the potentially enormous subjective element involved. Then why, to return to our original query, has the 'S' been added to the 'OC'? Presumably, and here we anticipate part of the following section, the answer is to be found in the fact that 'social' is analogous to 'public'. Overhead capital is frequently, if sometimes erroneously, viewed as being synonymous with the public sector or government, in part because it gives rise to predominately social as opposed to private benefits. Thus it can readily be seen how many development practitioners have come to

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[1] T.N.Brewis and Gilles Paquet, "Regional Development and Planning in Canada: An Exploratory Essay," paper presented to the Canadian Political Science Association, Ottawa, 9 Jun.67, p.15. They refer to development as expansion with structural change and to growth as expansion within a given structure.

[2] One can think of other roles, e.g., political and defence, but we shall henceforth ignore this complication.

associate the term, 'social', with the phrase, overhead capital, almost automatically. However, this seeming inevitability does not remove the ambiguity in the term. Thus, following Professor Youngson, one of the leading authorities on OC,[1] we shall henceforth refer to SOC simply as OC in recognition of the possibility, first, that 'social' may be taken to mean 'non-economic', and second, that its public sector connotation may be occasionally misleading.

The concept of OC is felt to have originated in the late 1940s.[2] Singer was one of the earliest, if not the first economist, to advance the idea in public.[3] Youngson credits Nurkse,[4] however, with putting the idea into "general circulation". Both Singer and Nurkse, it will be noted, were primarily concerned with the problems faced by under-developed countries. These problems provided the seedbed as it were for the OC concept. It has since been transplanted, of course, into many different contexts.

Polar definitions of OC have been provided by Hirschman[5] and Rostow[6]. To the former, transport and power epitomised the hard core of the concept. Rostow, on the other hand, generalised the idea of OC to include every investment essential to what he called take-off.

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[1] Cf. A.J. Youngson, Overhead Capital: A Study in Development Economics (Edinburgh: Edinburgh University Press, 1967).

[2] Youngson, Overhead, p.34.

[3] Hans Singer, "Development Projects as Part of National Development Programmes," in Formulation and Appraisal of Development Projects (New York: United Nations, 1951), cited by Youngson, Overhead, p.34.

[4] Ragnar Nurkse, Problems of Capital Formation in Underdeveloped Countries (2nd ed.; Oxford: Basil Blackwell, 1953).

[5] Albert O.Hirschman, The Strategy of Economic Development, Yale Paperbound (New Haven: Yale University Press, 1958), p.83.

[6] W.W. Rostow, "Introduction and Epilogue", in The Economics of Take-off into Sustained Growth: Proceedings of a Conference Held by the International Economic Association, ed. by W.W.Rostow (London: Macmillan & Co. Ltd., 1964), p.xxv.

Also at the wide end of the spectrum is the definition adopted recently by the Hunt Committee in Britain. It took infrastructure to mean "fixed investment on gas, water, electricity, housing, transport and communications, education and social services."[1] Bruton, writing for the International Encyclopedia of the Social Sciences, noted the lack of agreement on the meaning of OC but confined his own analysis to transport, communications and power.[2] Given the locus of his article, this might be taken as the most widely accepted definition of OC.

OC Characteristics.

Bruton's definition and the others mentioned above all suffer from a similar defect, viz., they are simply a list of OC items rather than a statement of the principles determining what should be on the list. A major purpose of Youngson's book was to remedy this problem. His conclusion is worth quoting:

> . . . overhead capital is not a set of things but a set of properties . . . . Briefly, capital may be regarded as overhead capital (1) to the extent that it is a source of external economies, either in the Marshallian or in the wider Pigovian sense; (2) to the extent that it has to be provided in large units, ahead of demand. Capital expenditure involving either of these two properties should be regarded as expenditure in the creation of overhead capital.[3]

More pointedly, at least ten characteristics can be ascribed to OC including and elaborating on the two specified by Youngson above although some of the ten may not always be present in any given instance - indeed, this is likely to be the case. First, OC is the source of the basic or essential services required in the production of virtually all commodities. In the words of Singer, "there are certain overhead installations which must be present to enable production to take place, but which do not themselves directly result

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1 Great Britain, Department of Economic Affairs, The Intermediate Areas, Report of a Committee under the Chairmanship of Sir Joseph Hunt, Cmnd. 3998 (London: HMSO, 1969), p.131.

2 Henry J. Bruton, "Capital, Social Overhead", in International Encyclopedia of the Social Sciences, Vol.II, ed. by David E. Sills (n.p.: Macmillan Company & The Free Press, 1968), pp. 287-90.

3 Youngson, Overhead, p.68. Note the absence of pecuniary external economies from this conclusion. Youngson argues that they "are not confined to any one set of capital goods." Ibid., p.57.

in the production of usable goods."[1] It is difficult, for example, to imagine any sort of development occurring without transport. Second, as stressed by Youngson, OC gives rise to certain types of external economy, many of which cannot be accurately foreseen, i.e., that they will eventually materialise often requires faith. A third OC characteristic is the indivisibility or lumpiness and the consequent capital-intensiveness of many OC items, e.g., hydro schemes.

Fourth, it frequently takes a considerable length of time to instal a unit of OC. The Hunt Committee Report noted (para. 441) that it rarely takes less than 5-7 years now in Britain to complete a major new road scheme because of statutory procedures; even relatively small road works can take 3-5 years. This technical property of OC helps to explain the need for building ahead of demand. Of course, this requirement poses certain risks as will be appreciated, to take a topical example, by the exponents of the £39 m Seaforth container project in the Port of Liverpool.[2] Another lengthy period typically elapses before newly-installed OC is utilized to capacity or results in the 'efficient sequences' propounded by Hirschman. This need not always be so as many urban motorway planners have come both to realize and to rue! But consider, in contrast, the case of the Australian trunk railway lines put in place between 1860 and 1890. Thirty years went by before they began to generate the developmental benefits promised by their political promoters. Professor Butlin has suggested, somewhat mildly, that this "gestation period" was an "extremely long one."[3] Professor Youngson provides a more caustic commentary:

> The economy, in time, grew into the assets which had been created. But . . . the sacrifices of those years could have been put to more profitable use.[4]

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[1] Singer (1951), p.7, cited by Youngson, Overhead, p.34.

[2] Cf. R.W. Shakespeare, "Facelift for the Mersey Waterfront," The Times, 23 Nov 70, p.22; "Trouble at Britain's Front Door," Economist, 7 Nov 70, pp.70 & 73.

[3] N.G. Butlin, Investment in Australian Economic Development, 1861-1900 (Cambridge, 1964), p.399, cited by Youngson, Overhead, p.67.

[4] Youngson, Overhead, p.68.

Even more depressing is the Canadian railway saga.[1]

A fifth OC characteristic is the difficulty of launching new ventures, e.g., a new telephone company, posed by the frequently large capital requirements. The result is a tendency towards monopoly. Sixth, and a related point, many OC operations display declining long-run marginal costs or alternatively, increasing returns to scale, rendering pricing policy very difficult. Seventh, OC is characterized by exceptional durability. For example, telecommunications plant in Britain has an economic life of 20-40 years. In contrast, many private firms write off new investment within 5-7 years.[2] Eighth, many of the services provided by OC cannot be imported, e.g., postal services, regardless of the efficiency of the domestic producer. A ninth characteristic emerges from the combined effect of those already mentioned, i.e., OC is generally considered to be in the public interest leading to the almost universal demand that it should be either owned or controlled by government. Finally, again for by now obvious if not always politically acceptable reasons, OC is frequently associated with what Youngson calls "a certain amount of centrally planned action or supervision."[3]

Transport and Economic Development.[4]

Transport, as suggested earlier, is invariably cited as an example of OC. But there is no consensus concerning the role of OC and hence of transport in either regional or national economic development.

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[1] A brief account together with references is included in the author's unpublished M.A. thesis, "Public Policy and Extra-Provincial Trucking in Canada: An Overview," University of New Brunswick, 1970.

[2] Cf. Walter W. Heller, "The Anatomy of Investment Decisions," Harvard Business Review, XXIX (March 1951), 95-103; "Investment Decisions: Motives Still Mixed," Economist, 14 Nov 70, p.79.

[3] Youngson, Overhead, p.69.

[4] Very little has been written on the subject of communications, narrowly defined, and economic development. We shall, therefore, ignore it for the remainder of this review chapter. However, one should keep in mind that, increasingly, communications are being substituted for transport. Cf. Wilfred Owen, "Transportation and Technology," American Economic Review, LII (May 1962), 412.

Four alternative viewpoints can be distinguished: active, permissive, agnostic and doubter. Members of the activist school hold that OC investment has a causal or catalytic quality with regard to economic development, preceding and inducing 'directly productive' capital outlays. A transport investment, for example, such as a new highway, may have the quadruple effect upon industry of reducing direct transport costs, lowering stock requirements, eliminating delays and extending market areas. Consequently, existing production units may be encouraged to expand and new units may be brought into being.

Contrarily, members of the permissive school argue that investment in OC is essentially passive in its effects. That is to say, whereas such investment will normally be necessary for development, it will not by itself be sufficient stimulus to bring development about. It follows that OC investment, having due regard to the problem of lumpiness, should coincide with, or even in some cases lag slightly behind, directly productive capital formation rather than be put in place ahead of demand and run the twin risks of obsolescence and under-utilisation.

Those who plead agnosticism with respect to the rival claims of the activists and permissives form a third school of thought. They suggest that each case should be examined on its merits. This pragmatic attitude reflects the failure of the other schools to buttress their beliefs with a convincing and empirically-tested normative theory.

The fourth school specified above is comprised of doubters. They deny that OC has any special part to play in economic development.

What is the relative strength of these various schools from a transport point of view? Before examining this question directly, it is worthwhile looking at transport and economic development in more general terms. From the beginning of classical economics, transport has been seen as an essential ingredient in the development process. Adam Smith, for example, observed that:

> Good roads, canals, and navigable rivers, by diminishing the expense of carriage, put the remote parts of the country more nearly upon a level with those in the neighbourhood of the town. They are upon that account the greatest of all improvements. They encourage the cultivation of the remote, which must always be the most extensive circle of the country. They are advantageous

> to the town, by breaking down the monopoly of the country in its neighbourhood. They are advantageous even to that part of the country. Though they introduce some rival commodities into the old market, they open many new markets to its produce. Monopoly, besides, is a great enemy to good management . . . .[1]

A slightly different tack was taken by Alfred Marshall who argued that England's rise to a position of industrial leadership in the world was delayed inter alia by the fact that "her industries were neither concentrated, nor united by good communications."[2]

Youngson assigned a key role to transport as a factor in economic development: "This, indeed, is one of the few general truths which it is possible to derive from a study of economic history."[3]

> The more closely one examines the impact of transport improvement, the more clearly one realises how pervasive this impact is, in what a multitude of ways the transport system helps to determine the scope and direction of economic development, and how important are transport improvements in the creation of new economic opportunities and new incentives.[4]

Not everyone would agree with Smith, Marshall and Youngson, however, at least without qualification. Kuhn & Lea, for instance, concluded from the Dahomey Land Transport Study sponsored jointly by the United Nations and the World Bank that it was difficult to verify empirically the widely accepted argument in the literature that improved transport would stimulate production. Dahomey farmers seemed more interested in labour matters, production techniques, credit facilities and marketing arrangements than in better transport. Moreover, analytical studies revealed that the ultimate effect of transport improvements was often slight:

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[1] Adam Smith, The Wealth of Nations, Books I-III, with an Introduction by Andrew Skinner, Pelican Classics (Harmondsworth, Mddx: Penguin Books, 1970), p.251. Underlining added. See also Book I, ch.3, "That the Division of Labour is Limited by the Extent of the Market," pp.121-26.

[2] Alfred Marshall, Industry and Trade (2nd ed.; London: Macmillan and Co.Limited, 1919), p.28.

[3] Youngson, Overhead, p.73.

[4] Ibid., p.75.

> Given a unitary elasticity of supply of a product, and a 30 per cent transport cost component in final market price, and a 10 per cent truck rate reduction passed on to the shipper, the result would be a mere 3 per cent growth in production. Few producers occupy themselves with such minute adjustments.[1]

Coming from a transport economist (Kuhn) and a professional engineer (Lea) working under the auspices of perhaps the two most important international development bodies in the world today, this line of reasoning deserves attention, especially since it was corroborated a short while later by Steele[2] using Turkish data. Nonetheless, it remains true that transport and economic development are still generally seen as being inextricably intertwined.

Fishlow[3] has distinguished three major types of development effect that might ensue from a transport innovation such as the railroad:

1) direct effects in the form of reduced transport costs and shipper savings (Smith's aphorism concerning the division of labour and the extent of the market sums up much of this argument)
2) induced responses or Hirshhman's forward linkage effects, the magnitude of which is a function of:
   a) the variety of industries into which transport enters as an input,
   b) the extent to which transport can be substituted for other inputs
   c) transport cost/total cost ratios
   d) the size of the transport cost reduction
3) Hirschman's backward linkage effects.

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[1] Tillo E. Kuhn and Norman D. Lea, Engineering-Economic Systems Analysis for Transport Planning in Dahomey, West Africa (Toronto : York University Transport Centre, 1970), p.13. Underlining added.

[2] David Steele, "Regional Planning and Infrastructure Investment - Based on Examples from Turkey," Urban Studies, VIII (February 1971), 3-19. Steele's argument is not really very persuasive however. For one thing, it largely ignores the dynamic effects of new investment. More generally, the overall approach which he takes to his subject does not inspire a great deal of confidence.

[3] Albert Fishlow, American Railroads and the Transformation of the Ante-Bellum Economy, Harvard Economic Studies, Vol.CXXVII (Cambridge, Mass.: Harvard University Press, 1965), ch.I.

While this analytical framework was formulated for the specific purpose of evaluating the economic impact of transport innovations, i.e.,new technologies, it can readily be used for the assessment of any transport proposal. Particularly relevant in this regard are the first two types of effect specified. In contrast, backward linkage effects from otherwise important investment projects such as highways tend to be rather ephemeral.

Detailed guides to the assessment of transport proposals have been published by the Brookings Institution and the World Bank. The former study[1] was prepared for the U.S.Agency for International Development and is oriented towards the problems of the under-developed countries(UDC) although the recommended methodology, the calculation of net present values ($V^0 = B^0 - C^0$), could be applied anywhere. Similarly with the latter publication[2] which was written by the Bank's chief transport economist and explicitly designed "to help fill a gap in the sparse general literature of the subject." His favoured decision criterion, the internal rate of return, can be used anywhere though the Bank, of course, deals primarily with UDC. Both guides are a pragmatic blend of theory and practice.

Mention might also be made of an excellent article by Burns[3] in which he sets out the strengths and weaknesses of various transport planning techniques. Four alternatives are discussed at length: 1) the prevention (or removal) of transport bottlenecks, 2) project analysis, 3) linear programming (LP) when one is trying, for example, to minimize total transport costs, and 4) simulation models of the transport and economic systems and of the interaction between the two. LP involves a "formidable" number of assumptions and a great deal of organisational talent in order to secure the necessary data. Indeed, in practice, according to Burns, specifying an LP model is "extremely difficult". Simulation models are still in their infancy and require

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[1] Clell G.Harral, Preparation and Appraisal of Transport Projects, Transport Research Program (Washington, D.C.: Brookings Institution, 1965).

[2] Hans A. Adler, Sector and Project Planning in Transportation, World Bank Staff Occasional Papers, No.4 (Washington, D.C.: International Bank for Reconstruction and Development, 1967).

[3] Robert E. Burns, "Transport Planning: Selection of Analytical Techniques," Journal of Transport Economics and Policy, III (September 1969), 306-21.

a "staggering" amount of data. While they may be "exciting and possibly the most significant development in transport planning for years", it is unlikely that they will move beyond the experimental stage for a long time yet. Project analysis is relatively much easier but narrow in approach. More importantly, the number of experienced specialists is limited. Thus one is left in many situations with variants on the prevention of bottlenecks technique, some of which scarcely deserve the name, planning, unless one accepts that planning can be implicit. A major defect in the prevention of bottlenecks approach is its inability per se to cope with innovation.

It will be evident from the foregoing that, despite the importance of transport for economic development, transport planning by economists is relatively new.[1] Transport planning by engineers and/or politicians, on the other hand, is an ancient form of activity but, as commonly practised, not a very sophisticated one in economic terms. Paradoxically perhaps, the services of transport economists would appear to be most appreciated at the moment outside the developed countries although this situation is beginning to change as the merits of planning in affluent societies become more widely appreciated. We turn now to an assessment of the relative strengths of the various schools of thought on the role of transport in economic development distinguished previously.

The Activist School

In essence, the activists hold that transport supply creates its own demand. While this viewpoint can be traced back to Adam Smith and beyond, today it would appear to be a minority one. One of the

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[1] In fact, the incipient nature of economic transport planning comes as a shock to most of those newly introduced to the subject. Cf. the following statement by A.A. Walters in his "Economic Development and the Administration and Regulation of Transport," Journal of Development Studies, IV (October 1967), 72: "The art of measuring the effect of highway investment is in its infancy; it should be forced rapidly to grow to a stature commensurate with the job to be done." On this point, see Herbert Mohring and Harold F.Williamson, Jnr., "Scale and 'Industrial Reorganisation' Economies of Transport Improvements," Journal of Transport Economics and Policy, III (September 1969), 251-71.

earliest modern[1] proponents was Schumpeter[2]. He laid enormous stress on the demand-inducing effects of canals and railroads in American economic history, arguing, for example, that many railroads were built ahead of demand[3] with "truly revolutionary" consequences for the development of the vast territories west of the Appalachians. Analogously, much of the industrial development in Germany during the 19th century in Schumpeter's view was either subsidiary to the development of the railroads or directly induced by it. Walter Isard was an activist. His articles on the economic implications of transport innovations[4] were very much from the Schumpeterian mould. The same could be said of Jenks[5] and of North.[6] Healy,[7] while basically an activist, attempted a "thoroughly critical analysis" of activist tenets with a view to deflating some of the more

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[1] 'Modern' is loosely defined here as post-depression. As suggested, the activist school predates Adam Smith and there have been innumerable adherents since, especially during the railroad era. However, it was essential to limit our discussion to manageable proportions - hence, our decision to stick basically to the modern era.

[2] Joseph A. Schumpeter, Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process, Vol.I (New York: McGraw-Hill Book Company, Inc., 1939), chs. VI and VII.

[3] For a critique of this argument, see Fishlow (1965), ch.IV.

[4] Walter Isard, "Transport Development and Building Cycles," Quarterly Journal of Economics, LVII (November 1942), 90-112; Caroline Isard and Walter Isard, "Economic Implications of Aircraft," QJE, LIX (February 1945), 145-69.

[5] Leland H. Jenks, "Railroads as an Economic Force in American Development," Journal of Economic History, IV (May 1944), 1-20.

[6] Douglass C. North, "Location Theory and Regional Economic Growth," Journal of Political Economy, LXIII (June 1955), 243-58.

[7] Kent T. Healy, "Transportation as a Factor in Economic Growth", JEH, VII (Supplement 1947), 72-88.

excessive claims. Perhaps the most interesting thing about his article from our viewpoint is the fact that he was moved to write it at all for it can be inferred from its general tenor that, at least until the late 1940s, the activist outlook was paramount in America. Hoover can be enrolled in the activist school by virtue of chapter 10 in his classic book, The Location of Economic Activity [1] he appears there to accept fully Isard's arguments (1942 and 1945).

Rostow can be considered an activist since he assigned pride of place to the railroad as the decisive stimulus to take-off in several countries, viz: the U.S., the USSR, Germany, France and Canada. Railroad construction was also "extremely important" in his view for the Swedish and Japanese take-offs. But he qualified his activist beliefs by noting that in India, China, pre-1895 Canada and pre-1914 Argentina "very substantial railway building . . . . . failed to initiate a take-off" due to the absence of certain vital preconditions. In other words, he explicitly recognised the main limitations of the activist doctrine, i.e., its lack of universality and its unreliability, while not forsaking the creed entirely.[2]

Hirschman's espousal of unbalanced growth and induced sequences[3] is an example of activist thinking, albeit an ambiguous one. He defined two alternative development paths: 1) development via excess OC, 2) development via a shortage of OC. Both set up incentives and pressures aimed at attracting "directly productive activities" (DPA).

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[1] Edgar M. Hoover, op.cit., McGraw-Hill Paperbacks (New York: McGraw-Hill Book Company, Inc., 1948).

[2] W.W. Rostow, "The Take-off into Self-Sustained Growth," Economic Journal, LXVI (March 1956), 25-48; Rostow, "Leading Sectors and the Take-off", ch.1 in Economics of Take-off: Proceedings (1964), pp.1-21; Rostow, The Stages of Economic Growth: A Non-Communist Manifesto (Cambridge: Cambridge University Press, 1966). Rostow's views have attracted considerable criticism as will be evident from a reading of the Proceedings noted above. See also in this regard Fishlow (1965) and Robert W. Fogel, Railroads and American Economic Growth: Essays in Econometric History (Baltimore: Johns Hopkins Press, 1964). Professor A.K. Cairncross in a witty paper, "Capital Formation in the Take-off", published as part of the aforementioned Proceedings observed (p.247) in support of Rostow's caveat concerning the activist doctrine that "there are many countries that have had a good railway system for nearly a century and are still struggling to 'take-off'."

[3] Strategy (1958). Hirschman's general argument was adumbrated by P. Wiles, "Growth versus Choice," Economic Journal, LXVI (June 1956), 244-55 and paralleled by Paul Streeten, "Unbalanced Growth," Oxford Economic Papers, N.S., XI (June 1959), 167-90.

which path should be chosen at any point in time depended on the country (or region) and its economic situation. When "DPA investors" were choosing between equally dynamic regions within a single country, their location choice ceteris paribus was "likely to be made primarily on the basis of the comparative SOC endowments of the different 'candidate' areas". On the other hand, the incentive effects of excess OC were not always sufficient to attract DPA, i.e., there was no necessary relationship between OC and DPA on either technological or economic grounds; pressures were also required sometimes, especially in the case of lagging regions since, in the absence of political intervention, 'polarization' effects tended to overwhelm the 'trickling down' process.

Other apparent activists could be mentioned such as Martin & Warden,[1] Voigt[2] and Walters.[3] But it will be clear by now that the activist viewpoint generally has little real predictive or operational value per se. This is especially true of developed countries like the UK without virgin territories and with a large stock of transport capital already in place. Nonetheless, activists have put forward some enormously stimulating arguments concerning the development process and the economic impact of transport innovations, and have made valuable contributions to the study of economic history. Perhaps their main problem has been that they have either claimed too much or have given rise inadvertently to unrealistic expectations. They would appear currently to be on the defensive but their influence is by no means dead as illustrated for example by the Hunt Committee Report and the policies

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[1] Brian V. Martin and Charles B. Warden, "Transportation Planning in Developing Countries," Traffic Quarterly, XIX (January 1965), 59-75.

[2] Fritz Voigt, "Backward Areas in Industrial Countries, Part 2: Empirical Analysis of a Selected Region (Eifel) - Report of the Federal Republic of Western Germany," Institute for Industry & Transport Policy, University of Bonn, 1967. (Roneoed).

[3] Op. cit. (1967), 49-85.

making process.[1] In a cognate article, he concluded that until a theory of greater substance than Weber's was developed, policy-making with regard to the location of industry "must necessarily be set in a framework of blundering empiricism."[2]

Greenhut, a location theorist in his own right, provided a more up-to-date survey of the field in 1956.[3] He classified the various contributions to the subject as follows: 1) least-cost location theories, e.g., von Thunen (1826), Weber (1909) and Hoover (1948 - see above); 2) market area theories, e.g., Launhardt (1885), Clark (1914), Fetter (1924) and Losch (1940);[4] and 3) locational interdependence theories, e.g., Hotelling (1929), Lerner & Singer (1939), Smithies(1941) and Chamberlin (1948 - see below). Only the theories in the initial group with their emphasis upon transport costs call for special comment here although the others are generally germane to our interests. Von Thunen's work related solely to the location of agricultural activities. Weber's theory has already been discussed. Hoover's ideas were cast in the Weberian mould but represented an improvement on those of his mentor. They are summed up in the following quotation as they pertain to transport costs and the location of the individual firm: "As a rough generalization, one can say that early stages of production are material-oriented and late stages are market-oriented while intermediate stages are relatively

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[1] This subject continued to be ignored till the 1960s. Cf. three cognate studies by P.M. Townroe - "Locational Choice and the Individual Firm," Regional Studies, III (April 1969), 15-24; "Managerial Behaviour and the Migration of Industry: A Study in Industrial Decision-Making," report prepared for the Centre for Environmental Studies, September 1969; "How Managers Pick Plants," Management Today, October 1970, pp. 50, 54 & 56.

[2] S.R. Dennison, "The Theory of Industrial Location," Manchester School, VIII (March 1937), 24.

[3] Melvin L. Greenhut, Plant Location in Theory and in Practice: The Economics of Space (Chapel Hill: University of North Carolina Press, 1956), pp. 1-100.

[4] For a distillation of Losch's main ideas, see Stefan Valavanis, "Losch on Location," reprint 1 in Regional Economics: A Reader, ed. by Harry W. Richardson (London: Macmillan, 1970), pp.32-41. In Richardson's view, Losch and Weber are the two greatest names in the history of location theory.

'foot-loose' as to transfer considerations."[1] In Greenhut's opinion, transport costs were a decentralizing influence with the degree of dispersion being related to the size of the transport cost burden. Transport assumed a "governing" role in location decisions either when transport charges were high relative to total costs or when the transport cost burden varied widely from site to site. It followed that the two types of transport data vital to informed location decision-making were a) spatial variations in transport costs, and b) transport cost/total cost ratios. Firms were rightly material-oriented when their inputs were perishable and/or when procurement costs were "much greater" than distribution outlays. A market location was most desirable when distribution costs exceeded procurement charges, when output was perishable, when customer demand was capricious or volatile, and/or when a strong market position depended on close contact with customers.

More broadly, Greenhut argued that a general theory of plant location must include: 1) cost factors, 2) demand factors, 3) cost-reducing factors, 4) revenue-increasing factors, 5) personal cost-reducing factors, 6) personal revenue-increasing factors, " and perhaps " 7) purely personal considerations.[2] "It is only by

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[1] Op. cit., p.46.

[2] Cf. D.E.C. Eversley, "Social and Psychological Factors in the Determination of Industrial Location," in Papers on Regional Development, ed. by Thomas Wilson, supplement to the Journal of Industrial Economics, XIV (Oxford: Basil Blackwell, 1965), pp. 102-14. Eversley argued inter alia that intra-UK communications were relatively poor. This handicapped distribution of industry policy. A good communications network was essential in his judgment, not only to industrial firms, but also to their employees as individuals. He therefore recommended for every DA that "Large modern civil airports with frequent cheap communications with London and the continent must be established, if necessary with a subsidy." - cf. chs. 3-6 below. E.A.G. Robinson has argued that "many location-decisions are influenced by rather minor considerations of personal preference or convenience, rather than by major differences of cost." "Location Theory, Regional Economics and Backward Areas," paper submitted to the Conference on Backward Areas in Advanced Countries, International Economic Association, Varenna, Lake Como, Italy, 28 Aug-4 Sep 67, p.9 (underlining added). In the same vein, Tarrant concluded that "The quantitative expression of personal factors remains a major obstacle to the construction of more complex models of industrial location." Consequently, more and more attention was being given by theorists to the concept of the "permissive location", i.e. one which allows profits to be made but not necessarily maximum profits. John R. Tarrant, "Industry in South-East Ireland: A Study in Industrial Location", Irish Geography, V (No. 5, 1968), 441.

ascertaining the impact of each of these types of factors on the site-selection(s) of a firm that a complete understanding of the forces guiding the location of its plant(s) can be acquired."[1] Existing theories in his view all had a common failing, viz., they assumed that firms were concerned solely with maximining profits. He attempted to remedy this defect by advancing a general maximum-profit theory in which psychic income could be given a monetary value and considered as part of profits.

Alonso(1964),[2] noting that work on the development of "the theory of the location of the firm" had more or less come to an end by the late 1950s due to diminishing returns, saw "the theory of market areas" as being the key to the future. Specific limitations to extant location theory in his opinion were its failure to cope adequately with demand, with internal economies of scale,[3] with the multi-product firm, with the reaction of competitors to location decisions,[4] with external economies and diseconomies, with uncertainty, and with time. With regard to the role of transport costs, he argued on a variety of a priori grounds (in concert with many others)[5]

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[1] Op. cit., p.177.

[2] W. Alonso, "Location Theory" reprint 10 in Needleman, ed.(1968), pp. 337-66.

[3] Cf. Ronald S. Edwards and Harry Townsend, Business Enterprise: Its Growth and Organisation, Papermac 10 (London: Macmillan & Co. Ltd.,1965), ch. VII, "Economies of Scale and Costs of Transport and Communication".

[4] Cf. Walter Isard, "Game Theory, Location Theory and Industrial Agglomeration," reprint 2 in Richardson, ed.(1970), pp. 42-54.

[5] But note the caveat put forward, for example, by Florence who cautioned that while the weight and influence of transport costs as a location factor had frequently been exaggerated "it should be borne in mind that in private business it is the proportion of costs to profit not to total costs that is significant . . . a /small/ proportion of costs spent on transport may mean quite a large ratio of transport costs to profit. It should further not be forgotten that cost of transport may be low, for the very reason that in choosing location and size of plant care was taken to make it low." P. Sargant Florence, assisted by W. Baldamus, Investment, Location and Size of Plant, National Institute of Economic and Social Research, Economic and Social Study No.VII (Cambridge: Cambridge University Press,1948), p.128. Analogous views were expressed by Edwards & Townsend(1965), pp.147-48. Chinitz in an important empirical study of the impact of transport developments on the New York Region has argued that transport costs have recently begun to rise relative to other costs after a long period of relative decline. (cf. ch. 9 below). Benjamin Chinitz, Freight and the Metropolis: The Impact of America's Transport Revolutions on the New York Region, New York Metropolitan Region Study (Cambridge, Mass.: Harvard University Press,1960), ch.5.

of Mr. Heath's Government in Britain (see ch.4).

The Permissive School.

The quintessence of the permissive position as defined here is that adequate transport is essential to economic development in a passive sense but the stimulative effects resulting from its provision are largely confined to the period of construction. This view is compatible with the balanced growth doctrine as propounded by Rosenstein-Roden,[1] Nurkse (1953), Scitovsky,[2] etc.[3] A more explicit statement, however, has been provided by Heymann[4] who, after ascribing activist beliefs to faith rather than facts ("there is no evidence that endowing a country with highway or rail transportation will ensure that new industrial or agricultural activity will result") concluded that transport investments must be seen as permissive in their effects, i.e., essential to other economic activities but not able necessarily to evoke them. Similar views have been presented by Singer (1951), Soberman[5] and Youngson(1967).

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[1] P.N. Rosenstein-Rodan, "Problems of Industrialisation of Eastern and South-Eastern Europe," Economic Journal, LXIX (June-September 1943), 202-11.

[2] Tibor Scitovsky, "Two Concepts of External Economies," Journal of Political Economy, LXII (April 1954), 143-51.

[3] We are not suggesting here that the doctrine originated with Rosenstein-Rodan. Streeten(1959) traced it back to Friedrich List (The National System of Political Economy, 1841). Nurkse seemed to alter his views on balanced growth towards the end of his life(he died on 6 May 59). In his 2nd Turkish lecture delivered in 1957 (but not published till 1961) he argued that the balanced growth doctrine applied only to "direct" (i.e., non-OC) investment, that excess OC could induce complementary direct investment (or vice versa), and that OC in a development context should be built ahead of demand. This was not the windmill that Hirschman, et al, were tilting at! See Nurkse, "Some Reflections on the International Financing of Public Overhead Investments" and "Appendix: Notes on 'Unbalanced Growth'," in Equilibrium and Growth in the World Economy: Economic Essays, ed. by Gottfried Haberler and Robert M. Stern, with an Introduction by Haberler, Harvard Economic Studies, Vol.CXVIII (Cambridge, Mass: Harvard University Press, 1961), pp. 259-78 & 278-81.

[4] Hans Heymann, Jr., "The Objectives of Transportation," in Transport Investment and Economic Development, ed. by Gary Fromm, Transport Research Program (Washington, D.C. : Brookings Institution, 1965), pp. 18-33.

[5] Richard M. Soberman, Transport Technology for Developing Regions: A Study of Road Transportation in Venezuela (Cambridge, Mass.: M.I.T. Press, 1966), p.1.

But overall, despite the reasonableness of their claim, it would seem that the permissives, like the activists, constitute a minority school of opinion.

The Agnostic School.

The agnostics, by definition, have not made up their minds concerning the role of transport in economic development. Cole, for example, has argued that our knowledge of the effects of improved transport upon economic growth is too fragmentary for the developed countries to be of much guidance to the less developed.[1] Fromm went even further asserting that both relevant theory and research were lacking,[2] that no country's experience could readily be generalised "except for technological characteristics" and that, contrary to Tinbergen who had concluded that all developing countries should invest 20-25% of their total capital resources in transport,[3] there was no point looking for "any universal rule for resource allocation to transport investment".[4] Bruton (1968) also pleaded agnosticism: "Within the constraints of present knowledge the only safe generalisation seems to be that the best /development/ strategy depends very much on the situation prevailing at the time the /development/ plan is made" (p.288). On the other hand, he felt confident enough to aver that a region with a superior endowment of OC had an advantage over competitor regions: "There are . . . . . many factors that affect the pattern of regional development, but the building of SOC is perhaps one of the most strategic and the one most susceptible to control by central authorities" (p.289). Christopher Foster while Director General of Economic Planning at the GB Ministry of Transport observed that the economic effects of new transport investments were "notoriously ambiguous"; indeed, as of 1968 the problem of measuring these effects had scarcely been tackled.[5] It should be stressed that the agnostic

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[1] Leon Monroe Cole, "Transport Investment Strategies and Economic Development," Land Economics, XLIV (August 1968), 308.

[2] Gary Fromm, "Introduction: An Approach to Investment Decisions" in Fromm, ed. (1965), p.1.

[3] Jan Tinbergen, The Design of Development (Baltimore: Johns Hopkins Press, 1958), p.31.

[4] Fromm, "Design of the Transport Sector," in Fromm, ed.(1965),p.90.

[5] Christopher Foster, "Future Research Needs of Transport Planners," in Forecasting and the Social Sciences, ed. and introduced by Michael Young (London: Heinemann for the Social Science Research Council,1968), p.81.

school is not denying the importance of a certain amount of investment in transport, regardless of the country concerned. Indeed, to do so would be absurd. As Owen has written in what is an excellent summation of the agnostic position with its emphasis upon pragmatism:

> maximum growth will be possible only if transport capacity is available to sustain it . . . . a fully adequate system of transport is in turn one of the prerequisites of economic growth. Transport plans, therefore, need to be an integral part of broad social and economic development plans rather than being conceived in isolation. Furthermore, the historical tendency to view each form of transport separately and without relation to the others has become untenable.[1]

The key difference really between the agnostics and the permissives is that the latter have definitely ruled out the possibility of an activist role for transport whereas the former have not. In numerical terms, the agnostics probably form the most populous single school of opinion although their paramountcy is being challenged increasingly by the permissives and the doubters, especially in nations with relatively mature economies.

The Doubters

Doubters do not dispute that transport has utility; they do deny that it is any more significant from a development point of view than other relevant economic variables. In fact, this is one of the main differences between doubters and permissives for the latter attach a disproportionately large amount of weight to transport considerations. Another difference is the way in which the two groups regard the provision of transport. Doubters have a tendency to take the existence of adequate transport infrastructure for granted. They appear to assume that supply will automatically adjust itself to demand in much the same way that retail outlets spring up to provide consumer

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[1] Wilfred Owen, The Transport Revolution in Europe, Reprint No.53 (Washington, D.C.: Brookings Institution, 1961), p.311. See also Owen "Transportation and Economic Development," Special Problems Facing Underdeveloped Countries, American Economic Review, XLIX (May 1959), 179-87.

goods to a growing population. Permissives, in contrast, are much less cavalier, looking upon transport as something which should be planned, not only to avoid bottlenecks, but to minimize the danger of over-supply inherent in a more laissez-faire strategy.

Doubters are a relatively recent phenomenon reflecting their confinement, by and large, to the so-called advanced countries of the world. Their initial appearance more or less coincided with the emergence of the view that transport costs were no longer the prime determinant of most industrial location decisions (*cf.* the section on location theory below). Colin Clark has attributed this intellectual development to the Barlow Report (1940 - see our ch.4); by the late 1950s he was asserting categorically with regard to Britain that "The old idea about transport costs is hopelessly inapplicable . . . . except for a few 'heavy industries' . . . transport costs represent only a trivial proportion of costs of production."[1] Marvin Barloon in the U.S. extended the argument to suggest that transport was a lagging rather than a leading variable:

> Changes in the structure of transportation appear to be principally responses to changes in the structure of the national product and in the consequent changes in transport requirements of the shipping and receiving industries. For the most part, changes in industrial output and in location appear to alter the structure of transportation, rather than the converse.[2]

A theoretical treatise on CC by Cootner pointed in the same direction.[3]

One might mention finally a comprehensive 'state of the art' report on the role of transport in regional economic development commissioned by the U.S. Government.[4] It concluded that additional

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[1] Colin Clark, "Transport-Maker and Breaker of Cities," Town Planning Review, XXVIII (January 1958), 244.

[2] Marvin J. Barloon, "The Interrelationship of the Changing Structure of American Transportation and Changes in Industrial Location," Land Economics, XLI (May 1965), 169.

[3] Paul H. Cootner, "Social Overhead Capital and Economic Growth," ch.15 in Rostow, ed. (1964).

[4] Charles River Associates Incorporated, The Role of Transportation in Regional Economic Development, a state of the art report prepared for the Office of Regional Economic Development, U.S. Department of Commerce (Cambridge, Mass.: Charles River Associates Incorporated, c.1966).

transport investments, on the whole, would not greatly influence regional development patterns in the U.S.,[1] that direct transport costs were diminishing in importance as an industrial locational factor,[2] that, contrarily, the quality of transport services, e.g., speed, frequency, ubiquity and safety, was growing in importance, and that a region desirous of further development should ensure that it had, as a minimum, a good intra-regional highway system in order to attract local market-oriented industry and the adequate inter-regional air links essential to many footloose firms. While it acknowledged the general lack of an integrated theory "on the role of transportation networks in regional development programs," the report suggested that transport investments could have an active developmentaleffect in either of two ways: 1) by giving a particular region a differential advantage, 2) by eliminating specific bottlenecks. But in the U.S. context, any differential advantages were bound to be short-lived, and bottleneck elimination could never be of more than marginal import - hence the general conclusion already cited.

Conclusions

Consensus is lacking on the role of transport in economic development. Of the four relevant schools of thought which we have identified, the activists have attracted the most attention, not least because they have made some of the most stimulating theoretical contributions to the subject. Yet these contributions have proved disappointing in operational terms; that is to say, they have not answered satisfactorily two key questions: 1) how much transport investment of specific kinds does development require? 2) what should be the timing of transport investments relative to other types? Since neither the permissives nor the doubters have been able to do any better than the activists, the agnostics, with

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[1] "it is difficult to disagree with those economists who see little direct leverage left to transportation in shaping the future profile of regions." Ibid., p.50.

[2] "Transportation costs are losing their privileged ranking in the locational calculus." Ibid., p.71.

their pragmatic bias, have perforce dominated the field. This judgement applies to both the national and regional levels of analysis.

Charles River Associates (c.1966) have suggested that an integrated theory linking transport and regional development might consist of contributions from seven different specialities, viz.:

1) international trade theory, e.g., the trade multiplier concept
2) economic base theory
3) regional and interregional input-output analysis[1]
4) location theory and agglomeration economies
5) interregional linear programming
6) benefit-cost analysis and capital budgeting techniques
7) simulation models.

To this list should be added overhead capital theory.

Location Theory

A plethora of outpourings on the general subject of location theory has appeared over the years and there is little need to survey the field yet again except in the barest possible way. One of the earliest but still useful surveys was made by Dennison (1939, ch.I). He devoted particular attention to the work of Weber (1909),[2] the only widely-accepted theory of location extant at the end of the 1930s. In essence, Weber hypothesised that firms would locate ceteris paribus where their transport costs were lowest. But Dennison argued that Weber's theory generally was "almost useless" as a working tool[3] for several reasons including its failure to distinguish clearly between the firm and the industry and its complete disregard of the intra-firm location decision-

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[1] Cf. William H.Miernyk, The Elements of Input-Output Analysis (New York : Random House, 1965), ch.4.

[2] For full references to the work of the various theorists cited in this and the following paragraph, consult the surveys mentioned.

[3] He was not alone in this view, even at that time. For instance, John Jewkes argued in a review of Weber's theory that it was impractical and largely unrealistic: Economic Journal, XLIII (September 1933), 506-07.

making process.[1] In a cognate article, he concluded that until a theory of greater substance than Weber's was developed, policy-making with regard to the location of industry "must necessarily be set in a framework of blundering empiricism."[2]

Greenhut, a location theorist in his own right, provided a more up-to-date survey of the field in 1956.[3] He classified the various contributions to the subject as follows: 1) least-cost location theories, e.g., von Thunen (1826), Weber (1909) and Hoover (1948 - see above); 2) market area theories, e.g., Launhardt (1885), Clark (1914), Fetter (1924) and Losch (1940);[4] and 3) locational interdependence theories, e.g., Hotelling (1929), Lerner & Singer (1939), Smithies(1941) and Chamberlin (1948 - see below). Only the theories in the initial group with their emphasis upon transport costs call for special comment here although the others are generally germane to our interests. Von Thunen's work related solely to the location of agricultural activities. Weber's theory has already been discussed. Hoover's ideas were cast in the Weberian mould but represented an improvement on those of his mentor. They are summed up in the following quotation as they pertain to transport costs and the location of the individual firm: "As a rough generalisation, one can say that early stages of production are material-oriented and late stages are market-oriented while intermediate stages are relatively

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[1]This subject continued to be ignored till the 1960s. Cf. three cognate studies by P.M. Townroe - "Locational Choice and the Individual Firm," Regional Studies,III (April 1969), 15-24; "Managerial Behaviour and the Migration of Industry: A Study in Industrial Decision-Making," report prepared for the Centre for Environmental Studies, September 1969; "How Managers Pick Plants," Management Today, October 1970, pp. 50, 54 & 56.

[2]S.R. Dennison, "The Theory of Industrial Location, "Manchester School, VIII (March 1937), 24.

[3]Melvin L. Greenhut, Plant Location in Theory and in Practise: The Economics of Space (Chapel Hill: University of North Carolina Press, 1956), pp. 1-100.

[4]For a distillation of Losch's main ideas, see Stefan Valavanis, "Losch on Location," reprint 1 in Regional Economics: A Reader, ed. by Harry W. Richardson (London: Macmillan, 1970), pp.32-41. In Richardson's view, Losch and Weber are the two greatest names in the history of location theory.

'foot-loose' as to transfer considerations."[1] In Greenhut's opinion, transport costs were a decentralizing influence with the degree of dispersion being related to the size of the transport cost burden. Transport assumed a "governing" role in location decisions either when transport charges were high relative to total costs or when the transport cost burden varied widely from site to site. It followed that the two types of transport data vital to informed location decision-making were a) spatial variations in transport costs, and b) transport cost/total cost ratios. Firms were rightly material-oriented when their inputs were perishable and/or when procurement costs were "much greater" than distribution outlays. A market location was most desirable when distribution costs exceeded procurement charges, when output was perishable, when customer demand was capricious or volatile, and/or when a strong market position depended on close contact with customers.

More broadly, Greenhut argued that a general theory of plant location must include: 1) cost factors, 2) demand factors, 3) cost-reducing factors, 4) revenue-increasing factors, 5) personal cost-reducing factors, 6) personal revenue-increasing factors, " and perhaps " 7) purely personal considerations.[2] "It is only by

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[1] Op. cit., p.46.

[2] Cf. D.E.C. Eversley, "Social and Psychological Factors in the Determination of Industrial Location," in Papers on Regional Development, ed. by Thomas Wilson, supplement to the Journal of Industrial Economics, XIV (Oxford: Basil Blackwell, 1965), pp. 102-14. Eversley argued inter alia that intra-UK communications were relatively poor. This handicapped distribution of industry policy. A good communications network was essential in his judgment, not only to industrial firms, but also to their employees as individuals. He therefore recommended for every DA that "Large modern civil airports with frequent cheap communications with London and the continent must be established, if necessary with a subsidy." - cf. chs. 3-6 below. E.A.G. Robinson has argued that "many location-decisions are influenced by rather minor considerations of personal preference or convenience, rather than by major differences of cost." "Location Theory, Regional Economics and Backward Areas," paper submitted to the Conference on Backward Areas in Advanced Countries, International Economic Association, Varenna, Lake Como, Italy, 28 Aug-4 Sep 67, p.9 (Underlining added). In the same vein, Tarrant concluded that "The quantitative expression of personal factors remains a major obstacle to the construction of more complex models of industrial location." Consequently, more and more attention was being given by theorists to the concept of the "permissive location", i.e. one which allows profits to be made but not necessarily maximum profits. John R. Tarrant, "Industry in South-East Ireland: A Study in Industrial Location", Irish Geography, V (No. 5, 1968), 441.

ascertaining the impact of each of these types of factors on the site-selection(s) of a firm that a complete understanding of the forces guiding the location of its plant(s) can be acquired." [1] Existing theories in his view all had a common failing, viz., they assumed that firms were concerned solely with maximizing profits. He attempted to remedy this defect by advancing a general maximum-profit theory in which psychic income could be given a monetary value and considered as part of profits.

Alonso(1964),[2] noting that work on the development of "the theory of the location of the firm" had more or less come to an end by the late 1950s due to diminishing returns, saw "the theory of market areas" as being the key to the future. Specific limitations to extant location theory in his opinion were its failure to cope adequately with demand, with internal economies of scale,[3] with the multi-product firm, with the reaction of competitors to location decisions,[4] with external economies and diseconomies, with uncertainty, and with time. With regard to the role of transport costs, he argued on a variety of a priori grounds (in concert with many others)[5]

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[1] Op. cit., p.177.

[2] W. Alonso, "Location Theory" reprint 10 in Needleman, ed.(1968), pp. 337-66.

[3] Cf. Ronald S. Edwards and Harry Townsend, Business Enterprise: Its Growth and Organisation, Papermac 10 (London: Macmillan & Co. Ltd.,1965), ch. VII, "Economies of Scale and Costs of Transport and Communication".

[4] Cf. Walter Isard, "Game Theory, Location Theory and Industrial Agglomeration," reprint 2 in Richardson, ed.(1970), pp. 42-54.

[5] But note the caveat put forward, for example, by Florence who cautioned that while the weight and influence of transport costs as a location factor had frequently been exaggerated "it should be borne in mind that in private business it is the proportion of costs to profit not to total costs that is significant . . . a /small/ proportion of costs spent on transport may mean quite a large ratio of transport costs to profit. It should further not be forgotten that cost of transport may be low, for the very reason that in choosing location and size of plant care was taken to make it low." P. Sargant Florence, assisted by W. Baldamus, Investment, Location and Size of Plant, National Institute of Economic and Social Research, Economic and Social Study No.VII (Cambridge: Cambridge University Press,1948), p.128. Analogous views were expressed by Edwards & Townsend(1965), pp.147-48. Chinitz in an important empirical study of the impact of transport developments on the New York Region has argued that transport costs have recently begun to rise relative to other costs after a long period of relative decline. (cf. ch. 9 below). Benjamin Chinitz, Freight and the Metropolis: The Impact of America's Transport Revolutions on the New York Region, New York Metropolitan Region Study (Cambridge, Mass.: Harvard University Press,1960), ch.5.

Theories of the Firm

The classical and neo-classical theories of the firm are in fact of very little interest here because they largely ignore transport costs.[1] Marshall, in the 8th edition of his Principles, noted that better communications contributed to the polarisation of industry, and that large firms were nearly always able by virtue of their size to secure more advantageous freight rates than small businesses,[2] but did not develop these themes in any depth. Indeed, he explicitly eschewed spatial in favour of temporal analyses. Chamberlin included a discussion on pure spatial competition in his Theory of Monopolistic Competition but confined it to an appendix.[3] More generally, the mainstream economic theorists disposed of communications considerations by assuming away spatial variations in prices and costs.[4] Pullen[5] has shown how neo-classical theory can be made slightly more realistic by treating transport costs as one type of selling cost rather than as a cost of production.[6] Nonetheless, our previous judgment remains unaltered, viz., that the traditional theory of the firm per se has little direct relevance to this study.

This conclusion does not apply, however, to an offshoot of the traditional theory, i.e., the attempts currently being made to merge

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[1] Location theory, while it would clearly be one aspect of any comprehensive theory of the firm, has never been considered part of mainstream economics.

[2] Alfred Marshall, Principles of Economics: An Introductory Volume, Papermac 16 (8th ed.,; London: Macmillan & Co. Ltd., 1961), pp. 227 & 235.

[3] E.H. Chamberlin, The Theory of Monopolistic Competition: A Re-orientation of the Theory of Value, Harvard Economic Studies, Vol. XXXVIII (6th ed.; London: Oxford University Press, 1948), App. C, pp. 260-65.

[4] On the reasons for this neglect of space, see Richardson (1969), pp. 1-5.

[5] M.J. Pullen, "Transport Costs and the Disappearance of Space in the Theory of the Firm," Yorkshire Bulletin of Economic and Social Research, XVI (May 1964), 3-14. For a brief critique, see Michael Chisholm, "Transport and Regional Development in Great Britain," paper presented to the Conference on Older Industrial Areas sponsored by the Regional Studies Association, University of Glasgow, 20-22 Mar 68, p.1.

[6] Cf. Chamberlin, op.cit., pp. 123-25.

the economic theory of the firm with organisation theory. Papandreou[1] was one of the first to highlight the complete lack of organisational content in the traditional theory.[2] Drawing on the work inter alia of Barnard,[3] Gordon[4] and Simon,[5] he conceptualised the modern firm as a system of consciously coordinated activities in which the nature and quality of intra-firm communications were of key importance.

According to Barnard's theory of formal organisation, an organisation is comprised of three elements: 1) communication, 2) a willingness to contribute effort, and 3) a common purpose. But they vary in significance:

> In an exhaustive theory of organization, communication would occupy a central place, because the structure, extensiveness, and scope of organization are almost entirely determined by communication techniques.[6]

The need for communication is the limiting factor on the size of simple organisations and a dominant consideration in the structure of complex ones. Communication increases beyond what it would otherwise be when an organisation's purpose is complex or abstruse, when precise

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[1] Andreas G. Papandreou, "Some Basic Problems in the Theory of the Firm," in A Survey of Contemporary Economics, Vol.II, ed. by Bernard F. Haley (Homewood, Ill.: Richard D. Irwin, Inc., for the American Economic Association, 1952), pp. 183-219.

[2] K.E. Boulding was another. See his "Implications for General Economics of More Realistic Theories of the Firm," Issues in Methodology, American Economic Review, XLII (May 1952), 35-44. Contrarily, some theorists saw little point in pursuing the course of action advocated by Papandreou and Boulding. See, for example, Edward S. Mason's "Comments" on Papandreou's article (Haley, 1952, pp. 221-22) and Edith T. Penrose, The Theory of the Growth of the Firm (Oxford: Basil Blackwell, 1963), p.14.

[3] Chester I. Barnard, The Functions of the Executive (Cambridge, Mass.: Harvard University Press, 1966). 1st published - 1938.

[4] Robert Aaron Gordon, Business Leadership in the Large Corporation (Berkeley: University of California Press in cooperation with the Brookings Institution, 1961). 1st published - 1945.

[5] Herbert A. Simon, Administrative Behavior: A Study of Decision-Making Processes in Administrative Organization (2nd ed.; New York: Macmillan Company, 1957). 1st published - 1945.

[6] Barnard (1966), p.91.

coordination is required, when the action required of an organisation member is difficult to comprehend or explain, and in non-routine situations. Barnard stressed that a large part of the total volume of intra-firm communication is informal in nature. Among his many suggestions was the idea that all organisations have a tendency to expand.[1]

Basing his arguments upon 65 detailed case studies, Gordon demonstrated how key decisions are made inside the large corporation. The professionalisation of management, the weakening of the profit motive, the growing resistance to price changes as a competitive weapon, the increased emphasis on advertising and long-range planning, the presence of multiple and partially-conflicting goals, etc. all emerged from his analysis with force and clarity.

Simon introduced the concept of 'administrative man' as opposed to the maximizing entrepreneur or 'economic man' postulated by economic theorists, and suggested that the 'satisficing' behaviour characteristic of administrative man was the norm in the large corporation. Satisficing behaviour was defined as looking for a course of action that was satisfactory or good enough rather than optimal. Managers satisficed because they lacked the wits to maximize. The main purpose of Simon's 1945 study was to set forth a comprehensive body of concepts suitable for describing the way in which an organisation actually functions.

Despite the promising nature of these early developments, however, and the length of time which has now elapsed since they were first made public, a great deal of work remains to be done before the integration of the theory of the firm and organisation theory can be considered to have been satisfactorily achieved. Cyert & March, for instance, could report very little progress towards this goal during the decade following the appearance of the Papandreou and Boulding articles.[2] Part of the

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[1] Penrose (1963, ch.V) reiterated this judgment insofar as it pertained to incorporated firms.

[2] Richard M. Cyert and James G. March, A Behavioral Theory of the Firm (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1963), p.16. See also Kalman J. Cohen and Richard M. Cyert, Theory of the Firm: Resource Allocation in a Market Economy, Prentice-Hall International Series in Management (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965), especially chs. 16 & 17. For example, some work which Cyert & March did during the mid-1950s was later abandoned as "not fruitful." Cf. their article, "Organizational Structure and Pricing Behavior in an Oligopolistic Market," AER, XLV (March 1955), 129-39, and their 1963 book (op.cit.), p.71.

problem was the unsatisfactory state of organisation theory itself. Furthermore, the extant literature on the subject had but tangential relevance to the economic world. Indeed, Cyert & March concluded that the organisation theory available in 1963 provided only " a very partial basis for a new theory of the firm."[1] That things had not progressed much further by the latter part of the 1960s is suggested by the acrimonious exchange between J. Kenneth Galbraith and Robert M. Solow in Public Interest.[2] Solow, while arguing that Galbraith's The New Industrial State was generally "a book for the dinner table not for the desk," agreed with his apparent nemesis that modern economics had failed to come to terms with the large corporation. Galbraith, in reply, accused Solow of making "ad hominem observations" and of being more concerned with supporting the professional establishment than debating the merits of unconventional views.

Mention might be made finally of some relevant theoretical work on the adaptability of the firm to its environment. Alchian,[3] for example, criticized the traditional theory of the firm for its failure to cope with uncertainty and for its unrealistic emphasis upon profit maximisation. He propounded an alternative view featuring the principles of biological evolution and natural selection. The economic system was visualised as an adoptive mechanism. A firm's survival prospects depended on its profitability but, in the face of uncertainty, profitability was a function of luck as well as adaptive behaviour on the part of the firm. Adaptive techniques included imitation of long-lived firms and trial and error. While they were neither essential to nor a guarantee of survival, such techniques could prove helpful and it was likely that they would be widely utilized.

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[1] Ibid., p.18.

[2] "The New Industrial State: A Discussion," Public Interest, No.9 (Fall, 1967), 100-19.

[3] Armen A. Alchian, "Uncertainty, Evolution, and Economic Theory," Journal of Political Economy, LVIII (June 1950), 211-21. For a critique, see Edith Tilton Penrose, "Biological Analogies in the Theory of the Firm," American Economic Review, XLII (December 1952), 804-19.

Simon, in an important survey article,[1] described the firm as an adaptive organism. To predict the behaviour of such a body, in his opinion, was not an easy task:

> it is not enough to know its goals. We must know also a great deal about its internal structure and particularly its mechanisms of adaptation . . . . . in an organism having a multiplicity of goals, or afflicted with some kind of internal goal conflict, behaviour could be predicted only from information about the relative strengths of the several goals and the ways in which the adaptive processes responded to them.[2]

The difficulties implicit in this argument were compounded by the need to distinguish between the objective environment in which the "economic actor" actually lives and the subjective environment that he perceives and to which he reacts: "When this distinction is made, we can no longer predict his behaviour - even if he behaves rationally - from the characteristics of the objective environment; we also need to know something about his perceptual and cognitive processes."[3]

Burns & Stalker, in a widely acclaimed work,[4] used the terms, "mechanistic" and "organic", to distinguish between management structures geared to relatively stable conditions and to change respectively. They hypothesized that "When novelty and unfamiliarity in both market situation and technical information become the accepted order of things, a fundamentally different kind of management system becomes appropriate from that which applies to a relatively stable commercial and technical environment."[5] This general thesis was corroborated by their study of major electronics firms in England. However, the underlying bipolar classificatory system has recently been found wanting by a research team at Ashridge Management College in a study of family firms in the printing industry.[6] On the other hand, the Ashridge group have proposed some

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[1] H.A. Simon, "Theories of Decision-Making in Economics and Behavioral Science," AER, XLIX (June 1959), 253-83.

[2] Ibid., 255.

[3] Ibid., 256.

[4] Tom Burns and G.M. Stalker, The Management of Innovation (2nd ed.; London: Tavistock Publications, 1966). 1st published - 1961.

[5] Ibid., p.vii.

[6] See Philip Sadler, "Industrial Change and Management Organisation," working paper prepared for the Social Science Research Council conference on social science research inside and outside government, Bristol, 1969.

modifications to the Burns-Stalker taxonomy which look hopeful.

Conclusions

Three main conclusions follow from this brief review of germane theories of the firm. First, the traditional theory with its inattention to spatial and organisational matters has very little relevance to our hypotheses. Secondly, much more pertinent and helpful is the so-called 'managerial literature' on the firm which, as Penrose (1963, p.4) remarked, has been "sadly neglected" by economists. Thirdly, this literature to date, while insightful, has yet to be synthesised into a comprehensive and widely accepted new theory.

Summary

Three bodies of received theory have been discussed in this chapter: 1) the theory of regional economic development, 2) location theory, and 3) the theory of the firm. Our purpose has been to shed theoretical light on the hypotheses set forth in chapter 1 and to illustrate something of their intellectual ancestry. In fact, we have shown that agreement concerning the part played by transport in the development process has so far proved unattainable, that the subject of communications, narrowly defined, and economic development has been virtually ignored in the literature, that location theory is a shambles in operational terms although it is far from being without value, and that the managerial literature on the firm is much more relevant to mobility research than the traditional theory which is practically void of spatial and organisational content. We look next at the role of communications in regional development as seen by selected contemporary British lobbyists.

CHAPTER 3

LOBBYIST VIEWPOINTS

In chapter 1 we propounded a divergence of views between lobbyists and researchers on the need for improved communication in Britain as part of a revamped regional policy. Lobbyists were defined (implicitly) as promotional bodies such as the CBI and the Scottish Council. The purpose of this chapter is to set out the arguments of selected lobbyist groups on the subject of communications and regional policy more fully. We begin with the CBI, distinguishing between the national organisation and its Scottish wing.

Confederation of British Industry (CBI)

Critical of the government's plans to introduce the Regional Employment Premium[1] and appoint the Hunt Committee[2] as announced in May 1967, the CBI initiated a comprehensive review of government regional policy and the incidence of regional development problems with two objectives in mind: a) the preparation of evidence for presentation to Hunt and his colleagues, b) influencing regional policy generally. Its results were published in two parts. The first, the evidence to the Hunt Committee, appeared in March 1969. More general policy recommendations followed in September. Contrary to the now conventional wisdom which accords a rather low position to transport and communication costs in the hierarchy of causes of regional retardation, both CBI documents stressed the importance of improved communications. Indeed, they argued that good communications together with an ample supply of trained or trainable labour were the

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[1] Introduced 4 Sep 67. Cf. McCrone (1969), pp. 136-38 & ch. VIII. The Scottish Council was also critical of the REP; it suggested that the money involved, some £100m a year, might better be spent on communications and other infrastructure.

[2] Appointed 21 Sep 67.

key factors in manufacturers' location decisions.[1] McCrone (1969), in his study of British regional policy, concluded that: "Probably no other Western European country employs such a comprehensive range of measures, and few give regional development the priority which Governments of both major political parties in Britain have done in the 1960s."[2] But even the exemplary British regional effort, according to the CBI, was likely to prove abortive unless industrialists could be made to feel "reasonably assured" concerning the adequacy of communications and labour supply in the areas selected for development.

Of the two overriding location factors identified by the CBI, good communications was seen to be the more important in terms of government action to help the Development Areas since, by definition, sufficient labour reserves were already in place. This preference was stated as follows:

> We . . . recommend the Government to make the improvement of infrastructure the first priority on their list of items of direct expenditure in the regions. The value of this expenditure is clearly proved by the effect of work already completed in Scotland, the Northern Region and the South West. Communications are of particular importance. . . . This expenditure should, as far as possible, be recovered from users.[3]

Working parties were set up by the CBI in each of its component regions, excluding NI (presumably because the Hunt Committee was EI- rather than UK-oriented), to undertake detailed studies as inputs

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[1] The late Professor D.J. Robertson was rather puzzled by the CBI stress on communications, at least to the extent that it related to executive travel, because in his experience intra-UK business travel facilities were generally excellent. He suggested that the CBI view might reflect a London-based organization's ignorance of travel realities in the country, i.e., Londoners sometimes exaggerated the difficulties involved in travelling to and from the peripheral regions. Private interview, 20 Mar 69. Cf. the conflicting views of CBI (Scotland) and the Scottish Council on this subject below. See also Frances Cairncross, "Bridging the Skills Gap," in "Scotland: A Special Report," The Times, 23 May 69, p.I. Miss Cairncross argued that the alleged difficulty of travelling to and from Scotland was an important reason for the unpopularity of the region with southern executives. Cf. "Demand for Executives Falls Off," The Times, 6 Nov 69, p.20. This article reports that Scotland is the most unpopular region of the UK with British executives seeking management posts.

[2] Op.cit. p.271.

[3] CBI Regional Study, p.2 of "Recommendations" section.

to the national review. Summaries were included as appendices to the evidence presented to the Hunt Committee. The GOR regions are coterminous with the official economic planning regions delineated in 1964. Noteworthy is the fact that nine out of the 10 working parties agreed on the need for better communications as an ingredient of their regional strategies for the future despite substantial differences of opinion on other matters. Paradoxically, the sole exception was the Scottish body which rejected a regional policy embracing infrastructural improvements and cash incentives to industry on the ground that it had already been tried in Scotland and found wanting. Instead, a policy having as its centrepiece a regionally-differentiated corporation tax was advocated. We return to the Scottish viewpoint below.

The strongest espousals of the need for better communications as an aid to development were contained in the Welsh, South-West and Midland summary reports. The Welsh document stated bluntly that:

> Shortages of trained labour and poor communications are the basic disadvantages of the Region. The present incentives are no compensation for them . . . Industry could be attracted to most parts of Wales if skilled labour were available and communications were better.[1]

Equally emphatic were the South-West and Midland reports. The former asserted, for example, that:

> Communications in the South-West - road, rail and telephone - need urgent improvement.

The South-East report, in a list of the factors influencing the mobility of firms, argued that:

> Good communications are vital for transporting materials, products and labour, as well as management contact. Adequate telephone communications are always needed.

An interesting comment on the transport cost penalty confronting manufacturers located at some distance from major national markets appeared in the report of the Northern Region:

> The remoteness of the Region, and the consequent communications difficulties with the corollary of higher transport costs, is a further disadvantage . . . Though the differentials may not be high, the thought of them, and the possible delays, will divert orders from customers in other parts of the country.

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[1] The argument in favour of improved communications for Wales was put even more strongly by the Welsh Liberal Party in its pamphlet, Life to a Nation: An Economic Policy for Wales (Aberystwyth, 1969) which averred that: "Communications are of the essence of development . . ." See also "Roads Vital to Economic Rebirth," in "Industrial Wales: A Special Report," The Times, 24 Nov 69, p. IV; Peter Jay, "A Welsh Awakening," The Times, 7 Aug 70, p.19. Jay emphasised not only the commercial effects of better communications, but also the psychological benefit in the form of a reduced sense of isolation.

The most specific comment on the role of communications was contained in the North-West regional report:

> Good communications are vital to the continued operation of branch factories, especially in the case of small companies.

CBI's emphasis on improved communications was explicitly related to its advocacy of a growth point development strategy for each of the official economic planning regions. It was argued that new investment in communications facilities should be concentrated on a limited number of growth areas to be selected by the Regional Economic Planning Councils according to the criterion of "inherent suitability". It was suggested, in other words, that the government should pursue a policy of restricting major communications improvements to those existing or potential growth areas having the greatest natural advantages. This would increase the likelihood of the total development effort being a success while minimizing public investment and diminishing the likelihood of waste. The CBI position, an essentially permissive one, was presented in largely *a priori* terms; there was little attempt to substantiate the various assertions with either facts or theory. Nevertheless, given the importance of the CBI and the pragmatic nature of its regional working parties, the proffered arguments merit careful attention.

CBI Scotland

In view of the surprising opinions on communications and regional development advanced by the CBI's Scottish Working Party, as noted earlier, the matter was raised with the organization's Scottish Regional Secretary, Mr Hamish D. Grant,[1] to determine what lay behind the published report. He argued that, for many companies, transport costs were of the same order of significance as petty cash. It followed that better communications were not sufficient in themselves to attract much investment to an area although a basic level of facilities was essential. In Scotland, for example, communication facilities were generally more than adequate by 1969 yet the Scottish economy had not improved dramatically as a consequence. Thus, new thinking was necessary. CBI's regional offices in England and Wales

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[1] Private interview, 16 Dec 69.

had not yet appreciated this fact because their situations were different; congestion was frequently worse in their areas for instance. However, they would come round to the Scottish viewpoint in time.

Needless to say, Mr Grant's observations were not accepted by all members of the CBI in Scotland, not because of their permissive tenor, but because of the suggestion that adequate communications capital was already in place and the de-emphasis of transport costs. This was evident, for example, at the hearings held by the House of Commons Select Committee on Scottish Affairs in Glasgow on 15 December 1969.[1] Two separate CBI (Scotland) teams gave evidence, one in the morning, the other in the afternoon. Transport was among the items discussed at the first session. It was asserted by Mr James Robertson, chief CBI spokesman on the subject, not only that good communications were vital to Scottish industry, but that air transport arrangements needed improvement; the responsibility for airports in Scotland was fragmented and businessmen lacked direct air access to the Continent. Mr M.F.G. Wylie, CBI Chairman in Scotland, replying to a question by Mr George Lawson, M.P., concerning the reasons for the apparent lack of enterprise in Scottish firms relative to foreign competitors, emphasised Scotland's geographic location and the resulting communications problems. Later in the day, however, he said, "I don't understand my colleagues in the South," when asked why they laid much stress on improved communications. Prima facie, these replies suggest a certain ambivalence in his attitude towards the subject as if he could not make up his mind. During the second session, Mr George Perry, chairman and managing director of General Motors (Scotland) Ltd., commented that distance was a very real problem for his company's factory in Peterhead (entry 297 in Appendix A below). In fact, the Peterhead works was only able to survive by paying wages 20-30% less than those being paid at the GM plant in Bowhouse (entry 296, App. A).

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[1] This paragraph is based on personal notes taken at the hearings.

On balance, it would seem that CBI (Scotland) overstated its indifference to improved communications in its written submission to the Hunt Committee. Nonetheless, it remains true that the Scots were much less interested in the subject than the English or the Welsh, not because they thought communications were unimportant per se, but because Scotland in their opinion had a surfeit of communications capital brought about in part by the failure of previous public investment to generate sufficient complementary private capital expenditure.

Scottish Council (Development and Industry)

In comparison to the CBI's argument, the Scottish Council's case for better communications, as developed in its 1969 pamphlet,[1] was a model of sophistication. The Toothill Report, published by the Council in November 1961,[2] had called for three types of improvement to Scotland's communications network: 1) better air services, both domestic and international, 2) improved rail freight services, and 3) accelerated investment in trunk roads and automatic telephone facilities. Apart from direct air links with the Continent, these goals had been largely achieved by 1969, although in the opinion of the Council "there has never been any real sign that governments accept the true role of the character and quality of communications in shaping the country's industrial structure: gains have been made slowly and painfully."[3] Nonetheless, there was little cause by the end of the 1960s to bemoan the reception accorded the Toothill document. Indeed, the main concern of the Council's 1969 "working paper" was not with communications as such, but with the increasing concentration of industrial decision-making in London[4] and the consequences of this trend for the Scottish economy.

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[1] Centralisation.

[2] Scottish Council, Inquiry into the Scottish Economy, 1960-61, Report of a Committee, John N. Toothill, chairman (Edinburgh: Scottish Council [1961]).

[3] Centralisation, p.11. Mentioned (p.8) as cases in point were aviation and telephones.

[4] Alan W. Evans has suggested that the Council may have exaggerated the extent to which centralisation is occurring. See his "Planning the Central Business District, Part IV: The Location of the Headquarters of Industrial Companies," Working Paper, Department of Social and Economic Research, University of Glasgow, 1970.

Corporate mergers on a growing scale and the resulting centralisation of decision-making were accepted as inevitable, and indeed desirable in some instances. What was not acceptable, however, was the tendency for the centralisation process to be confined to London. Three reasons were advanced in support of this position:

1) The centralisation trend was having an adverse effect on industry in Scotland. For example, more and more strategic, administrative and even operating decisions were being made outwith the region by men with little firsthand experience of Scottish conditions; the growing importance of London for Scottish affairs was imposing an extra travel burden on the region's businessmen; external economies in the form of business-oriented service industries, the scope for local initiative, the capacity for self-generating growth, and the opportunity for public discussion of possibly adverse industrial plans were all diminishing; Scottish industry was becoming more vulnerable to recessions and contractions; and the senior management braindrain was accelerating because of the truncated local career prospects.

2) The viability of the Scottish community as an independent centre of thought and action was being eroded.

3) By impoverishing Scotland, and the provinces generally, centralisation was warping the structure of national life and moving Britain closer to the highly polarised French situation with its attendant problems.

Given the inevitability of increased centralisation in one form or another, the Council urged that the government help to create an environment in Britain conducive to decentralised industrial decision-making with a view to the establishment of a number of independent centralisation foci. An essential ingredient of such an environment, it argued, was improved communications:

> The basic obstacle to a dispersal of the centres of large industrial and financial organisations is the difficulty of arranging human meetings and communications. Whatever other actions are taken, an immediate attack upon the obstacles created by the present state of communications is imperative.[1]

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[1] Centralisation, p.6.

A number of technical possibilities in the communications field were mentioned by the Council as examples of the types of change necessary if contemporary difficulties were to be overcome. In the field of aviation, automatic landing systems might well be in normal operation by 1975 removing from air travel the "uncertainties associated with landing in poor visibility." Passenger train speeds by 1975 might be fast enough to make rail travel "a real daytime alternative to air, even between central Scotland and London." Looking beyond 1975, hovertrains might reduce rail travel times even further.[1] However, greatest stress was laid on the prospects opened up by the imminent revolution in electronic communications involving, inter alia, improved data transmission and audio-visual facilities whereby "a great deal of that kind of business which can at present only be conducted when people meet each other in a room, will be capable of being carried out irrespective of distance."[2] Such facilities promised to be much more than a convenience, it was argued; they were essential in a permissive way to continued industrial growth in Scotland.

The Council did not regard its case as proven. Indeed, it frankly admitted that more work needed to be done before its hypotheses concerning the role of communications in the dispersal of industrial

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[1]There is a vast amount of literature on technological developments in the transport field, much of it ephemeral in nature, but by no means all. A few examples must suffice here: Allan P. McLean, "A New Era for the Railways: State of the Nation," Scotsman, 29 Jan 71, p. vii; E. Terrence Price, "Transport in the Eighties," (paper delivered before the engineering section of the British Association for the Advancement of Science, Durham, 8 Sep 70); Michael Baily, "Five-Hour London-Glasgow Rail Run by 1974," The Times, 24 Feb 70, p. 2; A.W.J. Daniel and Roger Calvert, Electrify Now (London: National Council on Inland Transport, 1969); "It's Outlook by APT," Economist, 1 Nov 69, pp. 62-63; William W. Seifert, "The Status of Transportation," I: Socio-Political-Economic Aspects of Transportation, Proceedings of the IEEE, LVI (April 1968), 585-95; Gordon D. Friedlander, "Railway vs. Highway - The Zoom of Things to Come," IEEE Spectrum, IV (September 1967), 62-76; "Changes in Mode Technology," ch. V in Charles River Associates (c.1966), pp. 90-119; Wilfred Owen, "Transport and Technology," ch. IV in Fromm, ed. (1965), pp. 69-88.

[2]Cf. the speech by John Stonehouse, Minister of Posts and Telecommunications at the Relay Services Association luncheon, London, 11 Nov 69; J.S. Whyte, "Telecommunications in the Next Thirty Years," Post Office Electrical Engineers' Journal, LXII (October 1969), 157-41; Brenda Maddox, "The Connections: A Survey of Communications," Economist, 9 Aug 69, pp. xl and Communications: The Next Revolution, Economist Brief Booklet No. 4 (rev.ed.; London: Economist Newspaper Ltd., 1969); James H.H. Merriman, "Ion, Circuits and Systems in Telecommunications," Proceedings of the Institution of Electrical Engineers, CXV (January 1968), 7-15.

decision-making could even be tested. A basic problem was that not enough was known (in 1969) about the nature of communications involved in decision-making. What part might be played by innovations such as the video-phone for instance? Moreover, while improved communications might be a necessary condition of decentralised decision-making, they might not be sufficient. Measures of a more positive kind might also be required.

What types of manufacturing concern would be best able to take advantage of the new communication technologies and to flourish with a decentralised management structure? Three possibilities were mentioned by the Council: 1) firms already headquartered in Scotland and selling nationally and/or abroad, 2) multi-product manufacturers headquartered in the South, e.g., Ferranti Ltd., and 3) nationalised industries such as the British Steel Corporation. However, there were relatively few of the first type of firm and the total was diminishing due to mergers. Thus, Scotland's main hopes rested by necessity on types 2 and 3. But it was not easy to see how pressure might be brought to bear on private firms to devolve HQs functions to a Scottish location. The nationalised industries, on the other hand, were subject to political influence. It was concluded that "a sympathetic approach by government to the situation set out in this report will be necessary if real results are to be obtained in some sectors of industry and commerce."[1]

A much more pointed though still permissive argument in favour of improved communications for Scotland was advanced by the Council in its written evidence to the Select Committee on Scottish Affairs on 8 December 1969. In essence, it was suggested that the government had consistently failed to integrate its regional and communications policies.

> Probably the biggest single disadvantage at which Scotland has been placed over the years is its peripheral position . . . Neither domestically nor internationally have its communication facilities been developed so as to overcome this disadvantage. The . . . facilities rest in the hands of many different U.K. agencies - dealing with aviation, airports, electronic communications of all kinds, rail facilities, and marine facilities. There has been on the part of none of these agencies a general lack of insight into, or sympathy for, special Scottish communications needs. This has resulted partly from the highly

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[1] Centralisation.

> centralised nature of the policy-making machinery of some of these agencies, and their primary concern with overseas activities, partly from the difficulty of generating the time and energy at the Scottish end to develop and maintain the endless pressures of arguments which are called for. The growth of industrial activity in Scotland has been restrained and restricted by inadequacies in communication facilities . . . this is a regional situation not sufficiently regarded by some of the responsible U.K. agencies.[1]

The lack of integration was said to bear particularly heavily on export-oriented industries.[2] As an aid to policy integration in future, it was recommended that consideration be given to the appointment of Ministers for Industry and Transport within the Scottish Office.[3]

Other points emerged during the Council's oral evidence before the Select Committee. For instance, Sir John Toothill, a director of Ferranti, complained about the adequacy of the telephone and teleprinter services available to industry in the Edinburgh area, the excessive funnelling of commercial air traffic between Scotland and the Continent through London, and the runway at Turnhouse Airport.[4] Mr W.S. Robertson, the Council's Executive Vice-President, was asked to cite evidence in defence of the allegation quoted above that inadequate communications were constraining industrial growth in Scotland. He began by explaining that for every 15 or so letters of enquiry to the Council by potential migrant companies, only one ultimately resulted in a new Scottish factory. In a typical year, the Council received over 200 industrial nibbles.

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[1] GB, Select Committee on Scottish Affairs, Minutes of Evidence Taken at Edinburgh, Monday, 8th December, 1969, H.C. 20-iii, 1969-70 (London: HMSO, 1970), p.iii.

[2] "In order to provide perspective . . . about 24 per cent. of all manufacturing output from Scotland is exported, 42 per cent. of the output of American companies in Scotland being exported." Ibid., p.112.

[3] For an account of the history, functions and structure of the Scottish Office, see GB, Commission on the Constitution, Written Evidence, 2, Lord Crowther, chairman (London: HMSO, 1969), pp. 1-63.

[4] H.C. 20-iii, Qq. 2605-06.

> Out of all this, one obtains a sense of the situation. I could not point to a particular company out of all these and say this company did not come to Scotland because communications are not as good as they should be, because in every case the decisions which are taken are a balance between a good many factors. What one can . . . say is that the communications situation is in most cases a very important factor . . . the disadvantage [in communications] . . . is perhaps the largest single inherent disadvantage in the Scottish situation . . .[1].

Yet another call for better communications for Scotland was made in a report solicited from the Council by the new Conservative Secretary of State for Scotland, Mr Gordon Campbell.[2] He was told that an improvement in communications was "the most important of all elements of a regional strategy,"[3] that Scottish air links with the Continent were "hopelessly inadequate," that the attraction of American migrant companies and the development of Scottish-U.S. trade on the scale of the 1950s and 1960s had been made possible by the existence of Prestwick International Airport, that the improvement of Scottish-Continental air links would make it much easier to attract new industry to Scotland geared to Continental markets, that a strong aviation policy recognising the importance of air transport for regional development was "urgently needed,"[4] and that the inability of the Post Office Telecommunications Service to provide for "even the existing rate of growth of traffic" was already having a sharply restrictive effect on

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[1] Ibid., Q. 2608.

[2] Scottish Council, Regional Incentives and Regional Policy (Edinburgh: Scottish Council, 1970). This xeroxed, 8-page document is dated 23 Sep 70. It was made public on 14 Oct 70. For an extensive summary, see the Glasgow Herald (p.9) or The Times (p.22) for that day. The former paper, in a leader (p.10), strongly supported the Council's stand on communications.

[3] "The principal reason that Scotland is not as prosperous as South-East England is that it is not in South-East England - factors other than distance are of secondary importance." To the Council, regional incentives were only a palliative. Improved communications, on the other hand, while they did not produce quick results in themselves, were the "core" of an optimum regional strategy. Op.cit., p.2.

[4] "until the necessary air services and airport facilities exist, any regional strategy for Scotland can have only limited success," Ibid.

the operation of "some companies".[1] In addition, it was suggested that Scotland's internal road network was inadequate.

Mr Robertson, writing in the Scotsman's "State of the Nation" special feature on 26 January 1971,[2] mentioned that discussions were underway between the Council and the government designed to persuade the latter that increased investment in communications systems must be "the next main step forward in regional policy." Also noteworthy is the Council's 'Oceanspan' concept involving the creation of a west-east industrial corridor and landbridge in Central Scotland on the assumption that the region's main markets in future will lie in Europe rather than the South.[3]

It will be obvious from the above that the Council is very keen indeed on improved communications for Scotland and sees them as the region's best hope for continued expansion and development. It will also be apparent that CDI (Scotland) and the Council do not see eye to eye on this matter. In fact, they have been giving conflicting advice to the regional policymakers. Why is this so? Part of the answer is the apparent lack of contact between the two bodies, due

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[1] An attempt to obtain the names of these companies from the Council proved abortive. It was said to be against Council policy to divulge such matters. We were also unable to determine the nature of the evidence underlying the Council's strictures on telecommunications. It may have been the results of a statistical survey but more likely it was an accumulation of chance remarks by managing directors. The Council itself has had a number of difficulties with PO services. Specific complaints mentioned by its Industrial Enquiries Centre in Glasgow during an interview on 15 October 1970 included delays in the delivery of mail, the protracted length of time it took to get a telephone installed, and the high abort rate on dialled calls. We were able to carry out a special survey to test the latter point. An on-going research project at the University of Glasgow during the autumn of 1970 provided the opportunity. The project involved a large number of telephone calls to destinations inside the Glasgow conurbation. We arranged for the recording of certain call characteristics during the period, October 21-November 12, i.e., for 14 days in total. The results appear in Appendix F below. They would seem to confirm the Council's allegation: 20% of the calls attempted had to be re-dialled at least once. A further 11.5% connected successfully but were subject to noticeable line deficiencies, e.g., faintness, noise, or other voices. The probability of some sort of problem arising proved to be highest on Wednesdays and lowest on Tuesdays, i.e., the quality of the telephone system clearly fluctuated from day to day.

[2] *Op.cit.*, p.ii.

[3] Scottish Council, Oceanspan: A Maritime-Based Development Strategy for a European Scotland, 1970-2000 (Edinburgh: Scottish Council, 1970).

Assuming Dennison's account to be true, this sudden burst of concern on the part of the Government is rather ironic in that the existence of the depressed area phenomenon had been widely recognized for a considerable number of years. Indeed, its beginnings are to be found half a generation earlier in the collapse of the frenetic 1919-20 economic boom. There ensued the paradox of the 1920s, a period during which good times remained just around the corner, tantalizing but elusive. Unemployment rocketed to a peak of 19% in 1921 and stubbornly stayed at or above 10% for the rest of the decade giving rise to Pigou's phrase, the "intractable million". It was not until 1927 that output rose to the level first attained in 1913. Coal, iron and steel, heavy engineering, shipbuilding, cotton and wool - Britain's traditional export staples - never regained their pre-war eminence. Unfortunately, these industries were concentrated geographically and such terms as 'necessitous', 'distressed', devastated', 'depressed' and 'black spots' came to be used more and more frequently to describe the areas affected. Hubert Henderson, editor of the much respected Liberal weekly, The Nation and Athenaeum (J.M. Keynes was chairman) drew attention to the unequal incidence of unemployment within GB in two leaders published during November 1926. Using data made public for the first time in the October 1926 issue of the Ministry of Labour Gazette to illustrate his argument, he divided the map of the island into two roughly equal halves in terms of labour force distribution and showed that the six main 'black spots' (Tyneside, Clydeside, South Wales, the Potteries, and the textile areas in Lancashire and Yorkshire) all lay north and west of the dividing line. Insured unemployment in Scotland as a whole during September 1926 stood at 17.3% of the insured population in contrast to a figure of 4.8% for the South-East. A series of ad hoc and ill-coordinated palliatives was the Government's main response to this situation. The list - expedited construction schemes, various aids to labour mobility including assisted emigration, 'make work' projects, the 'dole', derating, local government reform, tinkering with tariffs ('safe-guarding'), selected subsidies (e.g., to the sugar beet industry), etc. - is impressive; the results, however, were disappointing. Perhaps the most candid assessment of the official attitude towards the depressed areas in the mid-1920s was that made by a future Prime Minister, Harold Macmillan, looking back on the period from the vantage-point of 1934:

> . . . I think the Governments of those years can claim to have made some attempts . . . to deal partially with the problem, but I do not think that any of us - let us be quite honest about it - realised how deep-rooted was the problem, how difficult it would be to handle, and how incapable it was of being solved by the mere automatic correction of adverse trade conditions.[1]

The 1920s in Great Britain was not a time for radical economic experiment. Orthodoxy prevailed. The conventional wisdom, until the disquieting report of the Industrial Transference Board in July 1928 (see below), held that the normal course of the trade cycle would eventually solve the problem of the depressed areas by bringing the traditional industries back to their former prosperity. Leading policy-makers considered government expenditure to be essentially unproductive. The main aim of the prestigious Treasury Department was to balance the budget at as low a level as possible. There was no organized body of economic advice available to the Cabinet and adverse changes in economic conditions were seldom anticipated. Political life was dominated by the Conservative Party. It equated progress and prosperity with a return to pre-war conditions and had as one of its basic tenets hostility to state intervention in economic affairs. Laissez-faire was still very much in vogue; the return to the gold standard in 1925, an essential part of the Government's 'back to 1914' program, met with general satisfaction. 'Tranquillity', 'Safety First', and 'A Doctor's Mandate' were some of the Tories' main campaign slogans during the interwar years. Stanley Baldwin, Prime Minister from May 1923 to May 1929 with the exception of a nine-month period in 1924, has been called, not unfairly, "the living embodiment of 'Safety First'".[2]

This then was the setting for the regional policy innovation launched a few years later. The history of British regional policy has been written often and well, and there is little need for us to reiterate it yet again. But no study has focussed specifically on the role assigned to communications by the regional policymakers. Our

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[1] GB, 292 H.C.Deb.5s., col. 1806 (25 Jul 34).

[2] Trevor Wilson, The Downfall of the Liberal Party, 1914-1935, Fontana Library (London: Collins, 1966), p.281.

interest in this subject stems basically from our hypothesis concerning the importance of a good interregional communications network for successful long-distance industrial migration. Since induced interregional industrial mobility has been perhaps the most prominent feature of regional development in Britain, one might surmise from our hypothesis that considerable care has been taken as part of regional policy to ensure either that adequate interregional communications facilities were built ahead of demand or, at the very least, that prompt action was taken to eliminate incipient bottlenecks. In the language of chapter 2, it would seem reasonable to suppose that regional policymakers have been either activists or permissives with regard to communications. Bearing this conjecture in mind, we turn now to the task of tracing the role of communications in British regional policy as it emerged in practice. We begin our examination, not in 1934, but a decade earlier with the setting up of the Balfour Committee on Industry and Trade. The 1924-34 period has been neglected by most regional analysts but it is of considerable relevance to our discussion. Thus we devote a disproportionately large amount of attention to pertinent developments during that time. The following table summarizes pertinent developments over the whole of the period under review in this section, i.e., 1924-71, for ready reference and with a view to putting each of the individual events in a historical perspective.

Table 4.1 An Historical Outline of the Antecedents and Course of Regional Policy in Great Britain, 1924-71

Date		Event
1924		Appointment of Balfour Committee on Industry and Trade
1928	Jan	Appointment of Industrial Transference Board
	Feb	Report of Liberal Industrial Inquiry
	Jul	Report of Industrial Transference Board
1929	Mar	Publication of Liberal election platform
	Mar	Final Report of Balfour Committee presented to Parliament
	May	White Paper on 'Certain Proposals Relating to Unemployment'
1931		Commissioning of depressed area surveys by Board of Trade
1932		Publication of BOT's depressed area surveys
1934	Apr	Commissioning of derelict area investigations by Ministry of Labour
	Nov	Publication of derelict area investigations
	Dec	Royal Assent to Special Areas (Development and Improvement) Act

Date		Event
1935-38		Reports by Commissioner for Special Areas in England & Wales; similarly for Scotland
1936	May	Royal Assent to Special Areas Reconstruction (Agreement) Act
	Jun	Special Areas Reconstruction Association incorporated
	Nov	Special Areas policy statement by Prime Minister in Commons
	Dec	Nuffield Trust announced (its lending activities did not cease till 1943)
1937	Jan	Special Areas Interdepartmental Committee formed within Whitehall
	Mar	Statement (Cmd. 5386) re Special Areas by Ministry of Labour
	May	Royal Assent to Special Areas (Amendment) Act and resultant Treasury Fund
	Jul 8	Appointment of Barlow Royal Commission on Distribution of Industrial Population
	Jul 30	Royal Assent to Finance Act including National Defence contribution (tax) exemption provision
1940		Publication of Barlow Report
1944		White Paper on Employment Policy
1945		Distribution of Industry Act creating Development Areas
1947	Aug	Royal Assent to Town and Country Planning Act
	Oct	Report by Select Committee on Estimates (and related evidence) re administration of Development Area policy
1948		White Paper on Distribution of Industry
1950		Distribution of Industry Act
1955		Report by Select Committee on Estimates (and related evidence) re Development Areas
1958		Distribution of Industry (Industrial Finance) Act
1960		Local Employment Act substituting Development Districts for DAs
1963	Mar	Neddy on regional policy: growth point strategy advocated
	Apr	Announcement of standard grants and free depreciation
	May	Report by Estimates Committee (and related evidence) on administration of Local Employment Act
	Jul	Royal Assent to Local Employment and Finance Acts
	Oct	Mr. Edward Heath appointed President of Board of Trade and Secretary of State for Industry, Trade and Regional Development[1]
	Nov	White Papers on Central Scotland and NE England

[1] On the significance of this development for regional policy, see Samuel Brittan, The Treasury Under the Tories, 1951-1964 (Harmondsworth, Mddx.: Penguin Books, 1964), pp. 265-66. Inter alia, Brittan observed that "until an ex-14th Earl appointed Mr. Heath, the President of the Board of Trade, however able a person, was treated by Prime Ministers as if he sat below the salt . . . . The title of Secretary of State . . . greatly enhanced the President of the Board of Trade's standing in the innermost circles of the Cabinet and Whitehall."

Date		Event
1964		Formation of Department of Economic Affairs and announcement that Regional Economic Planning Councils and Boards would be set up.
1965		National Plan
1966	Jan	White Paper on Investment Incentives
	Aug	Royal Assent to Industrial Development Act; re-appearance of Development Areas
1967	Apr	Regional Employment Premium proposed in a Green Paper
	Sep 4	REP introduced
	Sep 21	Hunt Committee appointed
	Nov	Initial creation of Special Development Areas
1968		Selective Employment Tax premium became payable only in DAs and SDAs
1969	Feb	DEA's assessment of regional policy and prospects to 1972
	Apr	Hunt Committee Report published
	Oct	Government reorganisation announced: DEA abolished; responsibility for administering Local Employment Acts and Industrial Development Certificate Control transferred from BOT to Ministry of Technology; creation of new super-ministry, Local Government and Regional Planning, with responsibility for transport, housing, local government and regional planning
1970	Feb	Royal Assent to Local Employment Act creating Intermediate Areas
	Oct 15	White Paper on Reorganisation of Central Government: BOT and MinTech merged in new Department of Trade and Industry; Ministry of Local Government and Regional Planning absorbed by new Department of the Environment
	Oct 27	White Papers on Investment Incentives and New Policies for Public Spending
1971	Feb	Announcement of new Special Development and Intermediate Areas

1924-29 (Balfour) Committee on Industry and Trade

This Committee was appointed by Ramsay MacDonald's Labour Government in 1924 and issued its final report during March 1929, just prior to the general election of that year. Sir Arthur Balfour was chairman. The Committee produced a prodigious amount of published material[1] one small part of which was a valuable analysis of the role

[1] GB, Committee on Industry and Trade, Factors in Industrial and Commercial Efficiency, Part I of a Survey of Industries (London: HMSO, 1927); Further Factors in Industrial and Commercial Efficiency, Part II (1928); Survey of Textile Industries: Cotton, Wool, Artificial Silk, Part III (1928); Survey of Metal Industries: Iron and Steel, Engineering, Electrical Manufacturing, Shipbuilding, with a Chapter on the Coal Industry, Part IV (1928); Final Report, Cmd. 3282 (1929).

perhaps to professional jealousy. Yet that should not produce a fundamental clash of opinions, especially since both groups hold permissive attitudes on the role of communications in economic development. Clearly, something more basic is involved. CBI (Scotland), for example, sees itself as being more pragmatic than the Council. Certainly, its interests are narrower, being confined largely to the manufacturing sector, whereas the Council is concerned with all aspects of the economy. CBI (Scotland) is also less development-oriented and more interested in promoting the well-being of existing members. This may largely account for its maverick attitude towards improved communications relative to the CBI nationally; as noted by the Council, investment in communication facilities does not yield a harvest overnight. It could also be, though we have only impressionistic evidence on this point, that the CBI is less international-minded than the Council, perhaps because of its narrower membership.[1] Since a sizable portion of the Council's case for improved communications involves international air transport, and since CBI (Scotland) seems reasonably satisfied with the domestic communications network, it follows that the two organizations' divergent views on the need for better communications may reflect in part different geographic orientations.

British Road Federation

The BRF was formed in 1932 to promote the provision of roads on behalf of road builders and major users. Unlike the other lobbyists we have discussed, it obviously has a vested interest in better road communications. Nonetheless, some empirical research which it undertook recently is worth mentioning, especially since, in the opinion of Mr Adamson, CBI Director-General, "It goes a long way to prove CBI's contention that expenditure on infrastructure and particularly on communications is a precursor of industrial investment."[2]

A mail questionnaire was sent to all migrant firms (the precise total was not specified but it exceeded 100) setting up operations in the North-East during the period, 1965-69. Its purpose was to determine

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[1] About 1000 manufacturers belonged to CBI (Scotland) at the end of 1969; some 2000 were members of the Council.

[2] W.O. Campbell Adamson, "Foreword," in BRF, Roads and the Development of the North East (London: BRF, 1970), p.3. Note Mr Adamson's Delphic terminology; "precursor" is an ambiguous word. It can be interpreted as denoting either activism or permissiveness. We assume that the latter interpretation was the intended one.

the extent to which road accessibility and official road development plans (particularly those set out in the 1963 White Paper on the NE[1]) had influenced their location decisions. Roughly half (42) of those replying (88) indicated that roads had been one of the three most important factors leading them to choose the North-East (unfortunately, the published report[2] does not list the alternative location factors). Exactly half of the respondents said that they had previously considered other DAs; 57% of this group mentioned roads as being a prime location factor. The North-West was the main loser to the North-East (14 firms) followed by Wales (12), Scotland (6), the South-West (6) and NI (4). From the foregoing, it was concluded that good roads were a major attraction for mobile companies,[3] and *inter facto* that they were an important regional asset in the competitive struggle for new industry. At the margin, *ceteris paribus*, they could prove decisive.

Mention might also be made in passing of another recent BRF report.[4] It shows that the motorway construction program as it stood towards the end of the 1960s had cut the time taken by commercial vehicles to travel between the Clydeside and West Midlands conurbations by some 21%, a significant saving for many types of industry.

Summary

Selected lobbyist arguments in favour of better communications as an aid to regional development are set forth in this chapter. Our protagonists comprise the voice of British industry, the oldest and most influential unofficial regional spokesman and promoter in the

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[1] GB, Board of Trade, The North East - A Programme for Regional Development and Growth, Cmnd. 2206 (London: HMSO, 1963).

[2] Curiously, the BRF survey results were neither included nor mentioned in the report referred to above. They only came to our attention as a consequence of an article, "Regions Find Road to Progress", by Tony Dave in the Sunday Times, 26 Apr 70, p.50. (Dave, incidentally, exaggerated slightly the BRF findings.) A letter to the BRF elicited the reply that the survey material was being issued (separately) as an addendum to the published report!

[3] The Economist concurrently cited corroborative evidence to this effect from Japan: see "Airborne Motorways Can Pay," op.cit., 4 Apr 70, pp. 62-63.

[4] BRF, Motorways and Industry: A Report of a Study at the University of Newcastle upon Tyne (London: BRF, c.1968).

country, and a vested road interest. All hold in common the belief that good communications are a prime factor in industrial mobility and that better communications will help stimulate interregional movement. None would go so far, however, as to say that they were a sufficient inducement. In other words, the group norm is a permissive attitude towards improved communications. This finding may appear prima facie to contradict our argument in ch. 2 to the effect that the permissive school is a minority one. However, that argument pertained to the world as a whole, i.e., to countries at all stages of development. It could well be that as a nation advances in economic terms, and builds up a stock of communications capital, the scope for catalytic investments in communications diminishes inducing a concurrent diminution in the ranks of the indigenous agnostics. That is to say, the seeming contradiction referred to above is probably more apparent than real.

Empirical evidence for the lobbyists' views would appear to be sparse. The BAF survey is an obvious exception to this generalisation. Another may be the as yet unpublished Scottish Council enquiry into the air travel habits and requirements of industry in Scotland.[1] But by and large, the lobbyist viewpoints presented here mirror opinion rather than fact.

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[1] See Kenneth Owen, "Scots' Need of Better Air Links," The Times, 23 Sep 70, p.17.

CHAPTER 4

COMMUNICATIONS AND THE EVOLUTION OF REGIONAL POLICY IN GREAT BRITAIN

Introduction

The charge has been made, as indicated in the previous chapter, that the British Government has consistently failed to integrate its regional and communications policies to the detriment of the areas that regional measures have been designed to benefit. In this chapter we assess the validity of this accusation. The emphasis is upon the evolution of regional policy and the extent to which regional policy-makers and their advisors, both official and unofficial (i.e., academic), have seen communications as being an essential ingredient of a successful regional program. However, a brief look is also taken at the various communications policies to determine the extent to which they have had a regional bias. The analysis is based entirely upon published sources. While this is not an altogether happy situation, in the circumstances, it was inevitable. More importantly, there is no apparent reason why it should seriously distort our conclusions. Scotland is mentioned en passant in the following sections but it is dealt with much more fully in chapter 5.

The Role of Communications in British Regional Policy

The Setting

Regional policy in Great Britain is generally held (cf. McCrone, 1969, p.92) to begin with the Special Areas (Development and Improvement) Act introduced to Parliament on 26 November 1934 and, in the words of Professor Dennison (1939, p.126), "hurriedly passed" seventeen days later. This legislation was motivated by the abnormal unemployment levels prevailing in certain parts of the country and by belated Government recognition that the problems of these areas were too deep-seated and chronic to resolve themselves unaided, at least within any reasonable length of time.

Assuming Dennison's account to be true, this sudden burst of concern on the part of the Government is rather ironic in that the existence of the depressed area phenomenon had been widely recognized for a considerable number of years. Indeed, its beginnings are to be found half a generation earlier in the collapse of the frenetic 1919-20 economic boom. There ensued the paradox of the 1920s, a period during which good times remained just around the corner, tantalizing but elusive. Unemployment rocketed to a peak of 19% in 1921 and stubbornly stayed at or above 10% for the rest of the decade giving rise to Pigou's phrase, the "intractable million". It was not until 1927 that output rose to the level first attained in 1913. Coal, iron and steel, heavy engineering, shipbuilding, cotton and wool - Britain's traditional export staples - never regained their pre-war eminence. Unfortunately, these industries were concentrated geographically and such terms as 'necessitous', 'distressed', devastated', 'depressed' and 'black spots' came to be used more and more frequently to describe the areas affected. Hubert Henderson, editor of the much respected Liberal weekly, The Nation and Athenaeum (J.M. Keynes was chairman) drew attention to the unequal incidence of unemployment within GB in two leaders published during November 1926. Using data made public for the first time in the October 1926 issue of the Ministry of Labour Gazette to illustrate his argument, he divided the map of the island into two roughly equal halves in terms of labour force distribution and showed that the six main 'black spots' (Tyneside, Clydeside, South Wales, the Potteries, and the textile areas in Lancashire and Yorkshire) all lay north and west of the dividing line. Insured unemployment in Scotland as a whole during September 1926 stood at 17.3% of the insured population in contrast to a figure of 4.8% for the South-East. A series of ad hoc and ill-coordinated palliatives was the Government's main response to this situation. The list - expedited construction schemes, various aids to labour mobility including assisted emigration, 'make work' projects, the 'dole', derating, local government reform, tinkering with tariffs ('safe-guarding'), selected subsidies (e.g., to the sugar beet industry), etc. - is impressive; the results, however, were disappointing. Perhaps the most candid assessment of the official attitude towards the depressed areas in the mid-1920s was that made by a future Prime Minister, Harold Macmillan, looking back on the period from the vantage-point of 1934:

> . . . I think the Governments of those years can claim to have made some attempts . . . to deal partially with the problem, but I do not think that any of us - let us be quite honest about it - realised how deep-rooted was the problem, how difficult it would be to handle, and how incapable it was of being solved by the mere automatic correction of adverse trade conditions.[1]

The 1920s in Great Britain was not a time for radical economic experiment. Orthodoxy prevailed. The conventional wisdom, until the disquieting report of the Industrial Transference Board in July 1928 (see below), held that the normal course of the trade cycle would eventually solve the problem of the depressed areas by bringing the traditional industries back to their former prosperity. Leading policy-makers considered government expenditure to be essentially unproductive. The main aim of the prestigious Treasury Department was to balance the budget at as low a level as possible. There was no organized body of economic advice available to the Cabinet and adverse changes in economic conditions were seldom anticipated. Political life was dominated by the Conservative Party. It equated progress and prosperity with a return to pre-war conditions and had as one of its basic tenets hostility to state intervention in economic affairs. Laissez-faire was still very much in vogue; the return to the gold standard in 1925, an essential part of the Government's 'back to 1914' program, met with general satisfaction. 'Tranquillity', 'Safety First', and 'A Doctor's Mandate' were some of the Tories' main campaign slogans during the interwar years. Stanley Baldwin, Prime Minister from May 1923 to May 1929 with the exception of a nine-month period in 1924, has been called, not unfairly, "the living embodiment of 'Safety First'".[2]

This then was the setting for the regional policy innovation launched a few years later. The history of British regional policy has been written often and well, and there is little need for us to reiterate it yet again. But no study has focussed specifically on the role assigned to communications by the regional policymakers. Our

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[1] GB, 292 H.C.Deb.5s., col. 1806 (25 Jul 34).

[2] Trevor Wilson, The Downfall of the Liberal Party, 1914-1935, Fontana Library (London: Collins, 1966), p.281.

interest in this subject stems basically from our hypothesis concerning the importance of a good interregional communications network for successful long-distance industrial migration. Since induced interregional industrial mobility has been perhaps the most prominent feature of regional development in Britain, one might surmise from our hypothesis that considerable care has been taken as part of regional policy to ensure either that adequate interregional communications facilities were built ahead of demand or, at the very least, that prompt action was taken to eliminate incipient bottlenecks. In the language of chapter 2, it would seem reasonable to suppose that regional policymakers have been either activists or permissives with regard to communications. Bearing this conjecture in mind, we turn now to the task of tracing the role of communications in British regional policy as it emerged in practice. We begin our examination, not in 1934, but a decade earlier with the setting up of the Balfour Committee on Industry and Trade. The 1924-34 period has been neglected by most regional analysts but it is of considerable relevance to our discussion. Thus we devote a disproportionately large amount of attention to pertinent developments during that time. The following table summarizes pertinent developments over the whole of the period under review in this section, i.e., 1924-71, for ready reference and with a view to putting each of the individual events in a historical perspective.

Table 4.1 An Historical Outline of the Antecedents and Course of Regional Policy in Great Britain, 1924-71

Date		Event
1924		Appointment of Balfour Committee on Industry and Trade
1928	Jan	Appointment of Industrial Transference Board
	Feb	Report of Liberal Industrial Inquiry
	Jul	Report of Industrial Transference Board
1929	Mar	Publication of Liberal election platform
	Mar	Final Report of Balfour Committee presented to Parliament
	May	White Paper on 'Certain Proposals Relating to Unemployment'
1931		Commissioning of depressed area surveys by Board of Trade
1932		Publication of BOT's depressed area surveys
1934	Apr	Commissioning of derelict area investigations by Ministry of Labour
	Nov	Publication of derelict area investigations
	Dec	Royal Assent to Special Areas (Development and Improvement) Act

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Date		Event
1935-38		Reports by Commissioner for Special Areas in England & Wales; similarly for Scotland
1936	May	Royal Assent to Special Areas Reconstruction (Agreement) Act
	Jun	Special Areas Reconstruction Association incorporated
	Nov	Special Areas policy statement by Prime Minister in Commons
	Dec	Nuffield Trust announced (its lending activities did not cease till 1943)
1937	Jan	Special Areas Interdepartmental Committee formed within Whitehall
	Mar	Statement (Cmd. 5306) re Special Areas by Ministry of Labour
	May	Royal Assent to Special Areas (Amendment) Act and resultant Treasury Fund
	Jul 8	Appointment of Barlow Royal Commission on Distribution of Industrial Population
	Jul 30	Royal Assent to Finance Act including National Defence contribution (tax) exemption provision
1940		Publication of Barlow Report
1944		White Paper on Employment Policy
1945		Distribution of Industry Act creating Development Areas
1947	Aug	Royal Assent to Town and Country Planning Act
	Oct	Report by Select Committee on Estimates (and related evidence) re administration of Development Area policy
1948		White Paper on Distribution of Industry
1950		Distribution of Industry Act
1955		Report by Select Committee on Estimates (and related evidence) re Development Areas
1958		Distribution of Industry (Industrial Finance) Act
1960		Local Employment Act substituting Development Districts for DAs
1963	Mar	Neddy on regional policy: growth point strategy advocated
	Apr	Announcement of standard grants and free depreciation
	May	Report by Estimates Committee (and related evidence) on administration of Local Employment Act
	Jul	Royal Assent to Local Employment and Finance Acts
	Oct	Mr. Edward Heath appointed President of Board of Trade and Secretary of State for Industry, Trade and Regional Development[1]
	Nov	White Papers on Central Scotland and NE England

[1] On the significance of this development for regional policy, see Samuel Brittan, The Treasury Under the Tories, 1951-1964 (Harmondsworth, Mddx.: Penguin Books, 1964), pp. 265-66. Inter alia, Brittan observed that "until an ex-14th Earl appointed Mr. Heath, the President of the Board of Trade, however able a person, was treated by Prime Ministers as if he sat below the salt . . . . The title of Secretary of State . . . greatly enhanced the President of the Board of Trade's standing in the innermost circles of the Cabinet and Whitehall."

Date		Event
1964		Formation of Department of Economic Affairs and announcement that Regional Economic Planning Councils and Boards would be set up.
1965		National Plan
1966	Jan	White Paper on Investment Incentives
	Aug	Royal Assent to Industrial Development Act: re-appearance of Development Areas
1967	Apr	Regional Employment Premium proposed in a Green Paper
	Sep 4	REP introduced
	Sep 21	Hunt Committee appointed
	Nov	Initial creation of Special Development Areas
1968		Selective Employment Tax premium became payable only in DAs and SDAs
1969	Feb	DEA's assessment of regional policy and prospects to 1972
	Apr	Hunt Committee Report published
	Oct	Government reorganisation announced: DEA abolished; responsibility for administering Local Employment Acts and Industrial Development Certificate Control transferred from BOT to Ministry of Technology; creation of new super-ministry, Local Government and Regional Planning, with responsibility for transport, housing, local government and regional planning
1970	Feb	Royal Assent to Local Employment Act creating Intermediate Areas
	Oct 15	White Paper on Reorganisation of Central Government: BOT and MinTech merged in new Department of Trade and Industry; Ministry of Local Government and Regional Planning absorbed by new Department of the Environment
	Oct 27	White Papers on Investment Incentives and New Policies for Public Spending
1971	Feb	Announcement of new Special Development and Intermediate Areas

1924-29 (Balfour) Committee on Industry and Trade

This Committee was appointed by Ramsay MacDonald's Labour Government in 1924 and issued its final report during March 1929, just prior to the general election of that year. Sir Arthur Balfour was chairman. The Committee produced a prodigious amount of published material[1] one small part of which was a valuable analysis of the role

[1] GB, Committee on Industry and Trade, Factors in Industrial and Commercial Efficiency, Part I of a Survey of Industries (London: HMSO, 1927); Further Factors in Industrial and Commercial Efficiency, Part II (1928); Survey of Textile Industries: Cotton, Wool, Artificial Silk, Part III (1928); Survey of Metal Industries: Iron and Steel, Engineering, Electrical Manufacturing, Shipbuilding, with a Chapter on the Coal Industry, Part IV (1928); Final Report, Cmd. 3282 (1929).

of transport costs in the price structure of representative manufacturing industries. We return to this topic in a moment. First, however, it should be noted that the conclusions of the Committee both reflected and reinforced existing orthodoxies. Typical of its members' essentially laissez-faire attitude towards economic affairs is the following excerpt from the final report: "'Mobility' . . . is the very breath of life to modern industry."[1] One of the interim reports refers to "the prejudice caused to economic production by imperfect mobility".[2] The Committee said very little of direct relevance to what is now called regional policy apart from a cautionary injunction against viewing any given distribution of the working population, "whether geographical or industrial," as sacrosanct.[3] In the same vein, most public works, which were pejoratively referred to as "the artificial creation of work", were condemned as uneconomic, in part because of the continuous depression during the 1920s; the scope for economic relief measures was deemed to have been largely exhausted by 1929!

An official memorandum accompanying the Committee's terms of reference had suggested inter alia that it might look at transport as a factor in the cost structure of British industry. This directive gave rise to a considerable amount of original, and indeed, for a number of years, unique, analysis.[4] Part I of the 'Survey of Industries' contains the most interesting results for our purposes. There rail transport cost/gross output ratios are developed for a "few typical articles of importance" in Britain's export trade as indicated in the following table. Rail transport, of course, was the dominant mode at the time.

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[1] Op.cit., p.235.

[2] Part II, p.42.

[3] Cmd. 3282, p.132.

[4] For the outcome of this work in detail, see Cmd. 3282, pp.58-79; Pt. I, pp.62-65 & 493-520; Pt. II, pp.15, 88-89, 166-67 & 195-230.

Outbound Rail Transport Costs Relative to per Ton Export Values, Selected Commodities, 1914 and January 1925

Commodity	Export Value per Ton, 1924 £	s	d	1914 %	January 1925 %
Coal	1	3	6	9.50	9.22
Pig iron	6	17	6	4.56	4.24
Iron & steel ingots, etc.	15	5	0	1.43	1.83
Machinery, all classes	96	0	0	1.14	.90
Cotton piece goods	410	0	0	.58	.34
Boots & shoes	450	0	0	.45	.39
Woollen & worsted tissues	700	0	0	.22	.24

Note: the transport data are based partly on actual and partly on average approximate lengths of haul.

Source: Pt. 1, p.496.

The Committee was struck by the pronounced inverse relationship between product value and transport costs as a proportion of output. (This relationship still prevails today - cf. ch. 12 below.) Although the cost of outbound rail transport relative to the value of manufactured goods fell slightly over the 11-year period shown in the table, the Committee concluded in its final report as a result of price changes subsequent to 1925 that rail transport costs as a proportion of gross manufactured output had not changed significantly since 1914.

An important defect in the above ratios is the fact that they relate solely to outbound carriage costs; inbound charges are not included. However, the Committee was able to overcome this problem in three instances: iron and steel products, boots and shoes, and cotton piece goods. Its findings with regard to the iron and steel items are too extensive for detailed mention here but in essence they showed that procurement charges were roughly three times as great as distribution outlays. In the case of boots and shoes, inbound transport costs were more than three times as large as outbound charges; whereas the outbound transport cost/retail price ratio was 0.4%, the total transport cost/retail price ratio was over 1.6%. Equivalent ratios for cotton piece goods, i.e., 0.17% and 1.85% were even more polarized. Of interest in connection with these latter figures is the following table based upon data provided by the Calico Printers' Association.

Sequential Transport Cost /Finished Cotton Cloth Price Ratios as One Ton of Cotton Moves Through the Various Stages of Manufacture from Raw Material to Final Product, 1914 and 1926

Transport Sequence	Transport Costs/ Ultimate Price of Cloth 1914 %	1926 %
Raw cotton, cartage in Liverpool	.286	.188
Raw cotton, Liverpool to Oldham for spinning	.040	.039
Yarn, Oldham to Burnley district for weaving	.300	.196
Grey cloth, Burnley to warehouse in Manchester	.300	.196
Grey cloth, Manchester to Glasgow district for finishing[b]	.830	.532
Finished cloth, Glasgow to Manchester	.830	.532
Piece goods, finished and made up for export, Manchester to Birkenhead dock area	.246	.166
	2.832	1.849

Notes: a) all percentages are broad averages
b) both the Bleachers' and the Calico Printers' Association had many members in the Clyde Valley, and a "fair" percentage of cloth was sent there from Lancashire for finishing.

Source: Pt. I, p.517.

The Committee concluded with regard to Britain's internal transport system that: a) "it was of the first importance" in the nation's industrial life, b) road transport was rapidly gaining on rail but its efficiency was "quite impossible to measure," c) while railway rates were not excessive relative to railway costs despite allegations by witnesses to the contrary, they were imposing a burden on the "heavier trades" greater than these trades could bear thereby "affecting seriously our competitive position in the markets of the world," and d) allegations of deteriorating railway efficiency had not been adequately proven. But instead of advancing recommendations based upon these conclusions, the Committee simply noted with approval that provision was to be made as part of the Government's industrial derating scheme "to secure that the Railway Companies shall use the relief to reduce their charges for the conveyance of export coal and of raw materials used in the production of iron and steel."[1]

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[1] Cmd. 3282, pp. 70-71. The derating provisions in the 1929 Local Government Act took effect on 1 Oct 29.

1928 Industrial Transference Board

It was the Baldwin regime that appointed the Industrial Transference Board (ITB) in January 1928 allegedly as a result of a much-publicized trip to some of the depressed areas by Edward, Prince of Wales.[1] This trip focused the public's attention on these areas as never before; indeed, it has been suggested that the Royal tour marked the first widespread recognition of the tremendous disparities in regional unemployment rates and their effect on living conditions. As its name implies, the ITB had as its primary purpose the identification of ways and means by which emigration from the depressed areas might be accelerated. Its report[2] described the Government's unemployment policy as "one of 'tide-over'", the aim being to maintain intact in geographical terms the labour force required by the basic industries "in a state as free as possible from demoralisation." Such a policy it said was based on an erroneous assumption: "in many of the districts concerned, the idea of a cyclical or transient depression must now be recognised quite unflinchingly as no longer tenable." It followed that relief works in the depressed areas were counter-productive.[3] By providing temporary employment, they impeded the "only natural and permanent solution" of the depressed area problem, viz., transference. Two brief paragraphs (3 and 32) in the ITB report acknowledged that improved communications had made industrial dispersal easier and that the depressed areas had some assets of interest to new industry, e.g., good communications in places, but overall, the Board saw little scope for a positive regional program. This view did not go completely unopposed. The Economist, for example, while agreeing with much of what the ITB had to say, did suggest that its proposals were inadequate to the problem. Influenced no doubt by the Liberal Industrial Inquiry (see below), the periodical saw a need for "special undertakings" of an SOC nature in addition to transference such as the construction of roads, harbours and docks, expedited electrification, and the planning

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[1] GB, 292 H.C.Deb.5s., cols. 1797 & 1799 (25 Jul 34).

[2] GB, Ministry of Labour, Industrial Transference Board Report, Cmd. 3156 (London: HMSO, 1928).

[3] Keynes and Henderson in a hard-hitting political pamphlet produced for the 1929 general election referred to the ITB arguments concerning relief works as "scanty and insipid." J.M. Keynes and H.D. Henderson, Can Lloyd George Do it? An Examination of the Liberal Pledge (London: Nation and Athenaeum, 1929), p.20.

of "great" towns on a regional basis.[1]

The ITB report, despite its advocacy of an about-turn in Government policy and some outside criticism, was very much in tune with the dominant mood of the moment in official circles. It echoed rather than led informed opinion in Whitehall. The Government, acting quickly on the Board's recommendations, officially sanctioned the transference program which the Ministry of Labour had already begun on an experimental basis; this 'new' policy remained in effect till the end of the 1930s. Although the circumstances prevailing throughout much of this period were extremely unpropitious, the program had some, albeit modest, success in stimulating labour mobility. However, it did not provide a solution to the depressed area problem. Growing public disenchantment and the advent of World War II led to its eventual demise, an unlamented casualty in the evolution of Government thinking on the question of regional disparities. Today, transference is remembered chiefly as the only major attempt in the history of British regional policy to move the 'workless to the work'.

1926 Liberal Industrial Inquiry

Communications as a factor in regional development was not considered seriously in government circles until the report of the Liberal Industrial Inquiry[2] which appeared a month after the appointment of the ITB. This report, or 'Yellow Book' as it came to be known from its cover was recently praised by Skidelsky as "well in advance of anything in existence at the time."[3] Its 500 pages were the work of an expert committee of Liberal Party supporters including Keynes and Henderson. Their purpose was to influence Party policy. That portion of the Committee members' argument relevant to our discussion can be summarized as follows. Britain's economic equilibrium, they said, was undergoing a fundamental change. While it was important that the basic industries be revitalized, it was unlikely that they would ever again provide employment on a pre-war scale. Abnormal unemployment

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[1] "The Government and Unemployment," Economist, 28 Jul 28, p.164.

[2] Liberal Industrial Inquiry, Britain's Industrial Future ([London]: Ernest Benn, Limited, 1928).

[3] Robert Skidelsky, Politicians and the Slump: The Labour Government of 1929-1931 (London: Macmillan, 1967), p.52.

was largely a reflection of the shift from one equilibrium to another. The solution to this seemingly chronic problem lay in a speeding up of the transition process. In other words, labour mobility - geographic, occupational and industrial - and the level of domestic investment had to be greatly increased. However, the private sector unaided looked unequal to the task. At the same time, the scope for useful public investment was enormous. For example, the existing road system was "quite inadequate" relative to industrial and other requirements; it was causing congestion and raising manufacturers' costs. Its extension and improvement were imperative. Other investment possibilities included slum clearance, agricultural rehabilitation, electrification, afforestation, rejuvenation of the inland waterway system and garden cities "in different parts of the country . . . in accordance with regional plans, based largely on considerations of the transport facilities available."[1] Therefore, the Government should launch at the earliest opportunity a major and comprehensive national reconstruction and development program featuring large-scale investment in selected productive assets of the public sector as a stimulus to private enterprise. Implicit in this line of reasoning was the notion that the number of unemployed, and thus the depressed area problem, would be automatically and permanently shrunk once the State-induced reorientation of the economy had been completed. This idea - that public expenditure could be used much more actively for developmental purposes - was a radical departure from the prevailing climate of opinion.

Particularly interesting is the emphasis placed upon transport by the Yellow Book both as a condition of and stimulus to economic development.

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[1] Liberal Inquiry (1928), p.303.

> The progress of civilisation has always been dependent in large measure on transport. Roads were the arteries of the Roman system. The growth of inland and overland trading of the Middle Ages was made possible by the growth of roads. The large-scale manufacture which followed the Industrial Revolution only became possible when MacAdam and Telford gave us roads, Brindley canals, and Stephenson railways. Transport is more than ever essential to the modern industrial community. Without adequate transport facilities modern large-scale production and trading must be strangled. Per contra, really adequate transport facilities must give it a definite and important stimulus.[1]

To the authors, the petrol engine was to this century what the railway had been to the last.[2] They described its development in glowing terms as "this renaissance of the roads - this new Transport Revolution."[3] Inter alia they said, it facilitated the decentralisation of industry and population. Garden cities (new towns) could be sited, planned and built specifically to meet the requirements of the fast-growing light manufacturing industries. Equally important, these new centres would attract the surplus labour in the depressed areas once the proposed road program had been completed. The rationale for this latter view was two-fold. In the short-run, road work would be widely distributed and the unemployed, who were to be the prime beneficiaries of the new job opportunities, would be able to secure employment without having to leave their homes. Also, there would be important multiplier effects.[4] In the longer-run, the modernized road network would stimulate industrial efficiency, and therefore economic expansion, and help raise living standards generally in part by making possible the planned development of the garden cities on a regional basis. Unfortunately, the more precise inter-relationships in the minds of the authors between the road program, industrial development, garden cities and the future of the depressed areas were left ambiguous.

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[1] Op.cit., p.287. The Economist too took a very sanguine view of the importance of good communications. In a commentary on the Yellow Book, it argued that cheap transport and other communications were "almost as important to our prosperity" as low direct production costs and that public and semi-public providers of SOC-type services should be run as efficiently and economically as possible. "Our Industrial Future," Economist, 4 Feb 28, p.216.

[2] For a brief critique of this view, see Henry Clay, "The Liberal Industrial Report," Economic Journal, XXXVIII (June 1928), 201.

[3] Op.cit., p.288.

[4] Cf. ch. VI of Keynes & Henderson (1929), where these effects are detailed at some length.

The importance attached to transference in the Yellow Book suggests that expectations with regard to the depressed areas were somewhat pessimistic. On the other hand, it could be that the authors envisaged substantial intraregional as well as interregional mobility with the garden cities serving as *de facto* growth points. However, this explanation of their intent is improbable. It is more likely (see below) that they saw improved communications as a stimulus to development in those areas attractive to the new types of industry on *a priori* grounds. Or, to put the argument in a different way, the locational requirements of industry according to the Yellow Book had to be taken as given. It was the task of the Government to help the populace adjust to the needs of industry rather than the other way round.

It can readily be seen that the ITB accepted completely the diagnosis of the depressed area problem made by the Liberal Industrial Inquiry but only part of the prescription. Its explanation for this policy stance was simple. Without actually referring to the Yellow Book by name, the ITB report suggested that the proposals contained therein were highly disputatious. The Board's remit on the other hand was to come up with policy proposals that could be acted on immediately: "Projects, therefore, which would certainly arouse prolonged controversy before acceptance - even if they were to be accepted - cannot have any immediate and practical value for us."[1]

1929 Liberal Party Platform

Clearly, the ITB verdict and its eager acceptance by the Government were too important to go unchallenged. The 1929 election provided the opportunity. Lloyd George, the Liberal leader, put on a superb performance. His platform was a distillation of the Yellow Book. It appeared in the form of a pamphlet, We Can Conquer Unemployment.[2] The Liberal proposals dominated the election campaign. Trevor Wilson, a political historian, has referred to the three-month period between

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[1] Cmd. 3156 (1928), para. 10.

[2] [William Wallace], We Can Conquer Unemployment: Mr. Lloyd George's Pledge (London: Cassell and Company, Ltd., 1929). Astoundingly, Cassell and the Liberal Party sold 340,000 copies of this publication at 6d apiece. See "Business Diary: The Author Who Waited 41 Years," The Times, 9 Sep 70, p.23.

March 1 when Lloyd George launched what proved to be his last great appeal and May 30 (polling day) as "the Indian Summer of the old Liberal party".[1] The centrepiece of the Liberal platform was a massive program of road construction spread over two years and designed to give Britain an unsurpassed modern road network.[2] Three reasons were advanced in its support: 1) the insufficient roads and consequent traffic congestion characteristic of the times were giving rise to "very real and very great" social costs, 2) better roads would mean expanded employment in the motor industry, and 3) road-building was a source of immediate jobs "widely spread over the country." The Liberals also hoped that the road program would facilitate transference by inducing an expansion of permanent jobs in "the comparatively prosperous parts of Britain." In other words, it was not seen as being of direct benefit to the depressed areas although it was nationwide in scope;[3] "in formulating our proposals in regard to roads, as in other cases, we have proceeded upon the principle of doing work where the work is required, as distinct from doing work where unemployment exists".[4]

Another plank in the Liberal platform of interest here was an expanded telephone system. During the latter part of the 1920s, it was widely accepted in Britain that the nation was "telephonically undeveloped in comparison with other countries." The Liberals suggested a crash program to remedy this situation, arguing that "as the tool of industry and commerce it [the telephone] is a vital necessity, enabling capital to be turned over more quickly."[5]

Acclaimed by much of the press including the Economist[6] and by a number of prominent businessmen, and reinforced during May by Keynes & Henderson (1929), the Liberal platform dominated the election campaign.

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[1] Wilson (1966), p.373.

[2] "as Mrs. Hicks remarks, the last government that had taken any interest in motorways was the Roman government." Skidelsky (1967), p.52 referring to the Liberal road program.

[3] Cf. the maps on pp. 14 & 15 of Wallace (1929).

[4] Ibid., p.22.

[5] Ibid., ch. IV.

[6] 18 May 29, pp. 1095-96.

According to Professor Wilson, "It is unlikely that the British electorate has ever been paid the compliment of a more far-sighted and responsible party programme."[1] This judgment was echoed by Skidelsky.[2] From our point of view, the Liberal manifesto is an outstanding example of activist thinking with its stress upon the developmental effects of investment in infrastructure.

1929 White Paper on 'Certain Proposals Relating to Unemployment'

Needless to say, the Liberal proposals came under strong attack from both Conservative and Labour supporters. Interestingly, the wide gulf between the philosophical positions of these two groups did not prevent them from arriving at the same conclusion, viz., that a public works solution to the country's chronic unemployment problem was unrealistic. Labour's election manifesto was a muddled mixture of doctrinaire socialism and financial orthodoxy. The Conservatives, though equally unimaginative in policy terms, were at least more coherent calling for a continuance of the pre-ITB status quo augmented by transference, industrial derating and a selected extension of safeguarding. They also took the unusual step of issuing a White Paper[3] in May 1929 during the heart of the election campaign formally rebutting the main Liberal ideas. This White Paper comprised six memoranda written by departmental officials and signed by the responsible ministers. The Minister of Transport, for example, asserted that Britain's road network "by general admission excels that of any other country."[4] His colleague, the Postmaster-General, flatly denied Lloyd George's suggestion that telephone supply was lagging behind demand. More generally, five of the memoranda, including the two mentioned, focussed essentially on the administrative difficulties implicit in the various Liberal schemes. The sixth, prepared by the Treasury at the direction of the Chancellor of the Exchequer, restated what was by then the familiar 'Treasury view'. This intellectual

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[1] Wilson (1966), p.372.

[2] Skidelsky (1967), p.51.

[3] GB, Ministry of Labour, Memoranda on Certain Proposals Relating to Unemployment, Cmd. 3331 (London: HMSO, 1929).

[4] Ibid., p.17.

stance was enormously important; not only did it dominate civil service thinking, it was also paramount in the City and both the Conservative and Labour parties. According to Youngson, the precise nature of the Treasury view remains "something of a mystery."[1] However, it led to the conclusion that the program of national development proffered by the Liberals was largely uneconomic:

> all the schemes should be tested by the broad criterion whether they are likely to increase the efficiency of industry and enable it to lower its costs of production and increase its output, especially in the export trades . . . we cannot afford investments which yield only an uneconomic, or a very distant, return, or are of a purely luxury nature. Judged by this test, it is difficult to believe that the greater part of the expenditure proposed would increase the power of industry to provide remunerative employment.[2]

1931-32 Depressed Area Surveys Sponsored by the Board of Trade

Following the 1929 election, Ramsey MacDonald, the head of the Labour Party, became Prime Minister. His government's reaction to the growing economic crisis of 1930-31 was to cut rather than expand public expenditure. Caught by the twin dictates of socialist dogma and rapidly rising unemployment, Philip Snowden, Chancellor of the Exchequer, was forced to borrow more and more heavily to pay the dole but he remained opposed to large-scale borrowing for make-work or even development purposes. Supported by the Treasury, he initially turned down most of Herbert Morrison's requests as Minister of Transport for greater financial outlays on trunk roads. Morrison eventually got some money only after intervention by MacDonald. Sir John Anderson, the head of a group of civil servants set up to service a small Cabinet committee on unemployment policy, concluded in mid-1930 that while radical measures were necessary to overcome the problem of hard core unemployment in the depressed areas, nothing could be done until cyclical unemployment diminished. During March 1931, William Graham, President of the Board of Trade, and, like Snowden,

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[1] A.J. Youngson, The British Economy, 1920-1957 (London: George Allen & Unwin Ltd., 1960), p.254.

[2] Cmd. 3331 (1929), p.54.

an exponent of the Treasury view, announced that industrial surveys would be launched immediately in four areas, viz.: South Wales, Lancashire, the NE coast of England and SW Scotland, i.e., "the larger areas most severely affected by the depression in the basic industries."[1] The surveys had three purposes: a) to determine the existing industrial position of the areas, b) to assess their prospects for "early expansion and new development" and c) to estimate the size of their likely labour surpluses during the next few years. Local universities were used to carry out the work. Their findings were published in 1932.[2]

The NE report can be taken as indicative of contemporary academic opinion with regard to industrial prospects in the areas studied. It argued that the NE's best hope lay in the adaptation of existing factories to changing circumstances. The scarcity of new manufacturing operations in the area was attributed largely to the domestic market orientation of most of the post-W.W.I growth industries in Britain and to the remoteness of the NE from the major UK markets. In physical terms, the region's various transport facilities were felt to be "at least as good as those of any other industrial area in Great Britain" but, due to distance, road and rail freight charges on shipments south were generally prohibitive. "This makes us doubt whether efforts to attract new large-scale industries to the Area will achieve any marked degree of success".[3] It will be noted that this pessimistic conclusion was derived solely from the freight rate situation and not from any inadequacies in the communications network. Goods transport, of course, was entirely in private hands during the interwar period.

1934 Derelict Area Investigations Commissioned by the Ministry of Labour

The depressed areas did not share in the general economic recovery which got under way in Britain about March 1933. By the beginning of 1934 they were growing increasingly discontent with the Government's

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[1] GB, 250 H.C. Deb. 5s., col. 207 (24 Mar 31).

[2] GB, BOT, An Industrial Survey of the North East Coast Area by Armstrong College, University of Durham (London: HMSO, 1932); Lancashire Area (excluding Merseyside) by the U. of Manchester; Merseyside by the U. of Liverpool; South Wales by the University College of South Wales & Monmouthshire; South-West of Scotland by the U. of Glasgow. For a review of these 'official papers', see the article by N.B. Dearle in the Economic Journal, XLIII (June 1933), 341-45.

[3] Op.cit., p.54.

failure to come up with any development schemes on their behalf as opposed to salvage measures. This feeling was exacerbated by a series of special reports on their situation in The Times during March of that year.[1] On April 12th, the Prime Minister (MacDonald) told the House of Commons that the initiative for providing employment in particular areas did not rest with the Government. Its purpose, he said, was to restore confidence in the economy as a whole and to expand aggregate employment. Then on April 19th (later described by Oliver Stanley, Minister of Labour, as "exactly the psychological moment"), the Government announced that it was launching immediately parallel enquiries into the special problems of the "derelict areas" within Scotland, Durham, Cumberland and South Wales, the regions hit hardest by unemployment. Specific guidelines were given to the investigators, viz.: a) to assess the likelihood of revival in the traditional industries of the areas, b) to suggest possible inducements to new industry, and c) to estimate the size of the expected residual labour surpluses. Their reports were published in November.[2] Communications were scarcely mentioned. What references there were echoed the 1932 surveys.

1934 Special Areas (Development and Improvement) Act

This historic Act[3] is widely accepted as the beginning of regional policy in Britain.[4] In concept, it was experimental, welfare-oriented and ephemeral, the explicit expiry date being 31 March 1937 although the possibility of an extension was contemplated during the discussion which preceded its passing. The Act's geographic scope was confined to the derelict areas studied by the Government's investigators. The purpose of the Commissioners appointed under the Act was to supplement, not overlap, existing efforts by government departments and local

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[1] Cf. Austin Robinson, "Official Papers: Reports of Investigations into the Industrial Conditions in Certain Depressed Areas," Economic Journal, XLV (March 1935), 183-92.

[2] GB, Ministry of Labour, Reports of Investigations into the Industrial Conditions in Certain Depressed Areas, Cmd. 4728 (London: HMSO, 1934).

[3] 25 Geo. 5, ch. 1. Royal Assent was granted on 21 Dec 34.

[4] To many contemporaries, it was a very small beginning indeed. In the words of Mr. Harold Macmillan, Conservative MP for Stockton-on-Tees, "in comparison with the problems before us this [Special Areas Bill] is a mouse - a nice mouse, a good little mouse, a profitable and helpful little mouse, but a ridiculous, microscopic Lilliputian mouse." GB, 296 H.C. Deb. 5s., col. 640 (13 Dec 34). To parody T.S. Eliot, regional policy began not with a bang but a whimper!

authorities. This purpose was expressed by Mr Neville Chamberlain, Chancellor of the Exchequer, as follows:

> their [the Commissioners] primary function, as we see it, is . . . to enlist local effort and to make use of voluntary assistance from whatever source they can obtain it in order to initiate and prosecute schemes which lie outside the ordinary scope of our public administration but which appear to offer more prospect of employment or occupation, or the reaching of a higher standard for those who are resident in these areas.[1]

Examples of the schemes envisaged by the Chancellor were land settlement, site clearance and small crafts. Improved communications were not mentioned and were probably not considered since, from a reading of contemporary Commons debates, one gets the impression that the geographic facts of life in Britain were generally accepted as immutable. Remote areas were unfortunately remote and that was that, at least insofar as the home market was concerned. Export possibilities, on the other hand, held out hope for these areas in the longer run, i.e., when trade picked up again. So ran the conventional wisdom.

1935-38 Reports by the Commissioner for the Special Areas in England & Wales

There were five reports in all, three by the first Commissioner, Mr P. Malcolm Stewart, and two by his successor, Mr G.M. Gillett.[2] Stewart was chairman and managing director of Associated Portland Cement Manufacturers Ltd. at the time of his appointment, and in that capacity would have been highly conscious of the importance of transport costs to industry. Thus, the analysis in his initial report of why firms establishing new plants shunned the Special Areas is particularly interesting. He gave five main reasons: 1) inaccessibility to markets, 2) high rates, 3) fear of industrial unrest, 4) the SAs' depressed image, and 5) difficulty in obtaining finance for new industry. The inaccessibility argument was of prime importance, he felt, only in Cumberland although South Wales and Durham were also affected. On the other hand, none of the more remote districts in the SAs had much hope of revival due to their location, i.e., considerable intra-SA mobility

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[1] GB, 293 H.C. Deb. 5s., col. 1997 (14 Nov 34).

[2] GB, Ministry of Labour, Commissioner for the Special Areas (England & Wales), Reports - Cmd. 4957 (London, HMSO, 1935); Cmd. 5090 (1936); Cmd. 5303 (1936); Cmd. 5595 (1937); and Cmd. 5096 (1938).

was essential in addition to interregional transference.

With regard to communications, Stewart noted that the SAs Act effectively proscribed his supplementing Ministry of Transport grants to local authorities for new roads, etc. even though such supplements might induce economic development. Similarly proscribed were direct grants to local authorities for communications projects. Thus, while he specifically wanted "to assist in much needed schemes such as the tunnel under the Thames near Purfleet, the construction of an orbital road round London or of a bridge over the Severn at Chepstow,"[1] he was debarred from doing so. The latter project was seen as a stimulus to the economic development of South Wales, the first two as substantial employers of SA labour.

In his second report, Stewart discussed his mail questionnaire survey, conducted with the help of the FBI, of 5829 firms in Britain to discover their attitudes towards the SAs; 4066 did not reply. Of the remainder (1763), only 12 said they were prepared to consider a SA location. Stewart concluded, not that remoteness was the problem, but that "industrialists, in the main, are indifferent to the Special Areas."[2] His survey corroborated a conclusion which he had arrived at earlier that the only realistic way to foster industrial development in the SAs was to "create a local demand for local production"[3] through various self-help measures such as local enterprises, buy locally campaigns, local development councils and propaganda. Obviously, however, the employment potential in this general line of action was limited. Thus, he pressed for a complementary policy of more transference.

In his third and final report, Stewart returned to the subject of transport, commenting that "improvement of communications is one of the obvious ways of facilitating economic development and I have therefore felt justified in making certain specific recommendations," viz., that

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[1] Op.cit., para. 51. The Commissioner could assist certain projects regardless of their location so long as they promised to employ substantial numbers from the SAs.

[2] Op.cit., para. 17.

[3] Cmd. 4957 (1935), para. 201.

the Severn Bridge be built, that road and rail access to West Cumberland be improved, and that better facilities for crossing the Tyne east of Newcastle be devised. He argued that a Severn Bridge "was one of the most important steps which could be taken to facilitate the economic development of South Wales."[1] It would improve accessibility and help break down the feeling of isolation that affected not only the Welsh but the business/financial community in London. Interestingly, the scheme was strongly opposed by at least one Welsh borough, by railway interests, and by some important coal-owners. Indeed, the bridge was not built, despite its patent desirability and a conditional offer of financial support from the MOT to the local authorities involved, for another 30 years. Improved communications were essential for West Cumberland in Stewart's view: "the most practicable measure which could be taken for the industrial and economic development of West Cumberland would be a radical improvement in rail and road access from the South."[2] This was clearly an activist stance for existing traffic did not warrant further investment in transport facilities. In contrast, the Tyneside proposal was an example of bottleneck elimination. Ferries and bridges already existed but they had become antiquated and inadequate.

Gillett generally supported Stewart's views and proposals concerning communications.

1937-40 Royal (Barlow) Commission on the Distribution of the Industrial Population

The appointment of a Royal Commission under the chairmanship of Sir Montague Barlow on 8 July 1937 reflected both the persuasiveness of Sir Malcolm Stewart and the apparent intractibility of the SA problem. Extensive evidence was taken by the Commissioners. As a consequence, their report,[3] a comprehensive and prescient document, was not completed till August 1939; publication was delayed by the advent of war.

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[1] Op.cit., para. 173.

[2] Ibid., para. 181.

[3] GB, Royal Commission on the Distribution of the Industrial Population, Report, Sir Montague Barlow, chairman, Cmd. 6153 (London: HMSO, 1940).

In chapter IV of the report, there appears an analysis of the "influence of changes and development in transport since the [1914-18] war upon the distribution of industry." It was suggested that the emergence of road haulage as a major transport medium had produced three main effects: 1) a wider spatial dispersion of economic activity in and around existing urban areas, 2) a relative reduction in transport costs due to road-rail competition, and 3) an increase in the attractiveness of the London area to new industry most of which was non-local market-oriented, dependent upon external economies, mass assembly in nature, and relatively indifferent to transport costs. These ideas reflected an essentially descriptive and historical appendix on the location of industry in Britain by Professor (and Commissioner) J.H. Jones who, like Stewart, seemed to take a rather activist view of transport improvements.

The Commission recommended that a central authority be set up for the twin purpose of regulating the location of industry and coordinating town and country (regional) planning with a view to dispersing new industry from the South-East to planned counter-magnetic regional centres in other parts of the country, each of which would be helped to acquire a balanced industrial structure. The bulk of the Commissioners proposed that this authority should take the form of a 4-man National Industrial Board separate from, but responsible to, the BOT. But a minority, including Professor L.P. Abercrombie, felt that the authority should be a ministry in its own right embracing, not only location of industry and town and country planning matters, but also the existing powers and functions of the MOT under the 1935 Restriction of Ribbon Development Act and the 1936 Trunk Roads Act,[1] and possibly some housing functions. In other words, the minority explicitly recognised the need to integrate location of industry with transport policy at the national level; the majority did not. Specific recommendations regarding freight rate policy were not made by any of the Commissioners despite the chairman's comment during the taking of

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[1] This piece of legislation (1 Edw. 8 & 1 Geo. 6, ch. 5) transferred the responsibility for the GB trunk road system (4,500 miles in 1937) from the local authority to the national level of government. It took effect on 1 Apr 37. The MOT became Britain's first national highway authority.

evidence that the whole question of freight rates "is one of the things we shall have to look into very carefully."[1] It would seem to follow that the Commission generally attached little importance to transport costs as a location factor.

The evidence presented to the Commissioners is a mine of information. Indeed, it is much more interesting for our purposes than their report. Not only does it show in considerable detail what was known about transport and the location of industry at the time, but it demonstrates the beliefs and priorities of key ministries and influential groups, revealing in the process both muddle and genuine differences of opinion. For example, Mr W. Palmer, Second Secretary at the BOT, testified[2] that "easy transport is, I think, a very important factor in a business man's choice of where he should put a light industry, and probably a more and more important factor every year." On the other hand, in response to a question by Ernest Bevin, he said that none of the migrant companies during the previous few years which had declined to set up its new factory in South Wales had, so far as the BOT knew, attributed its decision to the region's relatively poor road facilities. Referring to the BOT's annual Survey of Industrial Development launched in 1932, Palmer observed that the survey personnel found it very difficult to weight the location factors involved in new factory openings: "there is never any one single reason: it is a combination of reasons and the person who makes the decision is often hazy in his own mind as to how he reached his conclusion and finds it difficult to tell us how he reached it."[3] Nonetheless, they attempted to establish the governing factors. The resultant official figures showed that, of the 1352 factories (for which information was available) opened in GB during the 1933-36 period, 134 were raw material-oriented and 117 were oriented towards local markets. 'Convenience of premises', however, was by far the most common main location factor cited (683 factories). This was roughly as true of Scotland as the island

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[1] GB, Barlow Commission, Minutes of Evidence (London: HMSO, 1937-39), Q.4717 (31 Mar 38).

[2] See ibid., evidence taken on 19-20 Oct 37.

[3] Cf. T.E. McMillan, Jr., "Why Manufacturers Choose Plant Locations vs. Determinants of Plant Locations," Land Economics, XLI (August 1965), 239-46. McMillan begins his article with the comment that plant location surveys almost invariably tend to produce identical results.

as a whole. On the other hand, raw material accessibility was substantially more important in Scotland than elsewhere; local market proximity was slightly more important. While Palmer did not draw this inference, these facts can be interpreted as suggesting that transport costs were of greater significance in Scotland than the rest of GB.

Mr. L. Browett, Secretary at the Ministry of Transport, told the Commission that transport generally lagged rather than led industrial development.[1] But he admitted that there had been some important exceptions historically to this generalisation when Professor Jones interjected that the conventional wisdom was the reverse of the MOT viewpoint. Jones also put forward a strong argument to the effect that long-distance traders had been disadvantaged during the interwar period by the growth in road transport and (from 1933) by the railways' growing use of agreed charges, the result of which had been a decline in the importance of tapered rates. He called this decline and its consequences "the central issue on the relation of transport to the location of industry." The MOT, however, did not agree.

It was argued in an MOT memorandum to the Commission that future transport developments were unlikely to have much effect on the prevailing regional distribution of industry. Road developments, on the other hand, were expected to increase the locational pull of large urban centres. The memo concluded that any marked reversal of "present" trends in industrial location would arise only through deliberate government action. It was further claimed in the MOT memo that the Ministry had no direct powers with which to influence the location of industry: "Changes in transport facilities will follow rather than initiate any changes in the location of the industrial population which may be considered desirable, but the existing transport system of the country should prove adequate, with a certain amount of adaptation, in the event of moderately substantial changes in such distribution." Existing MOT policy with regard to new road proposals was to judge them on their economic merits. Transport subsidies as an aid to regional development were explicitly ruled out on two grounds, ineffectiveness and administrative awkwardness.

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[1] See Minutes of Evidence, evidence taken on 2 Dec 37.

The Association of County Councils in Scotland suggested to the Commission[1] that long-distance transport might need to be subsidised in the interests of a "fair" distribution of industry, possibly by postalising freight rates. Transport costs were cited as a major factor in the general failure of Scotland to attract firms in the new expanding industries by the Association of Counties of Cities in Scotland.[1] Invoking the name of Adam Smith, it urged an expansion of Scotland's road facilities. It also recommended that consideration be given to the postalisation of freight rates. Interestingly, this subject was ignored by the Scottish Economic Committee.[2]

Transport costs were discounted as a general location factor by the FBI[3] and by the Port of London Authority.[4] Two MPs, Harold Macmillan and J.R.H. Cartland, advocated that some form of freight rate equalisation scheme should be introduced in Britain.[4] An expert enquiry into the "whole question of transportation rates" was recommended by the NE Development Board.[4] The Town Planning Institute called for the integration of transport, town planning and land use policy.[5] A cognate body, the Garden Cities and Town Planning Association, told the Commission as part of a very well-argued submission[6] that transport costs were undoubtedly "often decisive" in plant location decisions involving national markets and a choice of regions. It suggested that "a majority of factory industries" had an outbound transport cost/total production cost ratio of between 1% and 5%, and (contrary to the Balfour Committee's admittedly limited findings) that inbound transport costs were usually "though not always" less than distribution outlays. The GC & TPA included in its memo the following distribution cost data relating to a group of Lancashire firms oriented primarily towards national markets:[7]

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[1] See ibid., evidence taken on 15 Dec 37.

[2] See ibid., evidence taken on 3 Mar 38.

[3] See ibid., evidence taken on 30 Mar 38.

[4] See ibid., evidence taken on 31 Mar 38.

[5] See ibid., evidence taken on 4 May 38.

[6] See ibid., evidence taken on 5 May 38.

[7] The figures were supplied to the GC & TPA by Mr. S.R. Dennison. Cf. Dennison (1939) where it is argued in ch. III on the basis of presumably similar evidence that transport costs were not an important locational constraint for most expanding industries in GB during the 1930s.

Product	Average Delivery/ Total Cost Ratios %
Drugs and chemicals	5.0-7.5
Sewage plant	1.0-7.5
Linoleum	5
Wallpaper	5
Bathroom fittings	5
Nuts and bolts	5
Structural engineering	5
Paper	4
Coarse weaving	4
Rubber proofing	4
Rubber toys	2.5
Paint	2
Waxed cartons	1.5
Slippers	1.3-1.5
Domestic electric boilers	1
Clothing	1
Transparent paper	0.75
Hats	0.5
Tanning	less than 1
Handbags	negligible

Apart from the data published by the Balfour Committee, they appear to be the only figures of their type in existence at the time (see the following paragraph).

The Railway Companies' Association did not think much of freight rate postalisation as a concept, arguing not only that the idea was "unscientific, unreasonable and impracticable," but also that freight rates generally had not "materially affected the location or the concentration of industry."[1] It asserted that while the railways both followed and fostered industrial development, the former sequence was much the more important of the two. This assertion was contradicted by Associated Road Operators Ltd.[1] which argued that transport had been a rather important locational determinant in the past. But the road operators stressed that little was known about manufacturers' transport costs: "This is a matter of the greatest importance, and we suggest the results would justify a public enquiry." Not unnaturally, they took a very positive, and indeed activist, attitude towards the provision of roads:

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[1] See Minutes of Evidence, evidence taken on 18 May 30.

> With a road system capable of meeting modern needs, an industrial area could be established, other things being equal, almost anywhere in Great Britain. In fact, the provision of modern roads where at the moment they are non-existent might not only serve, it might create, an industrial area.

Paradoxically, the road hauliers themselves were prohibited by the road licensing authorities from investing ahead of demand.

In light of these many, albeit conflicting, comments on transport and the location of industry, it is not readily explicable why the majority report of the Barlow Commission virtually ignored the subject, except by implication, in its concluding section on remedial measures. However, a number of points can be surmised. First, since most expanding industry did not seem to attach much importance to transport costs, there was no pressing reason to make recommendations concerning freight rates. Secondly, improved or cheaper long-distance transport was recognized to be a two-edge sword. By itself, it could just as easily hurt as help the depressed and other areas remote from the South-East. Finally, transport subsidies were opposed by the MOT and postalisation was not really compatible with private enterprise in the transport sector. Thus, the making of positive recommendations on these topics was probably judged to be impractical and a waste of time. Negative recommendations, on the other hand, were scarcely essential.

The Barlow Commission as a whole seems to have been generally permissive in its attitude towards transport facilities although it recognised that transport innovations historically had been at least partially stimulatory in their effects. This was true, for example, of both the railway and the lorry. But obviously the provision of transport infrastructure in 'outer Britain' was not sufficient inducement *per se* in its view to attract industry from the Greater London area. Otherwise, it would not have been necessary to recommend that a National Industrial Board be created.

1944 White Paper on Employment Policy

This White Paper,[1] one of the most famous in British economic history, set out *inter alia* the Government's plans with regard to the Barlow Report. Three points warrant mention here. First, the Government committed itself to taking such action "as may be necessary"

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[1] GB, Ministry of Reconstruction, Employment Policy, Cmd. 6527 (London: HMSO, 1944).

to ensure adequate communications in the future 'development areas'. Secondly, the ministries concerned with the provision of communications were given only scant attention, and one can conclude that their role in postwar regional policy was seen as being a minor one. Thirdly, those types of industry most "naturally" suited to each DA were to be determined through research.[1]

1945 Distribution of Industry Act

This Act,[2] which repealed the earlier Special Areas legislation, was the basis for regional policy in GB between 1945 and 1960. Section 3 was the only clause relating to communications. It empowered the Government to make grants or loans for the improvement of basic services in the DAs "in addition to any other powers of a Minister . . . to make grants or loans." Basic services were defined as "the provision of facilities for transport (whether by road, rail, water or air) or of power, lighting or heating, and housing, health and other services on which the development of the area in question, and in particular, of industrial undertakings therein, depends." In practice, as will be discussed in more detail below, very little use was made of Section 3.

1947 Report on the Administration of the DAs by the Select Committee on Estimates, and Related Evidence

It was stated in the Select Committee's 1947 Report on the administration of the DAs that the BOT, with the consent of the Treasury, was empowered by the 1945 D of I Act to make grants or loans for the improvement of basic services in the DAs.[3] This assertion was in fact misleading for, as had been explained to the Committee in evidence by the BOT's Regional Controller in Cardiff, the Board had no power per se to expedite the provision of basic services to industry. Rather, power rested with the appropriate Ministry, e.g., Fuel and Power in the case of gas, Health in the case of water, and so forth.[4] On the other hand,

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[1] Cf. Florence (1948), pp. 136-40 and his earlier article, "The Selection of Industries Suitable for Dispersion into Rural Areas," Journal of the Royal Statistical Society, CVII (Part II, 1944), 93-107.

[2] 8 & 9 Geo.6, ch. 36. Royal Assent was given on 15 Jun 45. The Act did not apply to Northern Ireland.

[3] GB, Select Committee on Estimates, "Second Report: The Administration of Development Areas," in Reports Together with the Proceedings of the Committee and the Minutes of Evidence . . . and an Index, H.C. 97, 149, etc. 1946-47 (London: HMSO, 1947), p. xxiii. The report, of course, was referring to Sec. 3 of the Act.

[4] Reports, Q.957. McCrone (1969), p.110 fell into the same pitfall as the Select Committee.

sub-Ministerial coordination between the various government departments concerned with industrial location was the responsibility of an inter-departmental committee, Panel A, chaired by the Under-Secretary in charge of the BOT's Distribution of Industry and Regional Division. Equivalent panels at the regional level were chaired by the BOT Regional Controllers.

Sitting on these panels, which met during the early postwar period at least fortnightly, were representatives from six departments: the BOT, the Admiralty, and the Ministries of Labour, Supply, Town and Country Planning,[1] and Works. While all proceedings were confidential, copies were regularly sent to four other Ministries - Agriculture and Fisheries, Food, Fuel and Power, and Transport. If they wished, representatives from this latter group could attend panel meetings but they had no voting rights. Completely excluded from the work of the panels, whose discussions were confidential, were two of the several departments concerned with the provision of OC, viz., the Post Office and the Ministry of Civil Aviation.

Panel A's terms of reference were twofold:

a) to consider all general questions relating to the policy of industrial distribution calling for interdepartmental discussion below the Ministerial level.

b) to review and make recommendations on projects for new industrial development.[2]

In other words, it had no executive powers. On the other hand, it did provide a forum for the airing of a variety of viewpoints on industrial location matters. From the exclusion of the PO and MinCivAv, it can be inferred that the postal system, telecommunications and air travel were not seen at that time as having much locational significance. A similar attitude would appear to have prevailed with regard to road and rail transport since even the MOT had no effective voice on the panels. It seems reasonable to conclude that Section 3 of the 1945 Act was not so much ignored as emasculated by the institutional arrangements devised to give it effect, at least insofar as communications were concerned.

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[1] Department of Health in Scotland.

[2] Reports, p. 174.

This tentative assessment is corroborated by several pieces of evidence submitted to the Select Committee. The first involved the explanations proffered by industrialists refusing to locate in a DA despite BOT blandishments. Between mid-June 1945 and the coming into force on 1 July 1948 of the industrial development certificate (i.d.c.) provision in the (1947) Town and Country Planning Act, the BOT was equipped with various carrots but no official stick.[1] Sometimes the carrots proved ineffective with industrialists for one or more of three general reasons: 1) a belief that a DA location would mean much heavier transport charges on the shipment of output to main markets - "that argument is advanced in particular by the representatives of heavy industry" - 2) an inability to get key workers to move, 3) the cost of uprooting and moving.[2] No indication was given of the quantitative significance of these various arguments.

Echoing the 1931-32 industrial survey of the NE discussed earlier, the BOT Regional Controller in Newcastle upon Tyne told the Committee that the cost of transporting output from the NE to the South was a serious consideration for many southern firms contemplating a move to the NE region.[3]

Noteworthy, finally, is the argument advanced by the BOT Deputy Regional Controller in Whitehaven that transport inadequacies were, and always had been, West Cumberland's "most difficult problem."[4]

These points suggest both that transport costs were an important locational consideration for a not insignificant number of manufacturers, and that senior BOT personnel were fully aware of this situation. Thus, it is not readily understandable why the BOT at least was not a member of the distribution of industry panels. Equally puzzling is the failure of the Select Committee to comment on this matter in its report. Perhaps the answer to some extent lies in the radical shake-up of the transport system promised by the Transport Act which received Royal Assent during August 1947. The Committee may have felt that it was pointless

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[1] Building licences formed a de facto stick but they were issued by MinWorks.

[2] Evidence by Mr G. Calder, BOT Under-Secretary, Reports, Q.68.

[3] Ibid., Q.270.

[4] Ibid., Q.671.

to make any recommendations concerning communications when such momentous changes were underway. It is more likely however that the Committee considered the question of communications and regional development to be essentially a policy matter and therefore outwith its terms of reference which related to the administration of a program already in effect.

1948 Cmd. 7540 on the Distribution of Industry

The occasion for this White Paper[1] was the provision in the 1945 Distribution of Industry Act that the boundaries of the DAs should be reviewed three years after their initial designation. Apart from a recommendation that a DA be scheduled in the Highlands and Islands centred on the Inverness-Tain axis astride "the main lines of communications", transport and related matters were virtually ignored.

1955 Report on the DAs by the Select Committee on Estimates and Related Evidence

The Committee was concerned with expenditure on regional policy rather than policy per se. Four points arising out of its work[2] are relevant to our interests. First, it was noted that expenditures under Section 3 of the 1945 D of I Act had been negligible. However, the Committee had no significant comments to make on this matter.

Second, while factory rents on the BOT's industrial estates in Britain were based from mid-1951 on current market values, the rents in Scotland were unusually low relative to those in England and Wales. One of the reasons advanced by the "Chief Valuer, Scotland," a government official charged with the task of establishing current market values, in explanation of this situation was the distance separating Scottish manufacturers from the major British supply sources and markets. To illustrate his point, he mentioned the case of a London-based electrical components producer with a branch in Scotland. This firm estimated that its transport and administrative costs were £9,000 a year higher than they would have been had it not gone to Scotland but expanded in the South, a sum equal to about 3s. per square foot of its Scottish floor space. In contrast, the prevailing factory rent on the

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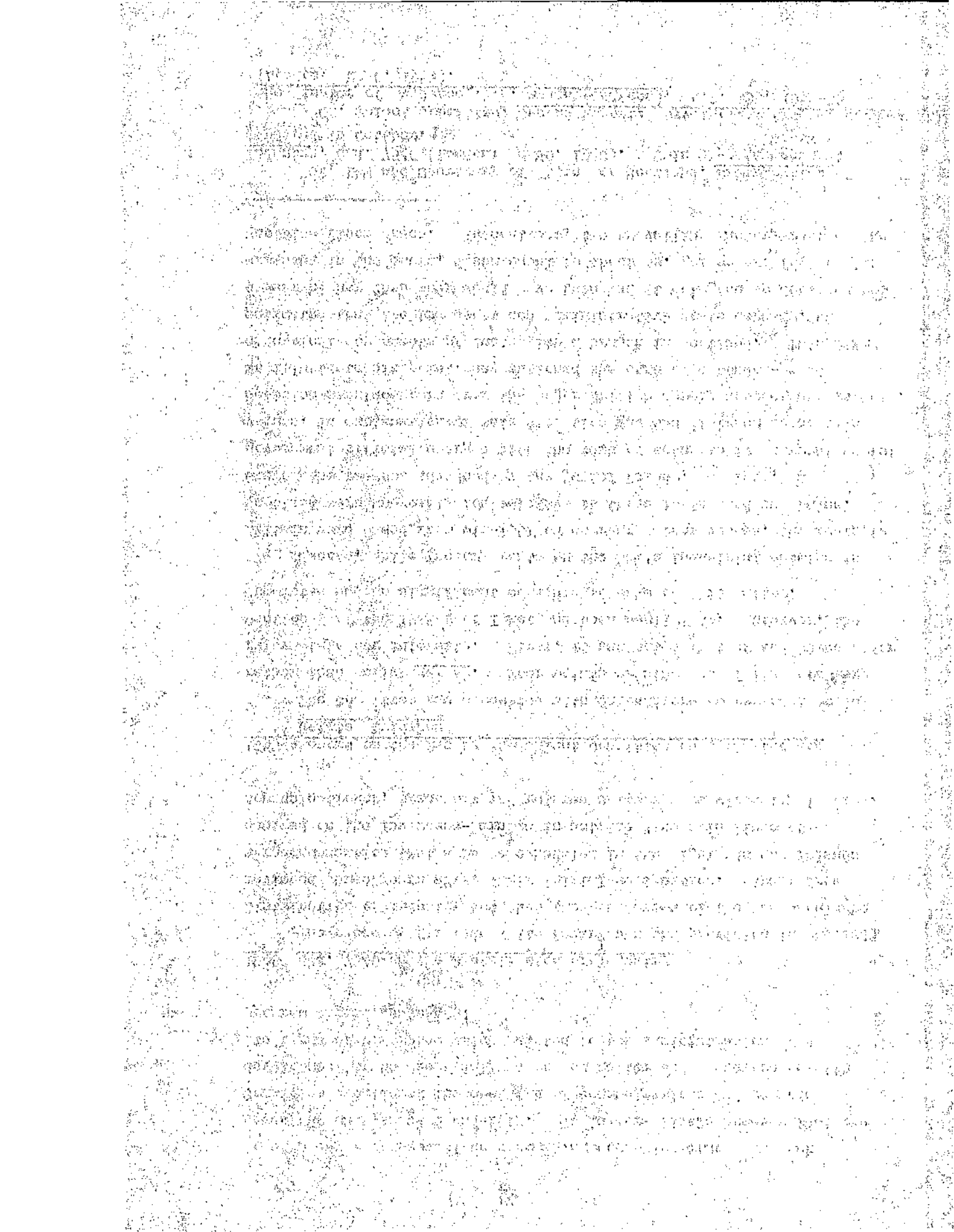
[1] GB, BOT and Secretary of State for Scotland, Distribution of Industry, Cmd. 7540 (London: HMSO, 1948). This 52-page document appeared in October.

[2] GB, Select Committee, Second Report: Development Areas (Together with the Minutes of Evidence . . . and Appendices), H.C. 139, 1955-56 (London: HMSO, 1955).



Hillington Industrial Estate at the time (August 1955) was only 1s.4d. per sq.ft. Part of the reason for this low figure was to help compensate for the distance costs faced by many migrants.[1] The important point here is that the compensation policy pursued in Scotland was deliberate though unofficial and indeed sub silentio. Surprisingly, it seems to have attracted very little attention.

Third, Dame Alix Kilroy, a BOT Under-Secretary, revealed that Panel A, the interdepartmental coordinating body, had virtually ceased to exist by 1955. Distribution of industry policy and procedures had allegedly become so widely known and so standardised that the Panel was no longer felt to be necessary. "We still do discuss with other departments, which is really what Panel A was doing; but it is done much more now by correspondence than it was before, although we do meet from time to time ad hoc."[2]

Finally, distance from major supply centres and corporate HQs in the Midlands and London was cited by senior executives of Wales and Monmouthshire Industrial Estates Ltd. as the principal drawback to the Fforestfach Industrial Estate in the Swansea area of west Wales. This estate had 12 tenants in 1955. Particular stress was placed on the fact that many parent companies "do not look kindly on any factory which is rather remotely situated, mainly we think because the directors of such companies who make weekly visits - and that is the usual procedure down here; they come down once a week or once a fortnight - have a curious reluctance to come much further west than Cardiff."[3] Bridgend Industrial Estate, on the other hand, with 74 tenants in 1955 and less than 25 miles east of Fforestfach, did not find the distance factor nearly so daunting.[4] Presumably, it represented the western margin of the area considered reasonably accessible by English industrialists

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[1] Mr Allan Young, BOT Controller for Scotland, told the Committee that distance from major markets and above-normal transport costs were major factors accounting for the lack of diversification in the Scottish economy and the consequent failure of the unemployment rate in Scotland to fall below double the UK average. Ibid., Qq. 704-05.

[2] Ibid., Q.45. According to Fogarty, the panels had become moribund by 1948, mainly because of the irritating delays endemic to the initial system. The BOT assumed sole responsibility for their work. Michael P. Fogarty, "The Location of Industry," ch. XII in The British Economy, 1945-50, ed. by G.D.N. Worswick and P.H. Ady (Oxford: Clarendon Press, 1952), pp. 266-67. Smith regretted their demise: Brian C. Smith, Regionalism in England, Vol. I: Regional Institutions - a Guide, (London: Acton Society Trust), p.20. Luttrell (I, 1962, p.68 - for full reference, see below) stated that the panels ceased to have an effective voice in i.d.o. decisions from mid-1948.

[3] Op.cit., Q.360.

[4] Cf. ibid., Qq. 385, 390-93.

The foregoing suggests very little change in the official attitude towards communications and regional development between 1947 and 1955; if anything, the aura of indifference prevalent at the beginning of the period had grown more pronounced during the ensuing eight years. Nonetheless, distance costs remained an important locational consideration in the eyes of many of those directly involved in interregional industrial mobility. Indeed, in Scotland, as we have seen, steps were quietly taken by the local BOT representatives to compensate for these costs beyond the level of compensation available elsewhere in GB under the normal range of DA benefits. One wonders, however, about the efficacy of such hidden subsidies.

1960 Local Employment Act

This Act[1] repealed and replaced the three D of I Acts. The clause relating to the provision of basic services in the 1945 Act was reiterated (Sec. 7) with very little change and with much the same, i.e., negligible, results.[2]

1963 Neddy on Regional Policy

No doubt influenced by the Toothill Report, the National Economic Development Council in March 1963 called for increased CC investment as part of a new-look regional development policy focussed on growth points.[3] CC, however, was assigned a distinctly secondary role in the development process with pride of place going to financial incentives and assistance with the training of labour. Furthermore, it was seen as permitting rather than stimulating new economic activity. Nonetheless, Neddy's advocacy of increased expenditure on CC as part of a comprehensive regional program represented the first such plea at the national level with the

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[1] 8 & 9 Eliz.2., ch. 18. Royal Assent was given on 22 Mar 60.

[2] Cf. the Hunt Committee Report (1969), p.236 which shows expenditure on the provision of basic services in the DAs under the 1960 Local Employment Act to have been negligible in 1966-67, £0.05m. in 1967-68 and an estimated £0.1m. in 1968-69. See also the various annual reports by the BOT under Sec. 23 of the 1960 Act, e.g., Local Employment Acts, 1960 to 1966: Eighth Annual Report by the Board of Trade for the Year Ended 31st March 1968, H.C. 370, 1967-68 (London: HMSO, 1968), pp. 11-12.

[3] "Regional Questions" in GB, NEDC, Conditions Favourable to Faster Growth (London: HMSO, 1963), pp. 14-29. In the words of Michael Shanks, the importance of improved infrastructure was "one of the most important lessons of regional development learned in the early sixties - and for this . . . the nation is particularly indebted to the bright young thinkers and planners of the Scottish Council." Shanks, The Innovators: The Economics of Technology (Harmondsworth, Mddx: Penguin Books, 1967), p.139.

exception perhaps of the Barlow Commission whose main recommendation as presented earlier can be construed (cf. McCrone (1969), pp. 104-05) as pointing in the same general direction. Its influence was almost immediate; the White Papers published in mid-November 1963 on Central Scotland and NE England both laid heavy emphasis on the importance of OC in regional development.

Echoing the conventional view in 1963, Neddy accepted that manufacturers' transport costs were probably higher in Scotland and NI than elsewhere in the UK, and that, in the case of the latter region, this adverse transport cost differential put local producers at a continuing total cost disadvantage. In the case of Scotland, however, it was argued that the adverse transport cost differential was offset by lower rents and wages leaving local producers neither better nor worse off than their competitors to the south.

1963 White Papers on Central Scotland and NE England

The Scottish document is discussed more thoroughly in the following chapter. However, it had certain features in common with its English counterpart, e.g., the circumstances surrounding its birth were essentially ad hoc, it explicitly embraced the growth centre[1] development concept, it assigned a key role to transport investments as an aid to regional economic growth, it revealed an awareness of the need for integrated economic and physical planning which had been missing from official circles in Britain for a generation, and, in a major departure from previous regional policies, it had a pronounced expansionist aura.

In the NE document,[2] it was baldly asserted that the free depreciation scheme and the standard grants inaugurated in 1963, while a powerful stimulus, were insufficient to induce self-sustaining growth in the region. Additional measures were needed, especially increased OC investment. Communications were singled out for particular emphasis:

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[1] Growth 'zone' in the case of the NE.

[2] GB, BOT, The North East: A Programme for Regional Development and Growth, Cmnd. 2206 (London: HMSO, 1963).

> Special attention will be given to improving communications within the region and between the region and the rest of the country. In particular, there will be a massive increase in the region's already substantial road programme.[1]

It was proposed to give the area a disproportionately large share of total British "public service investment" for some years ahead as a way, not only of accommodating, but also of triggering increased economic activity. The White Paper is quite clear that the proposed CC increments should be put in place ahead of known demand. Less certain is its stand on the activist/passivist issue. At one point it is argued that CC is essentially permissive in its effects.[2] Elsewhere, a more activist viewpoint is presented.[3] While this discrepancy suggests ambivalence, overall it seems clear that the NE programme was intended to produce results, i.e., the general tenor was activist.

1964 Creation of the DEA

The Department of Economic Affairs was formed by the new Labour Government on 16 October 1964, the day after the General Election. It took over responsibility for regional policy and planning from the BOT and became the apex of a novel regional planning apparatus involving: a) the designation of official planning regions, eight in England and 11 in total, b) the setting up of Regional Economic Planning Councils with appointed but representative memberships drawn from the local areas and intended to play an advisory role in the formulation and implementation of regional plans, c) the establishment of complementary Regional Economic Planning Boards comprised entirely of civil servants and intended to coordinate the work of the many government departments having a regional structure. All regional planning was to be done within the framework of an integrated national development plan.

While the Regional Boards had a wider membership than the old regional distribution of industry panels, Transport turned out to be one of the few ministries vitally concerned with regional planning on

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[1] Ibid., p.6.
[2] Ibid., para. 37.
[3] Ibid., paras. 71 & 126.

a priori grounds which had not granted its regional offices any extensive amount of autonomy. In the words of Chester and Gough,[1] this was "a matter of considered policy," i.e., decision-making in Transport was highly centralised by choice. It meant, however, that the Ministry's Divisional Road Engineers, who actually attended Regional Board meetings, were handicapped relative to their colleagues from other departments. This was the situation at the inauguration of the Boards. During the ensuing 12 months or so, the Divisional Road Engineers were given "considerably increased authority" which allowed them to decide, without reference to HQs, on road schemes costing up to £100,000, the money coming from a general fund set up in each region.[2]

1965 National Plan

The National Plan,[3] published in September 1965, contained chapters on regional planning and transport, and, like the 1963 regional White Papers, was fully cognizant of the importance of OC for regional development. Transport was seen as an active agent in the development process,[4] especially major road schemes. Implicit in the Plan was the view that most Whitehall decisions historically concerning the transport network had been made without regard to their consequences for the regions.[5] Explicit was a commitment by the Government "to give full weight to regional considerations in drawing up future investment programmes."

1969 DEA's Assessment of Regional Economic Prospects to 1972

The chapter on regional policy and prospects in this Green Paper published by the DEA during February 1969[6] only hints at the importance of good communications. By and large, in contrast to the National Plan, the subject is ignored.

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[1] T.E. Chester and I.R. Gough, "Regionalism in the Balance: Whitehall & Townhall at the Crossroads? A Progress Report," District Bank Review, No. 157 (March 1966), 16.

[2] Ibid.

[3] G.B., DEA, The National Plan, Cmnd. 2764 (London: HMSO, 1965).

[4] Cf. ibid., p.95 (para.32) & p.126 (para.2).

[5] The veracity of this viewpoint is demonstrated below.

[6] "Regional Strategy and Prospect," ch.9 in GB, DEA, The Task Ahead: Economic Assessment to 1972 (London: HMSO, 1969), pp. 91-107.

MOT Green Paper published in 1969[1] - they are still far from being fully satisfactory(cf. p. 23 above). As the Economist asserted recently, the "crux of the matter is the impossibility of costing or pricing roads."[2] Road and regional policy began to be coordinated only with the formation of regional planning machinery during the 1963-65 period. Coordination has continued ever since. That the roadbuilders and regional planners are not yet getting on as well as they might, however, is suggested by a critical review of the 1969 MOT Green Paper by Professor Anthony Goss.[3]

Rail

Largely built before regional policy began, Britain's railways were in private hands until 1947 when they were nationalised and made responsible to the newly-created British Transport Commission. They have remained nationalised, of course, to this day. Like the road system, the railway network was starved of capital for years prior to 1954. Between that date and 1960, however, gross railway investment totalled some £820m. But much of this expenditure proved to be hopelessly uneconomic despite sanction by both the MOT and the Treasury and an enjoinder on the BTC

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[1] GB, MOT, Roads for the Future:A New Inter-Urban Plan (London: HMSO, 1969). Cf. "Roads: The Next 2,000 Miles," Economist, 10 May 69, pp. 46-47.

[2] "Roads: Separate Paths," Economist, 3 Oct 70, pp. 83-84. Cf. British Road Federation, Roads: A New Approach, a summary of the report by a British Road Federation working party on road finance and administration (London: BRF /1968/).

[3] "Roads - 'Back to Square One'," Town and Country Planning, XXXVII (June 1969), 254-58. See also GB, DEA, "Industrial Change and Regional Policy," working paper presented to the Social Science Research Conference, Bristol, 1969 where it is asserted in an appendix (p. 7) that the "marginal benefit to regional planning from the resources put into transport planning turn out to be low."

1969 Hunt Committee Report

Contrary to The Task Ahead, the Hunt Committee Report, published by the DEA on 24 April 1969, devoted a great deal of attention to the need for improved communications as part of a comprehensive regional policy. The essence of the Committee's attitude is apparent from the following quotation:

> We are glad to see . . . the growing recognition of the importance of infrastructure improvements as a basis for growth. For many years the emphasis has been on incentives to industry to set up in development areas. Only in recent years has the importance of creating an environment favourable to growth come to be recognised. The major road programmes for the North East and for Central Scotland are striking examples of this . . . We regard those developments as of major significance . . .[1]

Better communications for the Intermediate and Development Areas were advocated, not as a way of reducing transport costs "which, except for heavy industries, represent a relatively small proportion of manufacturing firms' costs,"[2] but as a means of mitigating the allegedly much more critical feeling of isolation and remoteness prevalent in the more peripheral regions.

Generally speaking, the Committee adopted an activist view of improved communications. For example, it stated with regard to the Edinburgh area that "there has been a very considerable strengthening of the infrastructure, notably the improvement to Leith docks, which should provide an impetus to growth."[3] Even more pointed were some comments relating to the South-West:

> the most effective way of raising the level of economic activity is by improving communications to and within the region. The completion of the 'spine road' to the South West in the early 1970s would itself do much to attract industry. A good regional airport is also needed urgently.[4]

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[1] Op.cit., para. 112.

[2] Ibid., para. 70. No evidence was adduced in support of this assertion.

[3] Ibid., para. 262. Underlining added.

[4] Ibid., para. 301.

As part of its recommendation concerning the selection of growth zones for special attention, the Committee stipulated that they should be strategically located close to the national motorway/trunk road network so as to take full advantage of the latter's stimulatory effects.

Despite the importance which they attached to improved communications, Hunt and his colleagues found it difficult to evaluate the effectiveness of this policy variable in statistical terms.[1] They could neither determine the extent to which poor communications contributed to regional retardation, nor conversely, the precise developmental consequences of increments to the existing communications stock. Indeed, this problem made it impossible to resolve the issue raised by Professor A.J. Brown in his widely-acclaimed (at least by professional economists) "Note of Dissent" to the Committee's report.[2] Brown, while arguing on theoretical grounds that CC investment should be spatially distributed in accordance with the principle of equal cost-effectiveness at the margin, agreed with his colleagues that in practice "the 'drawing-power' of superior infrastructure" was indeterminate. He agreed further that the provision of CC "to a superior level" might indeed prove to be a particularly effective means of attracting mobile industry under some circumstances, e.g., when one was setting out to colonise a wilderness! But in general, he took a permissive rather than an activist stand on the role of CC in regional development:

> the evidence of recent years seems to me to be in favour of financial inducements, assisted by administrative action, as the most important element in any economical system for influencing industrial location, provided that the distribution of infrastructure investment, in accordance with the normal criteria, takes account of those changes in location of industry and population that it is desired to bring about.[3]

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[1] Odber has suggested that most of the Committee held pre-conceived ideas about the importance of improved communications. A.J. Odber, "Policy After Hunt," Urban Studies, VII (June 1970), 206. In Self's view, the Committee's attitude was essentially pragmatic. Peter Self, "Intermediate Report," Town and Country Planning, XXXVII (June 1969), 243.

[2] Op.cit., pp. 155-65.

[3] Ibid., p.157.

It followed that he was unable to support the rest of the Committee in what he termed their "excessive" emphasis on OC investment as opposed to fiscal and financial incentives.

The Government, for lack of time, money and inclination,[1] found it necessary to reject most of the proposals in the Hunt Committee Report, including Brown's dissenting recommendations. However, it did go some way towards accepting the Report's emphasis on improved communications. For instance, Mr Peter Shore, Secretary of State for Economic Affairs, averred during July 1969 that the construction programme for the long-delayed Humber Bridge had been brought forward as a direct result of the Hunt Committee's work.[2] He also argued that good communications were a "crucial element" in regional policy although this had not been evident from The Task Ahead.

1969 Government Reorganisation

A major Government shake-up was announced on 6 October 1969. The DEA was abolished after a life of only five years. Its regional responsibilities were transferred to a new super-ministry (under Mr Anthony Crosland), Local Government and Regional Planning, which also assumed responsibility for two extant ministries in their entirety, viz., Housing and Local Government, and Transport. Prima facie, this reorganisation seemed to be a very sagacious development, bringing regional and transport matters together under one Cabinet Minister for the first time. But anomalies remained. On the regional side, the responsibility for administering the Local Employment Acts and the IDC Control was transferred from the Board of Trade, not to Local Government

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[1] Cf. Odber, op.cit., 205-08; Self, op.cit., 242-46; Charles F. Carter, "The Hunt Report," Scottish Journal of Political Economy, XVI (November 1969), 248-55; J. Douglas McCallum, "Review Article: The History of British Regional Policy" (forthcoming); "Depressing Drift in Regional Policy: A Leader," The Times, 26 Jun 69, p.25; Roy Hodson, "A Plea for Britain's 'Grey' Areas That the Government Is Unlikely to Heed," Financial Times, 22 Apr 69, p.6.

[2] Peter Shore, "A Policy to Keep Pace with Industrial Change," The Times, 3 Jul 69, p.25. It is to be hoped that Mr Shore's assertion did not raise hopes on Humberside unduly. Work on the Humber Bridge will not start before 1972 it was announced by the Minister for Local Government and Development on 27 May 71 (The Times, p.1).

and Regional Planning, but to the Ministry of Technology. MinTech also assumed control of the DEA's regional development activities. On the transport side, the BOT retained responsibility for civil aviation and shipping. In other words, under the new arrangements, the formulation of both regional and transport policy was to remain fragmented and probably ill-coordinated,[1] despite indirect protestations to the contrary.[2]

1970 White Paper on Reorganization of Central Government

The proposals in this Tory White Paper[3] issued on 15 October 1970 represent a slight advance on the administrative setup left by the Labour Government inasmuch as they involve a cut in the number of departments concerned with regional and transport policies from three

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[1]Super-ministries have not been the subject of universal acclaim as coordinating mechanisms. Very real doubts exist concerning their efficacy. For instance, The Times, commenting on the formation of Crosland's ministry, observed in a leader (6 Oct 69, p.11) that "Experience has shown that this /the super-ministry/ is a weak arrangement and difficult for the coordinator." This judgment was reiterated by the Economist:" A Better Shape for Government?" 11 Oct 69, pp.18-21.

[2]For example, Mr. Anthony Wedgwood Benn, Minister of Technology, told a House of Commons Select Committee on 4 May 1970 that "There is the most highly organised interconnection within Whitehall stretching between departments and across departments bilaterally and multilaterally that provided that any issue that comes up in the Government that has a bearing on the work of any department is immediately and automatically brought to the attention of that department . . . communication exists. But it is not customary, and never has been, for Government to publish the structure of its interdepartmental consultative machinery." GB, Select Committee on Science and Technology, U.K. Computer Industry, Vol.I : Minutes of Evidence,H.C.137, 1969-70 (London: HMSO,1970), Q.1984. For greater insight into the arcane Whitehall world, see Evelyn Sharp, The Ministry of Housing and Local Government, New Whitehall Series, No.14 (London: George Allen & Unwin Ltd., 1969) and its companion volumes.

[3]GB, Cabinet Office and Civil Service Department, The Reorganization of Central Government, Cmnd. 4506 (London: HMSO, 1970). Scottish Office functions were not affected.

to two. MinTech and the BOT are merged in a new Department of Trade and Industry, and the Ministry of Local Government and Regional Planning is absorbed in a new Department of the Environment. Otherwise, the caveats registered earlier still apply.

1970 White Paper on Investment Incentives

It was announced in this White Paper[1] published during October 1970 that a "thorough-going study of regional development policy" had been put in hand, one of the first fruits of which was a decision to make wider use of the "existing powers under the Local Employment Acts for grants towards the cost of providing basic infrastructure services."

1971 Announcement of New Special Development & Intermediate Areas

Included in the announcement by Mr. Anthony Barber, Chancellor of the Exchequer, on 18 February 1971 that new Special Development and Intermediate Areas were to be designated was a paragraph on the subject of infrastructure:

> Another important aspect of regional policy is expenditure on infrastructure and the environment. In this field the development and intermediate areas already account for a considerable part of the total programmes, and we shall ensure that there will be a continuing reflection of regional development needs within the various public expenditure programmes - especially in relation to the road programme and general environmental improvement.[2]

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[1] GB, Chancellor of the Exchequer and Secretary of State for Trade and Industry, Investment Incentives, Cmnd. 4516 (London: HMSO, 1970).

[2] Private communication from the Department of Trade and Industry, 1 Jul 71. For a critique of this renewed emphasis on OC, see Malcolm Crawford, "Hard Road Up from the Pit," Sunday Times, 21 Feb 71, p. 43 who argued that while infrastructure was important, heavy investment during the latter half of the 1960s had largely remedied previous deficiencies, at least in Scotland and the NE. In an earlier article ("Whitehall Slates Tory Regional Plan," Sunday Times, 24 Jan 71, p. 41), Crawford suggested that a confidential Whitehall study had criticised Tory plans to boost infrastructure spending. Cf. Peter Jay, "The Changing North: Promise Born of Problems," The Times, 22 Jan 71, p. 21.

Summary and Conclusions

To summarize and conclude this lengthy discussion, we have been attempting to determine the communications content of British regional policy over time, drawing largely upon official sources. We surmised on the basis of our hypothesis linking the success of long-distance industrial migration to the quality of the interregional communications network that regional policymakers would have taken considerable pains to ensure either that adequate interregional communications infrastructure was in place ahead of demand in line with activist thinking, or that regional development efforts were not hampered by insufficient communications capital as prescribed by permissive doctrine. In fact, contrary to our conjecturing, for many years remarkably little was done to integrate regional with communications policies, i.e., to use chapter 2 terminology, a doubting attitude prevailed. Not till 1963 can it be said that the importance of integration was truly accepted at the national level, Sir Malcolm Stewart's activist attitudes, the Barlow Report, and the section pertaining to communications in the 1945 Distribution of Industry and 1960 Local Employment Acts notwithstanding. Behind this acceptance was a mounting concern over Britain's historically sluggish economic growth rate and a snowballing belief fostered by the first series of Common Market negotiations, French experience and the Toothill Report that integrated planning was the best way of eliminating this worrisome and indeed embarrassing chink in the national armour.[1] But if the need for integration was accepted, albeit belatedly, almost a decade ago, how are we to explain the charge cited at the beginning of this chapter that integration has yet to become a reality? Apart from the inevitable overstatement characteristic of lobbyists, the answer probably lies in the fact that acceptance is not the same thing as achievement. After almost revolutionary advances on the pre-1963 situation, integration has undoubtedly not yet gone as far as it should.[2]

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[1] Cf. Brittan (1964), Andrew Shonfield, Modern Capitalism: The Changing Balance of Public and Private Power (London: Oxford University Press for the Royal Institute of International Affairs, 1965) and Shanks (1967).

[2] Apart from ch. 3, see "No Public Spending Spree," Economist, 6 Dec 69, p.87 and "My, How Industry's Changed," Economist, 27 Jun 70, pp. 57-58.

Part of the problem, as will become apparent from the following section, is the lack of a single communications policy in Britain. Obviously, ceteris paribus, the greater the number of items to be integrated, the more difficult integration becomes. But more important is the continuing disagreement as to the most effective role for communications in regional policy.

One might argue, on the other hand, that the complete integration of regional and communications policies in Britain is neither practicable nor desirable, for several reasons. First, such a goal implies a single-minded approach to government which is simply unrealistic. Secondly, it would involve yet another Cabinet shuffle which might create more loose ends than it eliminated. Thirdly, the Post Office, a public corporation since 1 October 1969, would have to be reincorporated into the civil service, a most unlikely development. Fourthly, a policy of complete integration suggests the existence of a relevant body of authoritative economic theory. However, as we saw in chapter 2, existing theory with regard to the developmental role of communications is far from satisfactory. Finally, any move towards complete integration would unavoidably open up the thorny question of the extent to which regional and communications policies should be devolved from Whitehall. In sum, according to this line of reasoning (which deserves respect although it does not accord with our own predilection) existing administrative arrangements, or something close to them, should be thoroughly tested, especially since they are still relatively novel, before further alterations are attempted.

Can the present trend towards increased emphasis on communications as a facet of regional policy, which has been evident since 1963 with the possible exception of a period during the late 1960s, be expected to continue? It seems certain that the Conservatives under Mr. Heath have accepted the main lobbyist arguments in favour of improved communications outlined in chapter 3[1] although it is not yet clear to what extent they intend to stress communications relative to other regional policy variables. Nonetheless, so far as the existing Government is concerned, the answer to our

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[1] In addition to the evidence suggesting acceptance cited previously, see "Motorways: The Next 1,000 Miles," Economist, 26 Jun 71, p. 76 and Hugh Noyes, "£69m Works Programme for England and Wales," The Times, 15 Jul 71, p. 1.

question must be yes. But what would be the attitude of a future Labour Government? While this query is obviously speculative, signposts are not entirely lacking. For example, the previous Labour regime's reaction to the Hunt Committee Report suggests that the Cabinet at least (but probably also its main advisors) was not greatly taken with the Committee's views on the desirability of increased infrastructure expenditure. This impression is reinforced by a recent report on regional policy by a distinguished Labour Party Study Group[1] where it is asserted unequivocally that "we do not believe . . . infrastructure investment can be the central instrument of a distribution of industry policy." Indeed, the Study Group concluded that the most sensible policy, given the current state of knowledge with regard to the developmental effects of what it called EOC or Economic Overhead Capital investment, was one of 'accompagnement' rather than 'entrainement' as those terms are used by the French.[2] That is to say, it adhered by and large to the agnostic school of thought on the consequences of OC investment. It must be considered agnostic rather than permissive since it believed that the activists might have a case with respect to two specific types of OC investment, viz., new towns and roads.[3] Nevertheless, it was certainly permissive-leaning. There seems little doubt that the Group's views will dominate Labour thinking generally for some time to come. It follows that a future Labour Government will probably attach less significance to OC investment than Mr. Heath and his colleagues. But it is unlikely that OC will ever again be ignored by regional policymakers as it was, effectively, from 1934 to 1963.

In light of the foregoing, it is worth speculating briefly on why it took so long for the regional policymakers in Whitehall to recognise the need to include communications in their thinking. Obviously a complete answer to this question would require much more research than we have been able to undertake. Still, we can put forward some tentative propositions. Before doing so, however, it is necessary to provide more

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[1] Labour Party, Regional Planning Policy, Report of a Study Group (London: Labour Party, 1970).

[2] Ibid., pp. 68-69.

[3] Cf. Eric Jacobs, "Chief of Staff(Environment)," Sunday Times, 19 Oct 69, p.24 who quotes Anthony Crosland, Labour Secretary of State for Local Government and Regional Planning, as saying that the crucial factor in Leyland's recent decision to locate a factory in West Cumberland was the Government's prior agreement to build a new road to the area.

background information. This is done in the next three sections devoted respectively to communications policies, regional policy commentaries, and general surveys of migrant companies.

Communications Policies

In this section, we provide thumbnail sketches of the various communications policies being pursued in Britain, focussing on the extent to which they have taken regional considerations into account rather than, as in the preceding section, the other way round.

Roads

As noted earlier, the MOT assumed complete responsibility for the provision of trunk roads in GB only in 1937. Prior to that date, the prime responsibility for all types of road lay with local authorities under the 1920 Roads Act. In 1956, the responsibility for trunk roads in Scotland was devolved from the MOT to the Scottish Office (see ch.5).

While road supply has never really been adequate relative to demand in GB since the early 1920s, if then, it was not till the late 1940s that the shortfall became pronounced. Expenditure on new roads almost ceased between 1947 and 1953. According to Gwilliam (1964), real net fixed road capital formation during that period was actually negative.[1] Only in 1960 did a national road program get into high gear signifying the end of rail's long period of hegemony. Somewhat ironically in light of previous history, trunk roads and motorways thereupon became such a favoured object of expenditure that the Economist for example was registering strong dissent by 1968![2]

For the most part, road planning has been governed by political exigencies and engineering studies of existing traffic volumes rather than economic considerations despite the MOT claims to the contrary noted in connection with our discussion of the Barlow Report. Cost-benefit analysis came into use only during the 1960s. Previously, the economic benefits from road investments were more or less ignored, largely for technical reasons(cf. ch. 2). While planning techniques have improved enormously over the past decade - current practice is exemplified by an

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[1] Op. cit., p. 149.

[2] "A Critical Time for Britain's Motorways," Economist, 3 Feb 68, pp. 48-49.

MOT Green Paper published in 1969[1] - they are still far from being fully satisfactory(cf. p. 23 above). As the Economist asserted recently, the "crux of the matter is the impossibility of costing or pricing roads."[2] Road and regional policy began to be coordinated only with the formation of regional planning machinery during the 1963-65 period. Coordination has continued ever since. That the roadbuilders and regional planners are not yet getting on as well as they might, however, is suggested by a critical review of the 1969 MOT Green Paper by Professor Anthony Goss.[3]

Rail

Largely built before regional policy began, Britain's railways were in private hands until 1947 when they were nationalised and made responsible to the newly-created British Transport Commission. They have remained nationalised, of course, to this day. Like the road system, the railway network was starved of capital for years prior to 1954. Between that date and 1960, however, gross railway investment totalled some £820m. But much of this expenditure proved to be hopelessly uneconomic despite sanction by both the MOT and the Treasury and an enjoinder on the BTC

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[1] GB, MOT, Roads for the Future:A New Inter-Urban Plan (London: HMSO, 1969). Cf. "Roads: The Next 2,000 Miles," Economist, 10 May 69, pp. 46-47.

[2] "Roads: Separate Paths," Economist, 3 Oct 70, pp. 83-84. Cf. British Road Federation, Roads: A New Approach, a summary of the report by a British Road Federation working party on road finance and administration (London: BRF [1968]).

[3] "Roads - 'Back to Square One'," Town and Country Planning, XXXVII (June 1969), 254-58. See also GB, DEA, "Industrial Change and Regional Policy," working paper presented to the Social Science Research Conference, Bristol, 1969 where it is asserted in an appendix (p. 7) that the "marginal benefit to regional planning from the resources put into transport planning turn out to be low."

ultimately to pay its own way.[1] There ensued the famous Beeching Plan for the reshaping, i.e., the drastic pruning, of British Railways. Made public in March 1963, it explicitly acknowledged that neither transport trends generally nor regional policy had received much attention during the plan preparation process,[2] omissions for which it has been frequently criticised,[3] especially since an MOT report on GB's future transport needs[4] appeared just a few weeks later. Much of the surgery recommended by Dr. Beeching has now been achieved, some of it after consultation with the regional planning bodies created in 1965, and British Rail (as it is now called) seems to be getting back into fighting trim. But rail transport is not nearly so important to industry today as it used to be.

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[1] Cf. GB, Select Committee on Nationalised Industries, Report Together with the Proceedings of the Committee, Minutes of Evidence and Appendices: British Railways, H.C. 254-I, 1959-60 (London: HMSO, 1960) and Brittan (1964), p. 29. The latter, in a section called "Amateurs on the Retreat," wrote that "the Ministries of Labour, Transport, Housing, and Aviation may have had professionals who once studied or even taught economics; but for most of the last decade they have not had a single economist professionally employed as such. Many of the mistakes in Transport policy in the pre-Beeching days of the 1950s can be attributed to the absence of an economist for so long. The Board of Trade did without an economist for well over ten years, and has only just made one not particularly senior appointment." But a few years later Sir Alec Cairncross was able to assert upon his retirement as Head of the Government Economic Service that the "three departments outside the Treasury best supplied with economists are those dealing with transport, regional problems and overseas development." "Economists in Government," Lloyds Bank Review, No. 95 (January 1970), p.17.

[2] GB, British Railways Board, The Reshaping of British Railways, Part I (London: HMSO, 1963), p.57.

[3] See, e.g., Alan J. Odber, "Regional Policy in Great Britain," Part 6 in Area Redevelopment Policies in Britain & the Countries of the Common Market, by the Institute of Industrial Relations, University of California at Los Angeles, under contract to the Area Redevelopment Administration, U.S. Department of Commerce (Washington, D.C.: USGPO, 1965), pp. 374-75; G. Freeman Allen, British Rail After Beeching (London: Ian Allan, 1965), p.24.

[4] GB, MOT, The Transport Needs of Great Britain in the Next Twenty Years, Report of a Group Chaired by Sir Robert Hall (London: HMSO, 1963). This report too was virtually devoid of regional content but it is important as being the first study of its type at the national level and one of the first publications by a government agency to recognise the need for integrating transport and regional studies. Of interest is its revealing comment that the forecasting of interurban transport demand had been greatly hampered "by lack of data and even by lack of techniques."

economic and social benefits that might result. It was further pointed out in an observation which does not appear to have received as much attention as it deserves that regional air services were already being subsidised in three different ways: 1) cross-subsidisation by the airlines, 2) incomplete recovery of aerodrome costs, and 3) non-recovery of ground service costs. However, these subsidies are essentially inadvertent rather than planned.

Ports

Port planning until the mid-1960s in Britain was largely in the hands of local port authorities; national coordination was lacking and there was little attempt to link port with regional policy. In 1966, however, the Government announced in a White Paper on transport policy that henceforth the "planning of large-scale port facilities . . . must be closely related to plans for the redistribution of industry and population."[1] At the same time, it rejected a proposal by the Port of Bristol Authority for the creation of a major new liner terminal at Portbury. The reasons for this decision were set out in detail in a special MOT publication.[2] One of the arguments advanced was that port investment is permissive rather than activist in its effects: "Although efficient port facilities must be available and geared to location of industry and population development, they can hardly be regarded as an effective weapon for bringing such developments about."[3] But this view by no means met with universal acceptance. Tanner & Williams,

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[1]GB, MOT, Transport Policy, Cmnd. 3057 (London: HMSO, 1966), p.25.

[2]GB, MOT, Portbury : Reasons for the Minister's Decision Not to Authorise the Construction of a New Dock at Portbury, Bristol (London: HMSO, 1966).

[3]Ibid., p.9.

for example, in a critical discussion of the implications of the Portbury decision, stressed that the "relationship between port investment and regional economic growth is not fully understood."[1] Furthermore, they said, the MOT's permissive attitude ran directly contrary to much established opinion.

Telecommunications & the Postal Service

The Post Office has a complete monopoly of telecommunications and postal services in Britain and has had since 1912 when the last private telephone operations were nationalised. Beginning in 1961, the PO has been expected to behave like a commercial organisation. While telecommunications have been consistently profitable, the postal service has incurred a number of sometimes heavy losses. But some telecommunications services have been widely criticised for failing to cope with demand. Indeed, these criticisms span the entire postwar period. They have arisen partly because of poor demand forecasting and partly because the PO generally was virtually starved of investment capital by the Treasury until the early 1960s.[2] Needless to say, there is little historical evidence of integration between PO and regional policy or between PO and any type of transport policy until the formation of regional planning machinery during the mid-1960s.

Regional Policy Commentaries

Commentaries by academic economists on the need for coordination between regional and communications policies were very sparse indeed prior to the Toothill Report and the beginnings of an official interest in regional economic planning[3] illustrating Brittan's argument concerning "the enormous power of fashion in economic policy"[4] and corroborating Professor Brown's assertion that British regional policy measures, being

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[1] M.F.Tanner and A.F. Williams, "Port Development and National Planning Strategy: The Implications of the Portbury Decision," Journal of Transport Economics and Policy, I (September 1967), 320.

[2] Ian Senior, The Postal Service: Competition or Monopoly?, IEA Background Memorandum 3 (London: Institute of Economic Affairs, 1970), p.6 has suggested that the former reason is the more important of the two. Cf. Cairncross (1970), p.18.

[3] One exception to this generalisation (which, it should be noted, does not apply to physical planners) was Brian Loasby, "The Experience of West Midlands Industrial Dispersal Projects," Town and Country Planning, XXIX (August 1961), 309 although he did little more than touch on the topic under review. Another was H.P.Fogarty, Prospects of the Industrial Areas of Great Britain, Nuffield College Social Reconstruction Survey(London: Methuen & Co.Ltd., 1945).

[4] Brittan (1964), p.173.

essentially pragmatic in inspiration, "have generally preceded rather than followed academic analysis of regional problems."[1] Economic planning came into vogue at the government level in 1963; a spate of sympathetic academic writings duly appeared in 1964-65, a number of them directly relevant to our subject. Munby (1964),[2] for instance, welcomed the Government's interest in the integration of regional and transport planning after "the nadir of incoherence" reached during the mid-1950s. He argued that while transport cost/total cost ratios were generally low in the manufacturing sector, and while interregional transport cost differentials were probably inconsequential with the possible exception of NI and North Scotland, and while the new national motorways plan was unlikely to bring about spectacular differential cost reductions in favour of any one region, transport improvements could have important psychological effects upon industry thereby stimulating regional economic development. Hammond (1964),[3] Odber (1965)[4] and Robertson (1965)[5] also urged coordination between regional and transport policies.

Allen (1965), writing about the NW, argued that "road schemes . . . play a major part in regional growth. When coupled with good general transport facilities and major ports and airfields, they naturally attract industry to the area."[6] Manners (1965), noting that transport

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[1] A.J. Brown, "Surveys of Applied Economics: Regional Economics, with Special Reference to the United Kingdom," Economic Journal, LXXIX (December 1969), 784.

[2] D.L. Munby, "The Influence of Transport Planning," Town and Country Planning, XXXII (March 1964), 149-53.

[3] Edwin Hammond, "Improving the Machinery," ibid., 138-41.

[4] Op. cit., pp. 374-77.

[5] D.J. Robertson, "A Nation of Regions?" Urban Studies, II (November 1965), 121-36.

[6] E.G.W. Allen, "Regional Policies and the North West," District Bank Review, No. 155 (September 1965), 33.

improvements historically had "rarely" been considered in regional development terms, claimed that:

> transport improvements could have been better geared to serve the needs of the peripheral economies rather than being built simply as a response to existing and projected flows. It would . . . be wrong to argue that transport improvement of themselves have positively helped to attract new employments away from southern England. Transport is a permissive rather than a dynamic factor in regional economic development. However, the steady improvement of transport facilities undoubtedly facilitates the manipulation of industrial location by the government; and, granted the existence of policies designed to restrain the growth of industry . . . in southern England, transport improvements must be regarded as the principal catalyst in the revival of the peripheral economies.[1]

While discounting transport costs as a factor in industrial location, he suggested that the postalisation of telephone charges might be "as effective as any other single measure to reduce the entrepreneur's relative isolation of the peripheral economies, and so help in their speedy rehabilitation."[2]

McCrone (1969) seemed to suggest that the long hiatus between regional and communications policies in Britain had two main causes: 1) the apparent success of postwar regional policy between 1945 and 1957, 2) a preoccupation among policymakers for many years with the social aspects of the regional unemployment problem.[3] On the efficacy of communications and other forms of OC investment as a development tool, his views can be taken as representative of British academia generally at the end of the 1960s. First of all, he did not really make clear whether he was an activist, a passivist or an agnostic while stressing the importance of adequate OC if regional growth were to be accelerated. He also claimed that OC's economic effects were seldom "analysed properly" in Britain implying that suitable analytical

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[1] Gerald Manners, "Areas of Economic Stress - The British Case," in Areas of Economic Stress in Canada: Proceedings of a Conference, Queen's University, at Kingston, Ontario, ed. by W.D. Wood and R.S. Thoman (Kingston: Industrial Relations Centre, Queen's University, 1965), p.147.

[2] Ibid., p.152.

[3] See op. cit., pp. 104 & 121.

techniques were readily at hand. But, as we have seen, this implication, if intended, does not conform to reality. He cited airport planning as a "striking case" of the general failure of planners to take economic considerations sufficiently into account. But again, the existence of an airport policy implicit in this view is not borne out by the facts; as the Economist observed recently in connection with the (1971) report on the British Airports Authority by a Select Commons Committee on Nationalised Industries, "airports are not planned in this country, they happen."[1] In other words, McCrone, like academics generally, appeared to be both indecisive and confused with regard to the best role for communications in regional policy and the part played by OC in the development process. There is no doubt, on the other hand, that he was in favour of widespread policy integration.

General Surveys of Migrant Companies

A series of important BOT-funded surveys of migrant companies was carried out between 1949 and 1957 with two key consequences. On the one hand, they corroborated pre-war evidence to the effect that transport costs were not a serious barrier to mobility for a wide range of industry thereby weakening any incipient impetus towards bringing communications into regional policy. But on the other, they suggested that the significance of non-transport communications considerations as a factor in mobility may have been previously underestimated providing a rationale for policy integration which was quickly seized upon once the general climate of opinion with regard to planning began to change during the early 1960s. In this section, we briefly discuss these surveys beginning with Luttrell(1952).[2]

Luttrell (1952)

Being responsible for distribution of industry policy, the BOT was anxious during the late 1940s to stimulate research on industrial mobility. A government-universities committee was formed for the purpose.

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[1] "Airports - Gotta Plan?" Economist, 27 Mar 71, p.90.

[2] W.F. Luttrell, The Cost of Industrial Movement: A First Report on the Economics of Establishing Branch Factories, NIESR, Occasional Paper No. XIV (Cambridge: Cambridge University Press, 1952).

This committee invited the National Institute of Economic and Social Research to examine the effects on firms' costs of producing at (and distributing from) different locations, a burning question at the time. The NIESR established a high-powered committee of its own to direct the project; the membership included Sir Henry Clay (chairman), Professors G.C. Allen and E.A.G. Robinson, and S.R. Dennison. M.P. Fogarty was initially in charge of the work. He resigned at the end of 1949 after only a year or so on the job and Luttrell took over. The methodology used by the NIESR team, detailed case studies, was regarded as novel. About 110 parent firms were approached in total.

Luttrell alleged in this interim report[1] that transport costs had become "rather unimportant" as a location factor for the many 'lighter' manufacturing industries in GB, 'importance' being measured by the size of an industry's transport cost/value added ratio. He argued further that spatial differentials in transport costs could usually be estimated by firms prior to starting production at a new location. It followed, although this point was not spelt out (and despite the admitted difficulty of estimating the "distance-convenience factor" in industrial location), that the government's distribution of industry policy should prove successful in terms of volume of movement while not adding significantly to firms' private costs for two reasons: 1) a majority of companies would not be penalised by being forced to move or set up a branch at a distance, 2) the vulnerable minority had the means of proving their vulnerability thereby securing exemption from the policy. His interviewees were consciously selected from the supposedly indifferent majority for the most part and were physically concentrated in the North and East Midlands. Three industries were represented in his migrant sample initially: shoes(1958 SIC-Order XII, MLH 450), hosiery(X-417) and engineering(VI-IX).[2] Later, he broadened his industrial coverage.

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[1] His massive 2-volume study published in 1962 (see below) was the final report.

[2] Deviations from the 1963 UK transport cost/net output(TCNO) ratio for all manufacturing industries (see ch. 8 below): -3.6 percentage points, -3.6 and -3.0 respectively.

One of the explicit overhead items in the cost analyses which he and his team carried out was "travel and communications"; it was taken to encompass the transport of goods and persons, postage and telephone and telegram charges. Luttrell's key conclusion from our viewpoint was that branch plants over the long run would normally incur higher travel and communication costs relative to net output that their parents but, except where integrated operations over considerable distances were involved,[1] the extra costs would be insignificant, in part because of the widespread existence of spatially-uniform input prices and dispersed market patterns. Indeed he claimed that the extra costs would not even be apparent to many firms because of a common failure to give enough attention to the effect of mobility on overheads as opposed to operating costs and productivity. Travel, postage and telecommunication costs could be minimized, he felt, by making branch plants virtually self-sufficient.

These conclusions were tentative. Nonetheless, they both corroborated previous findings and accurately adumbrated Luttrell's final report. They also lent support to contemporary government policy.

Hague & Newman (1952)[2]

Like Luttrell (1952), this "interim progress report" by two economists at University College, London was concerned with the magnitude of private cost differentials between alternative locations. Close contact was maintained with the NIESR team. The authors focussed on the clothing industry(XII) because it had generated the largest number of branch plants in South Wales, the DA nearest to London. Each of the 25 companies cooperating in their research was based originally in the London area. A few had set up branches in the NE DA (or had transferred there) rather than S. Wales. Tailoring (442, 443) and dressmaking(445) firms predominated.[3] Most used relatively capital-

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[1] When a branch supplies its parent with intermediate goods, not only are extra transport costs incurred but production planning becomes more difficult, liaison staff may be needed, and stock control costs may rise: op. cit., pp. 85-86. This argument is corroborated by our case study of IBM (ch. 15).

[2] D.C. Hague and P.K. Newman, Costs in Alternative Locations: The Clothing Industry, NIESR, Occ. Paper No. XV (Cambridge UP, 1952).

[3] Deviations from the 1963 UK TCNO ratio for all manufacturing industries: 442(-3.8), 443(-2.8), 445(-3.0).

intensive, mass production "line" techniques and semi-skilled labour. It was concluded that firms of this type were essentially footloose.

Only four firms (3 with branches in S. Wales, 1 a transfer to the NE) were able to provide Hague & Newman with detailed cost data; in every case, transport costs were higher in the DA than they would have been in London but the increases were picayune ranging from less than 0.1% of turnover to 0.8% and averaging ($\bar{x}$) only 0.35%. This finding was attributed to the lack of spatial variation in input prices: "in the clothing industry, cloth usually comes in carriage paid."[1] It was concluded with regard to the clothing industry generally that a transport cost differential as high as 1.5% of turnover "would be abnormally large."

Communication costs including travel expenses and stationery were also found to be marginally higher in the DAs, an expected result. Much less expected, however, was the finding that the communication cost differential on average was twice the size of the differential on transport costs. This comparison did not take into account the value of the time spent by senior executives, technicians and skilled maintenance staff travelling to and from the branch plants or the cost of the associated physical and psychological strains. According to Hague & Newman: "It is quite impossible to give any pecuniary measure to this kind of 'transport cost' but its existence should not be overlooked."[2] Another non-quantifiable but real cost, they argued, arose out of the inefficiencies involved in transmitting orders and holding discussions over long distances; considerable time and energy could be wasted over essentially trivial matters. These points were not entirely new. Luttrell had mentioned them earlier although his treatment was less extensive and less precise, in part perhaps because he felt that greater delegation by the parent could eliminate many of the problems. Hague & Newman do not appear to have taken this possibility fully into account, concentrating instead on the limited autonomy alternative.

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[1] Ibid., p.37. It will be recalled that Luttrell also found evidence of widespread uniformity in supply prices.

[2] Ibid., p.38.

Dunning (1952)[1]

Dunning succeeded Newman as Hague's research assistant at University College, London. His study is devoid of methodological notes but it relates to the 28 (VI-364.2)[2] radio assembly(7) and component (21) migrant firms located in the DAs in 1951. Most were postwar migrants from the Greater London area; only two predated the war. Both branches and transfers were involved. Together they employed 12,000 workers (3,000 in Scotland) or something over 10% of the corresponding national total. Average employment was about 430, a very high figure.[3] Few would voluntarily have gone to a DA but most had benefitted by doing so. Cited DA disadvantages included distance from suppliers and markets, "often heavy" additional transport costs, delays, lack of direct contact with main markets, and heavy inter-plant communication costs (teleprinters, executive travel, etc.). Unfortunately, they were neither quantified nor ranked. It seems, however, that Dunning's respondents were more vociferous about the transport and communication cost disadvantages inherent in a DA location than those approached by Luttrell or Hague & Newman. On the other hand, this differential response may simply reflect the difference in the industries involved.[4]

Picton(1953)[5]

Unlike Luttrell and Hague & Newman, Picton, an economist at the University of Birmingham, focussed on the extent to which migrants had costed location alternatives prior to setting up their branch plants rather than actual post-move costs. Six Midland firms establishing

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[1]John H. Dunning, "The Radio and Television Industry: A Post-War Survey," Three Banks Review, No. 14 (June 1952), 22-37. Whether or not this study was BOT-funded has not been determined.

[2]Deviation from the 1963 UK TCNO ratio for all manufacturing industries: -4.2.

[3]Cf. Scottish Council, Committee on Local Development in Scotland, Report (Edinburgh: Scottish Council, 1952), para.41.

[4]The Scottish Economic Committee before W.W.II concluded that radio manufacturers were subject to more difficulties in Scotland than many other types of light manufacturing industry. Cf. SEC, Light Industries in Scotland: A Case for Development (Glasgow: SEC, 1938), pp.18 & 211.

[5]Glyn Picton, "Notes on the Establishment of Branch Factories," Journal of Industrial Economics, I (April 1953), 126-31.

branches in S. Wales were examined in depth. They produced adhesives (IV-277.2), accessories for cycles, lorries, motor cars and aircraft (VIII-381/83), nuts and bolts(IX-393), brassware (IX-399), metal hollow-ware (399) and abrasives (XIII-469.1). Only one of these products, the first one, would appear to be transport cost-sensitive.[1]

Luttrell and Hague & Newman had not been impressed by the comprehensiveness or quality of the ex ante cost forecasts which they had come across during the course of their work on cost differentials. Picton's findings corroborated this judgment. Not only did he uncover little evidence of serious ex ante costing, his interviewees displayed "a distinct lack of interest" in the subject. Part of the reason for this nonchalant attitude apparently was the widespread prevalence of centralized buying and spatially-uniform supply prices[2] on the one hand and diffused markets on the other. Picton concluded that the firms in his sample had suffered little hardship by being induced to set up a branch in a DA. He hypothesised that the longevity of a branch plant was a direct function of its degree of autonomy.[3]

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[1]Deviations from the 1963 UK TCNO ratio for all manufacturing industries: 277.2(+5.9), 381/83(-3.3), 393(-2.3), 399(-0.8) and 469.1(-2.3).

[2]This phenomenon appears to be so common in Britain that it is worth speculating briefly on its origins. Galbraith's theory of countervailing power seems particularly apropos in this regard. We can assume without violating reality outrageously that many suppliers of intermediate goods (i.e., inputs) are oligopolists. As such, they will tend to eschew price competition. On the other side of the market, many buyers are also oligopolists. They will use their countervailing power to thwart any attempt at spatial price discrimination by individual sellers. Since uniform supply prices are the result of such pervasive forces, and since many industrial migrants to the DAs are oligopolists, it follows that any transport cost disadvantage faced by the migrant firm will be largely confined to the distribution side of its business.

[3]Edith Penrose has provided theoretical support for this supposition. Cf. her "Limits to the Growth and Size of Firms," Research on the Business Firm, American Economic Review, XLV (May 1955), 531-43 and "Foreign Investment and the Growth of the Firm," Economic Journal, LXVI (June 1956), 220-35.

Hague & Dunning(1954-55)[1]

This excellent study is analogous to Hague & Newman(1952) in terms of purpose and methodology and to Dunning(1952) in terms of sample and findings. The authors concluded:

> most development area radio firms believe that their remoteness from London is a serious handicap, preventing them from keeping in touch with the latest technical developments in the industry and with buyers' current requirements. But one cannot measure the cost of such remoteness.[2]

Not only did this judgment run counter to most of the earlier BOT-funded research findings, it also implied that distribution of industry policy, at least as it related to the radio industry, was perhaps not quite so bland in its effects as had previously been allowed.

Hague & Dunning's conclusion can also be interpreted as raising doubts concerning the utility of TCNO ratios as a guide to distance sensitivity. The radio industry, for example, had a very low ratio according to our figures, indeed, a lower one than the other industries identified above. Yet not only were the migrant radio firms affected by remoteness, they were more affected apparently than any of the other migrants studied during the early postwar period. It would seem, therefore, as alluded to earlier in chapter 2, that a TCNO ratio is only a partial and possibly a misleading indicator of distance-sensitivity. But for what industries and to what extent is it misleading? Unfortunately, an answer to this query can only be built up in a piecemeal fashion by collating the coverage, methodology and findings of ad hoc research results. Such an approach has many pitfalls. Yet the theoretical alternative, a massive simultaneous study of all industries, is in practical terms simply unrealistic. We return to this general theme in later chapters.

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[1] D.C. Hague and J.H. Dunning, "Costs in Alternative Locations: The Radio Industry," Review of Economic Studies, XXII (No. 3, 1954-55), 203-13.

[2] Ibid., p. 211.

Luttrell (1962)[1]

This 1,114-page study represents a milestone in the history of regional analysis in Great Britain. Its most important single finding, that the bulk of British industry could operate profitably in any of the island's regions(but not necessarily in NI which was excluded from the study), had an enormous impact on contemporary opinion, not least because of the massiveness of the underlying research effort. At peak, Luttrell's team comprised 7 people; the study took almost 8 years to complete, from January 1949 to some time in 1957. The ensuing delay in publication is of course regrettable (and not entirely comprehensible despite the apologia in the study's Preface). It seems possible, however, that the analysis of transport costs in the Toothill Report might never have been undertaken had Luttrell's work appeared before say early 1960 for he said precisely what the Toothill Committee hoped to say, viz., that transport costs were no longer an important impediment to large-scale interregional industrial migration. As it turned out, the Committee's own researches established the validity of this hypothesis to the satisfaction of most commentators (but see ch.5). Nonetheless, some of the more churlish might have found it difficult to believe that Toothill, et al.were completely non-partisan in their approach to the matter. But any such doubts were scotched by Luttrell's obviously independent study which, fortuitously, came out soon enough after the Toothill Report for the latter's conclusions to be still fresh in people's minds. The combined effect of the two studies was finally to lay prostrate the idea that transport costs were an important factor in most private location decisions. A new conventional wisdom had finally been borne after a gestation period covering decades.

Early on in his research, Luttrell decided that existing location theories, with their emphasis on transport costs, were of only partial relevance in explaining branch plant location decisions in GB. This idea, as we have seen, was by no means novel; Luttrell, however, went beyond previous analysts to suggest that intra-firm organizational arrangements were at least as important as transport costs in determining which branch plants would be successful. Again, this insight, which can be viewed as Luttrell's second most important finding, was not entirely new in 1962; its antecedents are clearly visible for instance in Luttrell (1952) and Hague & Newman (1952).

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[1] W.F. Luttrell, Factory Location and Industrial Movement: A Study of Recent Experience in Great Britain, 2 vols. (London: NIESR, 1962).

But it was not really accepted widely until the publication of Luttrell (1962). McGovern (1963), as discussed in chapter 6, was one of the first to be strongly influenced by the idea; it shaped the entire approach to his Ph.D.thesis.

Volume I of Luttrell's enquiry is based upon 98 case studies covering 12 of the 14 manufacturing Orders in the 1948 SIC. The two missing Orders are treatment of non-metalliferous mining products other than coal(III) and leather, leather goods and fur(XI). As noted earlier, Luttrell deliberately drew the bulk of his sample from transport cost-insensitive industries, especially shoes, hosiery and engineering (broadly defined), but he did not make clear the precise extent to which this selection criterion was employed. Also, he did not assign determinable SIC code numbers to his interviewees. However, the 88 case studies in Volume II and the references to the other 10 in Volume I are detailed enough in most instances to enable coding to be accomplished without undue difficulty and with reasonable accuracy. In a few cases, on the other hand, the clues available to the coder are negligible. We attempted the coding exercise using the 1958 SIC to form a clearer impression of the degree to which Luttrell's sample was transport cost-insensitive. Our results appear in the following table together with relevant UK TCNO ratios from the 1963 Census of Production and an indication of the extent to which these ratios deviate from the equivalent figure for all manufacturing industries. A positive deviation is interpreted, despite the doubts raised above concerning the utility of TCNO ratios, as indicating transport cost sensitivity and vice versa. The size of the figures in Column 4 suggests the degree of sensitivity or insensitivity.

According to our calculations, Luttrell's case studies were drawn from 11 of the 14 manufacturing Orders in the 1958 SIC, the omissions being VII (shipbuilding & marine engineering), XXII(bricks, etc.) and XVI(other). On the other hand, the coverage was very uneven; 57% of the cases related to two Orders, textiles(X) and clothing(XII), and 76% to three Orders, engineering and electrical goods(VI), X and XII. Over 2/5ths (42%) related to two MLHs, hosiery(X-417) and shoes(XII-450). There were two reasons for this situation, one major and one minor. First, Luttrell was constrained by the industrial distribution of his sampling frame. This frame consisted for the most part, though not entirely, of all industrial migrants in GB, both branches and transfers,

Table 4.2: Luttrell's Case Studies by Industry (1958 SIC), Related TCNO Ratios and Transport Cost-Sensitivity Estimates[1]

(1) Industries	(2) No. of Cases	(3) TCNO Ratios %	(4) Transport Cost-Sensitivity Estimates
III	1	13.9	+8.1
IV	3	7.0	+1.2
IV-262	1	2.2	-3.6
IV-271.2	1	17.4	+11.6
V-313	1	6.7	+0.9
VI-331/52	1	2.5	-3.3
VI-335/39	3	2.8	-3.0
VI-332	2	2.2	-3.6
VI-333	1	1.8	-4.0
VI-351	2	1.7	-4.1
VI-361/69	3	3.2	-1.6
VI-362	1	5.9	+0.1
VI-364	3	1.6	-4.2
VI-365	2	4.0	-1.8
VIII-381	2	2.6	-3.2
IX	4	5.1	-0.7
IX-395	3	11.7	+5.9
IX-399	2	5.0	-0.8
X-412	3	2.5	-3.3
X-413	1	2.7	-3.1
X-414	6	3.9	-1.9
X-417	24	2.2	-3.6
XII-442	1	2.0	-3.8
XII-444	2	3.3	-2.3
XII-445	2	2.8	-3.0
XII-450	17	2.2	-3.6
XIV-472/73	2	9.4	+3.6
XV-481/83	1	7.8	+2.0
XVI	3	4.5	-1.3
	98		

[1] Deviations from the 1963 TCNO ratio for all manufacturing industries (5.8%).

between mid-1945 and mid-1952. The exceptions were a number of pre-war, wartime and post-1952 migrants. (In fact, nine of Luttrell's cases were taken from this group of exceptions; only two were post-1952). Some manufacturing Orders gave rise to more migrants than others. However, this was a minor reason for the unevenness of Luttrell's industrial coverage. Much more important was the fact that his sample was not intended to be representative in any scientific sense, i.e., it was deliberately biased. This bias was multi-faceted: (i) hosiery and shoe migrants were greatly over-represented because of the early emphasis on migrants originating in the North and East Midlands, (ii) non-shoe clothing migrants were greatly under-represented because they had been covered by Hague & Newman(1952), (iii) migrants originating in the South-East were greatly under-represented, presumably because of the existence of the research group (Hague, Newman and Dunning) at the University of London, (iv) despite the foregoing, a conscious attempt was made to obtain a wide geographical coverage in terms of origins and destinations (in reality, the origins and destinations of Luttrell's migrants ranged in distance from a few to over 400 miles; only about 40 of the destinations or well under half were in a DA), and (v) as mentioned before, transport cost-sensitive industries were under-represented.

From our table, it would appear that 87% or so of Luttrell's migrant sample were transport cost-insensitive, a conclusion more or less corroborated by a careful reading of the individual case studies. This is hardly an auspicious foundation on which to mount an argument that transport costs are no longer very important as a constraint on industrial mobility. Yet that is exactly the argument that is commonly associated with Luttrell's work!

Conclusions

We are now in a much better position to speculate briefly on a point raised at the end of the first section in this chapter, viz., why did it take so long for regional policymakers at the national level in Britain to recognise the value of including communications considerations in their thinking? It is clear that it was not for want of prompting. As far back as 1928 there appeared a seemingly cogent and well-publicised activist argument in the form of the Liberal Yellow Book emphasising the importance of improved communications as part of a comprehensive national development program. The 1931-32 BOT depressed area surveys drew attention to the retardative effects of transport costs upon the

economic development of the more peripheral regions. Sir Malcolm Stewart advanced a number of activist proposals for major communications improvements. Communications matters were frequently raised before the Barlow Commission, and so on.

Offsetting these 'positive' points, however, was a whole series of 'negative' ones including the dominance of the Treasury view in Whitehall and Westminster until the Keynesian revolution, the doubter attitude characteristic for many years of the MOT, the continuing lack of a comprehensive regional development theory, a consequent reliance on pragmatic considerations, a feeling triggered off initially by the work of the Balfour Committee that transport costs were not an important factor in industrial location decisions by firms in the expanding(i.e., the main migrant-generating) industries in Britain, a failure for many years to recognise that transport costs were not an adequate measure of the importance of good communications to industry, the virtual absence of any form of positive national transport policy until 1937, the private ownership status of the railways until the late 1940s, the misguided capital starvation policy pursued with regard to the several communications sectors for almost a decade after W.W.II, the continuing absence of a comprehensive communications policy, the seeming success of regional policy during the 1945-57 period, the welfare bias behind much of the civil service thinking on regional matters prior to 1962-63, the paucity of economists in the civil service until the 1960s, a long-time antipathy to economic planning and interventionist government within Whitehall circles, and a lack even today of both adequate data and suitable techniques for evaluating regional and transport proposals in economic terms.[1] This list is not intended to be inclusive. Neither has any attempt been made to weight the various items mentioned. Clearly, however, the topic is an interesting one and warrants further research.

We turn now to look at communications and regional policy in Scotland.

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[1] On this latter point, see Gerald Manners, "Research After Hunt," SSRC Newsletter, No. 8 (March 1970), 17-19.

CHAPTER 5

COMMUNICATIONS AND INDUSTRIAL DEVELOPMENT IN SCOTLAND

Introduction

Prima facie, Scotland would appear to be much like any other part of Great Britain in regional policy terms, depending on Westminster for enabling legislation and Whitehall for administrative action. But closer examination reveals that it is a region with a difference in two ways: 1) over a wide range of government functions, it has its own civil service in the form of the Scottish Office based in Edinburgh, 2) it has acquired a reputation for being a pioneer in the field of regional development. In this chapter, we explore various aspects of these two phenomena from the viewpoint of our interest in communications and regional policy. The analysis is analogous to that in the preceding chapter both in format and content. It also touches on the dispute raised in chapter 3 between the CBI(Scotland) and the Scottish Council. Particular attention is given to relevant research findings by the latter body and one of its predecessors over the 25-year period ending in 1961, the publication date of the seminal Toothill Report. Similarly, considerable space is devoted to selected literature references to specific categories of Scottish communications. Finally, a brief look is taken at both general surveys and individual case studies of migrant companies to Scotland.

Communications in Official Scottish Thinking on Regional Policy

In this section, we quickly scrutinize a number of official policy or policy-shaping documents published by HMSO in Edinburgh for the most part and having a common relevance to the subject of communications and Scottish development policy. The analysis is intended to complement that in the previous chapter relating to communications and regional policy in GB as a whole. We begin with the reports prepared between 1935 and 1938 by the Commissioner for the Special Areas in Scotland.

1935-38 Reports by the Commissioner for the Special Areas in Scotland

Five reports were produced in total, three by Mr. H.A. Rose, one by Sir D.A. Hay and one by Lord Douglas-Hamilton, in that order.[1] Rose laid a great deal of stress on the importance of improved OC as a general precondition for industrial development but was unable, owing to the nature of his powers, to do much more directly than contribute to the financing of sewage systems, water supply schemes and hospitals. Hay and Douglas-Hamilton, while continuing Rose's emphasis on public works, also invested heavily in the new industrial trading estates at Hillington and in Lanarkshire. Douglas-Hamilton pointed out the need for a "civil aerodrome" in the West of Scotland. But, overall, the successive Scottish SAs Commissioners had remarkably little to say on the specific subject of communications and industrial development suggesting that they did not share Sir Malcolm Stewart's activist views.

1949 Abercrombie & Matthew[2]

Clydeside was by far the most important industrial area in Scotland during the late 1940s with some 40% of the total population and all four pre-war industrial estates, viz., (North) Hillington, Carfin, Larkhall and Chapelhall. Abercrombie, it will be recalled, was a member of the Barlow Commission and Professor of Town Planning at the University of London. Matthew was at the University of Edinburgh.[3]

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[1] GB, Secretary of State for Scotland, Commissioner for the Special Areas in Scotland, Reports - Cmd. 4958 (Edinburgh: HMSO, 1935); Cmd. 5089 (1936); Cmd. 5245(1936); Cmd. 5604(1937); and Cmd. 5905 (1938). The last report is by far the best and as good as the generally superior contemporaneous reports for England and Wales.

[2] Patrick Abercrombie and Robert H. Matthew, The Clyde Valley Regional Plan, 1946: A Report Prepared for the Clyde Valley Regional Planning Committee (Edinburgh: HMSO, 1949). For a follow-up discussion on the Report, see Robert Grieve, "The Clyde Valley - A Review" (with Discussion), in Report of Proceedings: Town and Country Planning Summer School, St. Andrews University, 1954 (London: Town Planning Institute, 1954), pp. 6 - 28. Grieve ignored the subject of communications.

[3] Matthew was later responsible for the Belfast Regional Survey and Plan and, with Professors Wilson and Parkinson, for the 1970-75 NI Development Programme. Cf. chapter 6 below.

Their Clyde Valley planning project was launched in 1943 and completed in 1946. The ensuing report, which laid the foundations of postwar physical planning in Scotland, had a great deal to say about both industrial location and communications.

With regard to the former, it was argued that while a national policy for the distribution of industry and population was essential, "comparatively little" was known about the most important factors influencing the location of industry. During recent years, firms had moved to Scotland in considerable numbers but many were local market-oriented and therefore of limited value as major sources of employment. Although distribution of industry policy had brought a number of national market-oriented firms to the region, some had come "rather unwillingly" and branch plant closures had already begun.[1] What industries were suited to Clydeside? Abercrombie & Matthew suggested that the number was almost unlimited in theory but severely constrained in practice. Take motor car and aircraft companies they said. While such firms could probably operate profitably in the area, they were most unlikely to set up factories in Scotland because their minimum plant size requirements were so enormous, and they had become so firmly established in the South. Against what criteria should one judge an industry's suitability for location in a given area? The authors noted that the Government was to promote research on this question but little had yet been done. They were certain, however, that transport costs would be included in any eventual list. On the other hand, they made no attempt to weight this criterion. In the event, the research program to which they referred provided very little support for their assertion(cf. ch. 4).

Much of what Abercrombie & Matthew had to say about communications involved the road system; this topic is discussed in a later section. Of interest here is the fact that they were fully aware of the importance of good roads for industrial development. Indeed, they recommended that the two be planned on an integrated basis. Abercrombie, of course,

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[1] Rolls Royce was cited as a case in point but erroneously so as it turned out for the firm stayed on to become one of Scotland's biggest employers.

had said the same thing in the Barlow Report. But both roads and industrial development were mainly Whitehall responsibilities until 1956 and there is little indication that the Clyde Valley Regional Plan, an advisory document, had much impact on either the MOT or the BOT.

1952-54 Royal Commission on Scottish Affairs[1]

Scottish nationalism flourished at the beginning of the 1950s. One of its effects was the appointment of a Royal Commission under the chairmanship of Lord Balfour in July 1952 to review the arrangements for exercising the various functions of Her Majesty's Government(but not the operations of the nationalised industries) as they pertained to Scotland. The RCSA reported in July 1954 following an exhaustive enquiry. Its major consequence from our viewpoint was the transfer of the responsibility for trunk roads, ferries and bridges in Scotland from the Ministry of Transport & Civil Aviation to the Scottish Office effective 1 April 1956. This essentially political development and cognate railway and civil aviation matters are discussed below. Here we note the RCSA's views on shipping and industrial development. Concerning the former, Lord Balfour and his colleagues held simply that the MOTCA was properly responsible, and that there was no case for devolution. Retention of the status quo was also favoured with regard to the latter: "we have received no evidence which established a case for the transfer of . . . Ministerial responsibility /from the President of the BOT/ to a Scottish Minister."[2] The Scottish Home Department's Industrial Development Division (total authorised staff complement at 1 Jan 53 = 13) was said to maintain close contact with the BOT "both through individual officials and by attendance at meetings of the /Scottish/ Distribution of Industry Panel and other standing committees"; on the other hand, it was suggested that the two bodies had not always been as cooperative in the past as they might have been. Division representatives regularly attended meetings of the Scottish Council, according to the RCSA, many of which were held in St. Andrew's House. It is worth noting finally that the Highlands

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[1] GB, Royal Commission on Scottish Affairs, 1952-54, Report, Earl of Balfour, chairman, Cmd. 9212 (Edinburgh: HMSO, 1954).

[2] Ibid., p. 123.

Development Area designated jointly by the Scottish Office and the BOT in 1948 had failed to attract many jobs up to 1954 largely due, in the opinion of the RCSA, to the inadequacy of contemporary incentives as compensation for distance from markets and lack of skilled labour. This failure was presaged by the Committee on Highland Transport Costs three years earlier; it had warned that "Without assistance in the matter of transport costs, the facilities normally offered to industries in a Development Area may be insufficient to attract industrialists to the Highlands."[1]

Among the submissions to the RCSA were three memoranda from manufacturers' associations. One would expect businessmen to be the first to complain if transport facilities or services were in any way inadequate or if costs were too high. Thus, the contents of these memoranda are of particular interest. The first, (published on 10 April 53) was prepared by the Scottish Council of the Federation of British Industries. Transport was mentioned but in the most restrained terms. More attention was devoted to the problem of securing permission to carry special loads by road than any other transport matter. The second (27 May) was submitted by the British Employers' Confederation. Being labour relations-oriented, the Confederation understandably had nothing to say about transport. The third (also 27 May) was written by the Scottish Branch of the National Union of Manufacturers. In sharp contrast to the FBI brief, it was very outspoken on the subject of transport and industrial location. The NUM's Scottish Branch was a keen supporter of distribution of industry policy and claimed that the Government's intent was being frustrated in Scotland by an inefficient transport system, excessive transport costs, and inadequate decentralisation of decision-making in the public sector, including both ministries and the nationalised industries. Accordingly, it proposed inter alia that a weight-based flat rate tariff structure "be given most careful consideration" and that a Scottish Transport Authority be set up to coordinate all forms of transport.

[1]Scottish Council, Committee on Highland Transport Costs, Report (Edinburgh: Scottish Council, 1951), para. 34.

From the minutes of evidence taken following the presentation of the NUM brief, it is plain that the organisation's proposals had not been thought out in any depth. Indeed, the Scottish Branch comes across as something of a maverick body; it was formed only the year before, its small membership was composed essentially of small and medium-sized establishments, and its brief had not been ratified by NUM HQs in London. The Scottish Council of the FBI, on the other hand, strikes one as being highly responsible; it claimed to represent all sizes and types of industry in Scotland, and its brief had been approved (but not altered) by the Grand Council of the FBI. On balance, therefore, it seems reasonable to conclude that the FBI's brief with its relative lack of concern about transport matters reflected the bulk of Scottish industrial opinion.

1963 White Paper on Central Scotland[1]

Before discussing this White Paper, which, together with a companion document on the NE (see ch. 4), heralded the beginning of comprehensive regional economic planning in GB, it is helpful to sketch in a bit of background. In November 1961, the month the Toothill Report appeared, the Scottish Office under a Secretary of State comprised a Permanent Under-Secretary and four departments, Agriculture & Fisheries, Education, Health and Home. This structure had prevailed without major alteration since 1939, the year St. Andrew's House was opened in Edinburgh as the HQs of the Scottish Office.[2] The Home Department was responsible inter alia for industrial development and (from 1956) roads; town and country planning came under Health. Interestingly, as noted in chapter 4, it was the latter rather than the former department which was represented on the Scottish Distribution of Industry Panel suggesting that physical planning considerations dominated Scottish Office thinking during the early postwar period, and that Home's industrial development activities were in fact extremely limited.

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[1]GB, Scottish Development Department, Central Scotland: A Programme for Development and Growth, Cmnd. 2188 (Edinburgh: HMSO, 1963).

[2]Cf. David Milne, The Scottish Office and Other Scottish Government Departments, New Whitehall Series (London: George Allen & Unwin Ltd.,1957) and GB, Commission on the Constitution, Written Evidence, 2: The Scottish Office; Lord Advocate's Department and the Crown Office, Lord Crowther, chairman (London: HMSO, 1969).

The Toothill Committee considered but recommended against any further devolution of powers from Whitehall to St. Andrew's House. However, it felt that existing Scottish Office functions relevant to economic development could be better coordinated despite the alleged benefits accruing from the concentration of the departments involved in a single building[1] and the fact that "Over and above day-to-day contacts and ad hoc meetings to deal with individual problems the departments in Scotland of Trade, Labour, Transport, Works, Admiralty, Health and Home normally meet once a month under the chairmanship of the Controller of the Board of Trade to discuss and exchange information."[2] Thus, it proposed that a new development-oriented department be created embracing not only germane activities from Home and Health but also an economic information and research unit, a body previously lacking in St. Andrew's House.[3] This was the provenance of the Scottish Development Department (SDD) created in June 1962.[4] In August of that year, an interdepartmental Scottish Development Group (SDG) was formed at the instigation of the Government under the chairmanship of the SDD to study the implications of a growth point policy for Central Scotland. Its hard core comprised representatives from the BOT, the Ministry of Labour, the Scottish Statistical Office and the SDD. Other ministries such as Power and Transport were consulted as required. It was the SDG, strongly influenced by the Toothill Report, that prepared the 1963 White Paper on Central Scotland.

The White Paper set forth a comprehensive development program featuring coordinated GC investment and the designation of growth areas (six major and two minor), migrants to and firms in which were to be eligible for the financial inducements already available in Development Districts. Its purpose was threefold: 1) to reduce unemployment, 2) to cut out-migration, 3) to modernise the economy. Particular

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[1] Cf. Milne(1957), p.123.

[2] Toothill Report, p. 173.

[3] According to John Mackintosh, "before 1962 there were no economists in St. Andrew's House and no individual, group or department charged with examining the Scottish economy or preparing proposals to put to the Ministers." J.P. Mackintosh, The Devolution of Power: Local Democracy, Regionalism and Nationalism (Harmondsworth, Middx.: Penguin Books, 1968), p.113.

[4] Different aspects of the birth and work of the SDD are currently under study by fellow University of Glasgow Ph.D. candidates, Frank Walton (Department of Social & Economic Research) and Richard Tindal (Department of Politics).

emphasis was placed on the importance of improvements to the communications network, both intra- and interregionally, with a view not only to increasing accessibility levels but also to widening local labour market areas. Specific communications proposals included completion of the main trunk road system (Glasgow-Carlisle, Glasgow-Edinburgh, Glasgow-Stirling and Edinburgh-Stirling), a bridge over the Clyde at Erskine, completion of Abbotsinch Airport, and Clyde and Forth ports improvement schemes. Interestingly, Post Office services were virtually ignored despite Toothill Committee strictures concerning telephone supply (see below). Rail transport was mentioned but it was obvious that the SDG had been unable to find any serious fault with the Beeching proposals made public a few months earlier. The program as a whole, in a major break with the past, was intended explicitly to stimulate development, i.e., the goals/means relationship was seen as being a realistic one. It seems clear in this regard that OC investment per se was felt to be insufficiently stimulatory. That is to say, SDG thinking with respect to the provision of OC seems to have been essentially permissive (contrary to a recent memo by the Regional Development Division of the Scottish Office which suggests, perhaps inadvertently, that the SDG held activist views[1]).

Program implementation was left to the several departments directly affected but the key coordinating role was assigned to the SDG, a thitherto purely advisory body. Eventually the SDG became the Scottish Economic Planning Board(SEPB).

1966 Scottish Economic Plan

Pursuant to the National Plan, the Scottish Office issued a White Paper in January 1966 setting out a comprehensive plan for the expansion of the regional economy over the period, 1965-70. Most of the preparatory work was done by the SEPB. Growth expectations concerning manufacturing output were put at 4.6% per year, a very ambitious target relative to

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[1] Cf. GB, Select Committee on Scottish Affairs, Minutes of Evidence, 23rd April-16th July, 1969, and Appendices, H.C. 397, 1968-69 (London: HMSO, 1969), p.2, para. 8. T.D. Maddow, Permanent Secretary at the SDD, told an audience in 1964 that "the right kind of physical environment and supporting services are a very important factor in promoting economic growth. But this is not the only factor . . ." See Maddow, "The Administration of Redevelopment," Public Administration, XLII (Autumn 1964), 242. More recently, W.D.C. Lyddon, Chief SDD Planning Officer, stated that the provision of infrastructure involved both "promotion and response" - Glasgow University Seminar, 30 Apr.70. These points suggest that the SDD, like the Labour Party Study Group mentioned in ch. 4, is permissive-leaning but agnostic pending further research.

previous performance and one which ultimately proved unattainable.[1] As in 1963, strong emphasis was placed on the need for improved communications, especially roads.

1969 Wheatley Report

From chapter 3, it will be recalled that the Scottish Council in 1969 was highly critical of the Government's failure to integrate its regional and communications policies. Thus, it was interesting to note in the report of the Royal Commission on Local Government in Scotland, 1966-69, chaired by Lord Wheatley, the following excerpt from written evidence submitted by the MOT:

> Not only must there be a comprehensive policy for the whole transport sector; a comprehensive transport policy must itself be an integral part of the physical and economic planning of the country.[2]

This quotation clearly suggests that the MOT and the Scottish Council were as one with regard to what should be done. The Commission itself observed that:

> A good system of communications is of great importance to industry, and can have a considerable influence on industrial steering. Policy in these two matters - in so far as they are the business of local government - should preferably be co-ordinated within a single authority.[3]

As we saw in chapter 4, this objective has not yet been achieved. Patently, however, its desirability is coming to be appreciated more and more widely in official circles.

1970 Select Committee on Scottish Affairs

Mention might be made finally of the report on economic planning in Scotland by the Select Commons Committee on Scottish Affairs published shortly before the 1970 General Election.[4] Together with the minutes of evidence before the Committee, it provides a wealth of information on the

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[1] Total employment in Scotland, far from rising by 60,000 or so over the plan-period in conformity with plan objectives, actually fell by that amount to a level comparable to that prevailing in 1950! Cf. GB, SO, The Scottish Economy 1965 to 1970: A Plan for Expansion, Cmnd. 2864 (Edinburgh: HMSO, 1966).

[2] GB, Royal Commission on Local Government in Scotland, 1966-69, Report and Appendices, Lord Wheatley, chairman, Cmnd. 4150 (Edinburgh: HMSO, 1969).

[3] Ibid., para. 254.

[4] GB, Select Committee on Scottish Affairs, Economic Planning in Scotland: Report and Proceedings, HC.267, 1969-70 (London: HMSO, 1970). Dr. Gavin McCrone served as the Committee's economic advisor for a period.

current planning setup in the region. For example, the SEP Council, a purely consultative body dating from March 1965, receives advice inter alia from a 13-member Transport Committee "whose function is to promote the co-ordination of transport facilities and to assist the Council in advising on transport questions generally."[1] The SEPB, "the main official instrument for ensuring that the separate developments which contribute to economic growth are kept in step,"[2] dates from January 1965. Its membership includes the BOT, the MOT, MinTech, British Rail and the PO.[3] The Regional Development Division of the Scottish Office, formed in 1964, is a staff group headed by the SEPB's chairman, an Assistant Under-Secretary of State. One of its sub-divisions is concerned specifically with transport policy matters. The Division as a whole is in "close daily contact" with the SDD's physical planners. Also worth noting is the RDD statement that the Secretary of State for Scotland is "now recognised as being responsible for taking the lead in the preparation of plans for economic development in Scotland and for co-ordinating the execution of those plans."[4] Obviously, many other points could be cited but this is not the place for a detailed description of the Scottish economic planning machinery and the foregoing is sufficiently illuminative for our purposes.

After due deliberation, the Select Committee concluded that "ample machinery is available for co-operation between the Scottish Office and the departments which have responsibility for Great Britain as a whole."[5] On the division of responsibility for the main transport modes in Scotland between the Scottish Office (roads), the MOT (British Rail and ports), and the BOT (civil aviation), the Committee agreed with the MOT (and, in effect, with the Scottish Council) that the existing arrangements prima facie were not very sensible. However, it proposed no changes apart from urging that

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[1] Ibid., para. I.7.

[2] H.C. 397 (1968-69), p.3, para. 14.

[3] Cf. p.97 of H.C. 267(1969-70).

[4] H.C. 397(1968-69), p.3, para.10. In fact, this seeming revelation was not new. T.D. Maddow in his capacity as Permanent Secretary of the SDD said the same thing on 18 Mar 64. See Maddow (1964), 243.

[5] H.C. 267(1969-70), para. II.16.

the BOT take a more active role"in assessing whether or not it is practicable to improve air services into and out of Scotland."[1] Similarly, it was opposed to any devolution of MinTech's responsibility for Development Area policy to the Scottish Office. On the CBI (Scotland)-Scottish Council disagreement over the need for improved communications raised in chapter 3, the Committee, not surprisingly, found itself having to straddle the fence through lack of conclusive evidence:

> In our view it is not really possible to compare the relative attraction to the industrialist of infrastructure and financial incentives. . . . Clearly this is a field in which the most careful planning and co-ordination with the policy for the location of industry are necessary. It is also . . . a field in which departments have some possibility of influencing the kind of industry brought into Scotland . . . We lack detailed evidence . . . of the views of industrial firms themselves. . . .[2]

Summary

Uniquely Scottish official policy or policy-shaping documents of relevence to this study were a comparative rarity until 1963, and indeed there was no such thing as a Scottish regional policy separate from regional policy generally in GB prior to the advent of regional development planning during 1962-63. Since 1963, however, the initiative for development planning, a potentially important part of British regional policy(broadly defined) as it stands at the moment, has rested in the case of Scotland with the region's Secretary of State. He has fashioned a planning apparatus which, while capable of improvement, has worked reasonably well, and probably better than comparable machinery in England and Wales.[3] The result has been first, better interdepartmental coordination, secondly, more comprehensive assessments of the regional

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[1] Ibid., para. III.33.

[2] Ibid., para. IV.58. McCrone in his capacity as Director of the new Advisory Unit on Regional Development within the Scottish Office told a 28 Jan 71 seminar on the Scottish economy at Glasgow University that the region was now well-endowed with OC and he saw little need for major additional infrastructural investments, i.e., it was clear that he sided with the CBI(Scotland) rather than the Scottish Council on this issue.

[3] Cf. Mackintosh (1968), p. 102.

economic impact of public investment expenditures, and thirdly, a number of published surveys[1] and plans,[2] all of which explicitly recognise the need for widespread policy integration.

Today in Scotland, it is a commonplace to say that communications considerations should be an integral part of industrial promotion efforts. This does not mean that a comprehensive communications policy exists - in fact, as we saw in the previous chapter, it does not. However, the need for one is now so obvious, and commands such widespread support, that it seems only a matter of time before a way will be found of overcoming the present anomalous situation whereby four different bodies are responsible for various parts of the Scottish communications sector. Official thinking in Scotland concerning the role of communications in industrial development would appear currently to be agnostic but permissive-leaning. Until the early 1960s, however, as in the rest of GB, a doubting attitude prevailed with the exception of town and country planning specialists who have traditionally held permissive views.

Research by the Scottish Council & a Predecessor, the Scottish Economic Committee

By far the most extensive and influential body of research pertaining to communications and industrial development in Scotland, and the source of much of the region's reputation as a development policy seedbed, was that undertaken by the Scottish Council(Development & Industry) (est. 1946) and one of its predecessors, the Scottish Economic Committee (est. 1936) between 1936 and 1961. In this section (and, to a much lesser extent, its successor), we appraise this material focussing on the main findings germane to our study and the extent to which they appear to have relevance today. We begin with a discussion of the work carried out by the SEC, an autonomous offshoot of the Scottish Development Council (est. 1931).

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[1] E.g., GB, Scottish Office, Regional Development Division, North East Scotland: A Survey of Its Development Potential, by Maxwell Gaskin, et al. (Edinburgh: HMSO, 1969).

[2] Especially the 1963 and 1966 plans discussed above.

1936-39 Scottish Economic Committee

The SEC, with a membership drawn from business, the railroads, organised labour and the tourist industry, was appointed in April 1936 by the Scottish Development Council "to consider the economic condition of Scotland and to take all possible steps to promote improvement in it."[1] Its formation was due largely to the Secretary of State for Scotland acting on the advice of SAs Commissioner Rose; that is to say, the Committee had strong official backing. It was essentially research-oriented and during its short life accomplished a great deal. Its views on communications and industrial development both reflected and helped to mould contemporary opinion.

In evidence before the Barlow Commission on 3 March 1938,[2] the SEC devoted considerable attention to transport matters. Mention was made, for example, of the pervasiveness of a feeling that Scotland was remote, the crippling time and expense involved in shipping certain types of good to Midland and Southern markets, the frequent need to visit London for contact purposes, and the failure of many commercial buyers in the South to visit Glasgow and other Scottish centres. Road bridges over the Forth and Tay were advocated on the grounds that they would help to promote tourism, Scotland's economic integration, and a broadening of its manufacturing base, both geographically and industrially. It was also proposed that some sort of central planning authority be created in the region under the control of the Secretary of State to advise on all matters affecting industry, including transport. While this idea was not worked out in any detail, it clearly adumbrated the creation of the SEPC 27 years later.

Two studies were published by the SEC in 1938, one on the special problems of the Highlands and Islands,[3] the other on a representative group of light manufacturing industries in Scotland.[4] The former dwelt

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[1] SEC, Scotland's Industrial Future: The Case for Planned Development (Glasgow: SEC, 1939), p. 136.

[2] See Barlow Commission, Minutes of Evidence: Fifteenth Day (London: HMSO, 1938).

[3] SEC, Committee on the Highlands and Islands, The Highlands and Islands of Scotland: A Review of the Economic Conditions with Recommendations for Improvement (Glasgow: SEC, 1938).

[4] SEC, Light Industries in Scotland.

at length on transport considerations but the discussion had little relevance to manufacturing firms south of the Highland line. The latter contained detailed and generally excellent reports on eight industries: canning; heating, ventilating and refrigerating apparatus; electrical appliances and equipment; hosiery and knitwear; linen; leather; boots and shoes, and furniture. Each of the several analysts involved in its preparation made explicit mention of the importance or otherwise of communications, undoubtedly because the SEC felt that this was a topic that needed particular attention. But none concluded that communications problems were a major handicap to industrial development in Scotland. On the other hand, such problems were seen as being a not unimportant consideration in two instances, fruit and vegetable canning, and furniture-making. The Scottish fruit and vegetable canneries, for example, were highly raw material-oriented and sold most of their output in England. Not only were outbound transport costs considered to be a "serious item" because of the sizable distance to the main English market and the relatively heavy nature of canned goods, but Scottish canneries generally paid higher prices than their English competitors for cans "owing to freight charges."[1] Vegetable canning was more vulnerable to transport costs than fruit canning because vegetables were both bulkier and cheaper than fruits. Despite the foregoing, however, the canners' main problem was stated as being not excessive transport costs but insufficient raw material supplies.

Scottish furniture firms, in the opinion of the SEC's analyst, failed to take advantage of pre-war market opportunities in Britain but for reasons having nothing to do with communications. Furthermore, since most British furniture was made from imported hardwoods, Scottish producers were under no price disadvantage on inputs. Distribution, however, was a different story. It was estimated, for instance, that the cost of transport on a chair shipped from East Scotland to London represented about 6% of the delivered price. English furniture-makers, concentrated in London and High Wycombe, were thus at an advantage in the key London market. Their advantage was heightened in the case of central government

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[1] See the discussion below of the Metal Box Company in Scotland.

contracts by the common practice of asking for tenders f.o.b.London[1] and by the fact that samples could be inspected only in the London area. These handicaps on the Scottish industry were very real. While they were not critical in the circumstances of the 1930s, under other conditions they could have been of considerable consequence.

Scottish hosiery and knitwear firms, although their main market was London, experienced no serious difficulties in obtaining orders largely, they said, because "any disadvantage is offset by the advantage of being able to mark goods 'made in Scotland'." On the other hand, they mentioned a large number of apparently minor communications problems. Their outlays on telegrams and the telephone, for example, were "considerable". They were always longer in receiving postal enquiries and delivering samples than their competitors in the South. London area firms were in closer touch with day-to-day changes in the market and with fashion trends. And while parcel post rates were uniform throughout Britain, passenger train rates varied with distance and freight train services were often slow.[2]

Heating, ventilating and refrigerating apparatus manufacture was a "flourishing" industry in Scotland before W.W.II and communications problems were generally minimal. There were exceptions to this situation, however. Some producers of heavy items, for example, found transport costs on shipments to England burdensome to the point where they decided to move their entire production facilities south. Other firms complained that, due to the inadequate services available to travellers between Scotland and many places in N. England and the Midlands, "much inconvenience" was experienced in doing business with a large part of the potential GB market.

The manufacture of electrical appliances and equipment was felt to be under-represented in Scotland by the SEC's analyst but not because of transport costs which were estimated at only 2-3% of UK delivered prices. On the other hand, it was held that the small local market was a causal

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[1] This situation still prevailed in 1953 according to evidence submitted to the Royal Commission on Scottish Affairs by the Scottish Branch of the National Union of Manufacturers. See GB, RCSA, Minutes of Evidence: Fifth Day (Wednesday, 27th May 1953) (Edinburgh: HMSO, 1953), Q. 792.

[2] Precisely the same complaint was made by the Toothill Committee 23 years later (see below) suggesting a certain lack of responsiveness by the railways to outside criticism!

factor in the failure of the radio industry to take root in Scotland.[1] It was also noted that on central government electrical contracts "the difficulty of organised inspection of work at a distance from London makes itself felt in the distribution of work." One might mention finally the 100% local market orientation of the neon sign industry[2] in Scotland during the late 1930s.

Only 12 boot and shoe firms of any size remained in Scotland by 1937-38; in 1900, there had been close to 50. Not surprisingly, the Scottish share of the GB market declined over this period. However, lack of enterprise rather than communications problems was generally held to blame. On the other hand, leather prices were slightly higher in Scotland than in England because of the importance of imports from the Continent, the extra transport costs involved in shipping these raw materials north of the border, and the need to hold larger stocks at the Scottish factories. Also, on central government contracts, tenders had to be f.o.b. south of England. Scottish firms argued in addition that they encountered special communications problems dealing with government officials because of distance. Nonetheless, these several difficulties were not viewed as crucial by the SEC's investigator:

> There is no doubt that English manufacturers have certain advantages in large pools of trained labour, readier access to . . . raw materials, and proximity to large markets; but none of these advantages can be considered decisive . . . Distances in the British Isles are small enough for an efficient producer to sell his shoes economically throughout the country.[3]

Most leather produced in Scotland was sold in England. The product was easily packed, and transport costs were relatively low although they were high enough to constitute "some disadvantage" to Scottish tanners.

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[1] Cf. our discussion on pp. 112 and 114 of Dunning (1952) and Hague & Dunning (1954-55).

[2] VI-369 (1958 SIC): deviation from the 1963 Scottish TCNO ratio for all manufacturing industries = -4.2 (cf. ch. 10 below).

[3] Op.cit., p. 193.

The Scottish linen industry, i.e., firms utilising flax fibre, declined considerably between 1918 and 1938. Communications problems, however, were apparently of little consequence.

We can summarise this discussion by comparing TCNO ratios for Scotland from the 1963 Census of Production with the weighting attached to communications considerations by the SEC analysts. The results of this exercise are set out in the following table:

(1)	(2)	(3)	(4)
Industry	1958 SIC	Deviations[a] (1963)	SEC Weighting[b] (1938)
Fruit & veg.canning	III-218	+11.2	Significant
Heating,etc.apparatus	VI-339	-3.6	Insignificant with exceptions
Electrical goods	VI-361/69	-3.9	" " "
Hosiery & knitwear	X-417	-4.1	Insignificant
Linen	X-412, 422	+0.1	"
Leather	XI-431	-0.6	"
Boots & shoes	XII-450	-4.8	"
Furniture	XIV-472	+2.1	Significant

[a] Deviations from the 1963 Scottish TCNO ratio for all manufacturing industries. It is true that the absolute size of the 1963 deviations may have limited relevance to 1938. We assume, however, that their relative size was roughly similar at the two points in time.

[b] Our interpretation of the findings of the SEC investigators concerning the importance of communications considerations as a constraint on development in Scotland.

Although 25 years separate Columns 3 and 4, the 1963 data corroborate the SEC's findings (as interpreted by us) seven times out of eight! Only the figure for the linen industry runs counter to expectations. In other words, from the SEC's findings we would expect the 1963 Census of Production data to show that fruit and vegetable canning and furniture-making were transport cost-sensitive, i.e., characterised by above-average (positively-deviating) TCNO ratios. In fact, that is exactly what the data do show. In contradistinction, we would expect the remaining figures in Column 3 to be negative, and indeed they are with one exception, the figure for the linen industry. However, this exception may be more apparent than real for, apart from the fact that the positive deviation is extremely small, it is not necessarily contradictive to suggest that a transport cost-sensitive industry serving national markets might find Scotland a satisfactory location. Clearly, if tariffs on imports are high enough, and if most firms in the industry discern in

Scotland important locational advantages not readily available elsewhere in GB, then transport costs can rise to otherwise intolerable levels before they begin to act as a constraint on industrial expansion. This argument has considerable relevance to the linen industry. On the other hand, it contains two serious weaknesses. First, it does not take into account competition from NI, an important omission(although the province *prima facie* is even more remote than Scotland) since 4/5ths of the UK industry was located there during the 1930s. Secondly, it ignores the possibility of substitution between linen and similar goods. Part of the explanation for the post-1918 decline in the Scottish industry was the housewife's growing preference for cheaper (and more easily ironed) cotton household textiles. On balance, it seems reasonable to conclude first that the nominal transport cost-sensitivity of the linen industry can, at most, only be an indirect and partial explanation of its decline in Scotland, and second that the SEC findings pertaining to the end of the 1930s are generally in harmony with the results of the 1963 Census of Production. These conclusions suggest in turn that transport cost sensitivity measures are more or less invariant with time, except perhaps over the very long run when the effects of any technological changes have had a chance to make themselves felt, and that they require careful interpretation, i.e., there is a constant danger that more will be read into them than they warrant.

A third and final SEC study appeared in 1939.[1] It contained a recommendation that the Government should evaluate carefully, "having regard to the handicap experienced by Scottish industry in connection with freight charges to the South," the possibility of moving towards an equalisation of freight rates as part of a more general regional policy. This appears to be the Committee's first published reference to rate equalisation;[2] of interest is the fact that it came after the study of of light industries discussed above which we have interpreted as concluding that transport costs, with notable exceptions, were not a critical barrier to industrial development in Scotland. Unfortunately, the SEC did not

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[1] SEC, *Scotland's Industrial Future*.

[2] As we saw on p.80, it did not raise the issue before the Barlow Commission.

present any arguments of substance in support of its recommendation nor any estimate of the cost implications.

To sum up this discussion, it is evident that informed unofficial opinion in Scotland prior to the 1939-45 war was very alive to the importance of communications in regional development, and that attempts were actively being made in 1938-39 both to secure additional investment in transport infrastructure and to bring about reductions in the alleged burden of freight rates. These facts suggest that the relative silence of the several Scottish SAs Commissioners on the subject of communications is attributable more to a belief that they themselves were denied direct involvement in the communications field and therefore there was no point mentioning the topic than to any idea that communications were unimportant. Assuming this assessment to be true, it could be construed as connoting a certain lack of aggressiveness and indeed imagination on the part particularly of Commissioner Rose who got the stage as it were for his two successors. On the other hand, he would appear to have been a dying man even at the time of his initial appointment; this may explain much of the difference between his reports and those by his contemporary, Sir Malcolm Stewart.

1948 Scottish Council

An extensive series of special studies was published by the Scottish Council during the late 1940s. Here we mention only three of them: furniture,[1] chemicals[2] and plastics.[3] Furniture has been picked because, as we saw earlier, it was considered by the SEC to be relatively transport cost-sensitive.[4] On the other hand, the SEC did not view transport costs

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[1] Scottish Council, Panel on the Furniture Industry in Scotland, Report (Edinburgh: Scottish Council, 1948), especially p.27.

[2] Scottish Council, Committee on the Chemical Industry of Scotland, Report (Edinburgh: Scottish Council, 1948). This study deals not only with chemicals but with a large number of apparently cognate products as well, e.g., cement, glass, paper, man-made fibres, flour and whisky.

[3] Scottish Council Committee on Plastics, Final Report: Plastics in Scotland (Edinburgh: Scottish Council, 1948).

[4] So was fruit and vegetable canning it will be recalled. But fruit and vegetable canning differs from furniture-making in two important ways: 1) it is much more raw material-oriented, 2) insufficient raw materials are a much more important constraint on its development. In other words, even zero outbound transport costs would not solve the canners' major problem. Since it is difficult for us to generalise from this sort of situation, we have not examined the fruit and vegetable canning industry further.

as a major impediment to Scottish furniture-makers. The Scottish Council study, perhaps not surprisingly, reached exactly the same conclusion. Distribution costs were found to be quite high but, on balance, they were not viewed as being especially disadvantageous to firms in Scotland. Producers in the south of England experienced just as much difficulty selling north of the border as the Scots did selling in the London area.[1] Part of the work of the Council's furniture panel involved a survey of furniture distributors. Each was asked inter alia: "Are Scottish manufacturers adversely affected by distance from the main Southern market rendering service less efficient and contacts with buyers more difficult to maintain"? Clearly, their answers were unexpected:

> Somewhat to the surprise of the Panel, distributors did not consider Scottish manufacturers were adversely affected by distance from the main Southern market. This is primarily because manufacturers doing a sizeable trade in the South generally have showrooms in London where orders can be placed, deliveries arranged for, etc.[2]

Chemicals and plastics have been selected for mention here because they were widely discussed as potential industrial "growing points" during the early postwar period.[3] A strong awareness of the importance of transport costs is revealed by the chemicals report. In sharp contrast, the subject is virtually ignored in the plastics study suggesting that it was not considered to be very important.

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[1] Cf. the case of Educational Supply Association Ltd. in the addenda section of App.A below.

[2] Op. cit., p. 32.

[3] Cf. A.K. Cairncross and R.L. Meier, "New Industries and Economic Development in Scotland," Three Banks Review, No. 14 (June 1952), 3-21 and R.L. Meier, "Industrial Planning for Scotland: The Role of New Technology in the Economic Development of a Region," Planning Outlook, II (No. 4, 1952), 5-26. On balance, Meier's attempts at futurology do not seem particularly impressive from the vantagepoint of 1971. For example, he saw little prospect of Scotland attracting a polythene producer yet only a few years later Union Carbide's Grangemouth plant was in production (cf. our case study of BXL).

Like most of the Scottish Council reports from this period, none of the three mentioned above contains any quantitative material on transport costs.

1951 Committee on Highland Transport Costs.[1]

Appointed jointly by the Scottish Council, the Advisory Panel on the Highlands and Islands, and the Scottish Board for Industry, this Committee was asked *inter alia* to consider the effect of contemporary freight charges on the level of industrial activity in the Highlands and Islands and to recommend "practical" measures for neutralising any obstacles that might be uncovered. While its findings and proposals relate explicitly to northern Scotland, some are of interest much more widely. For instance, it was found that most of the manufacturing firms actually operating in the Highlands were not seriously impeded by transport costs. On the other hand, these firms were invariably local market-oriented, local resource-oriented, or producers of high value/low weight goods. It followed that transport costs were seemingly unimportant only because the range of viable manufacturing activity was so narrow. The Committee concluded that the best way of widening it was to induce a general lowering of transport costs. While the Highlands is perhaps an extreme case, this conclusion is not without relevance for the rest of Scotland (and *a fortiori* for NI).

Two of the Committee's recommendations are noteworthy, to wit, the call for greater efficiency throughout the transport system including the curtailment of some existing (but unspecified) services, and the proposal that the amount of tapering in freight rates be increased, if necessary by cross-subsidisation. The latter suggestion was justified in the name of distribution of industry policy. However, it is generally agreed today[2] that the original intent behind the Distribution of Industry Acts did not include the indefinite subsidisation of uneconomic locations.

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[1] *Report*. An analogous but later study is the unpublished Ph.D. thesis, "Transport in the Highlands and Islands," prepared by W. Iain Skewis between 1958 and 1961 under the supervision of the Professor of Geography at the University of Glasgow. Skewis's work has little relevance here but it is noteworthy as being the only thesis on the subject of transport (generally) in the U. of G. library!

[2] Cf. McCrone (1969), p. 107.

To what extent the Committee was aware of or constrained by this intent is indeterminable.

Particularly interesting is the fact that the Committee rejected a flat rate tariff structure. Such a scheme, it argued, "in addition to encouraging the wasteful use of transport, might well have the reverse effect of what is intended and might only benefit those parts of the country where industry is already strongly established."[1] As we saw earlier, the SEC in 1939 came out in favour of flat rates. During the ensuing 12 years, however, opinion among Scottish influentials (to use a sociological term) seems to have changed.

1952 Cairncross Report[2]

Professor Cairncross and his colleagues were asked to recommend ways of stimulating economic growth in Scotland's rural areas, especially the larger country towns. Their report is perhaps best known as a harbinger of the growth centre strategy promulgated by the Scottish Office in 1963. On the subject of communications and industrial development, their views were more traditional; they suggested that country towns should concentrate their promotional efforts upon: a) relatively transport cost-insensitive industries such as textiles (OrderX),[3] clothing (XII), machine tools (MLH 332), and some types of light engineering, b) highly transport cost-sensitive industries such as bricks (461) and other building materials (469.2), c) materials-oriented industries, e.g., timber processing (471), d) industries related to agriculture such as feedstuffs (219), fertilizers (271.2) or agricultural machinery (331), and e) industries requiring pure water, clean air, etc. - e.g., certain chemical and pharmaceutical activities. In other words, they seemed to feel, like the SEC and the Committee on Highland Transport Costs, that transport considerations were a generally important industrial location factor. However, this may have been due in part to their rural orientation.

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[1] Op. cit., para. 35. Cf. D.L. Munby, "Transport Costs in the North of Scotland," Scottish Journal of Political Economy, I (March 1954), 75-95. He also opposed the postalisation of freight rates while calling for more careful coordination of public investment in transport.

[2] Scottish Council, Committee on Local Government in Scotland, Report, A.K. Cairncross, chairman (Edinburgh: Scottish Council, 1952).

[3] 1958 SIC.

1961 Toothill Report

The Toothill Report had an enormous impact on regional thinking, not only in Britain, but throughout the world. Among its many effects was the tremendous boost which it gave to the growing idea that transport costs were not an important barrier to large-scale intra-UK interregional industrial mobility. Indeed, the Toothill Report and Luttrell (1962), being published within a few months of each other, can be considered as jointly responsible for the final transformation of this one-time radical view, the holders of which were probably judged to be in need of purgation, into the new conventional wisdom as expressed, for instance, by Needleman (1965)[1] and embodied in one of our hypotheses. Certainly others had laid the groundwork for the conversion but the Toothill Committee-Luttrell combination was the catalyst, not least because of its formidable research underpinnings. However, this body of research is not beyond criticism. We demonstrated in chapter 4, for example, that Luttrell's findings with regard to transport costs and industrial mobility were in a sense pre-ordained by the criteria used in the selection of his migrant sample. Similar misgivings have been expressed concerning the Toothill Report, notably by Cameron & Reid (1966).[2] Before looking at them in detail, however, it is necessary to examine more closely precisely what the Toothill Committee said on the subject of transport costs and the methodology employed in arriving at its conclusions.

In essence, Toothill and his colleagues averred that the role of transport costs as a retardative factor in Scotland's industrial development had been exaggerated:

> we found nothing in our inquiries to support the view that transport costs are a significant additional burden on manufacturing industry in industrial Scotland. Indeed we have seen no evidence to suggest that over a wide range of industry we cannot produce as cheaply in Scotland as anywhere else in Britain.[3]

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[1] Lionel Needleman, "What Are We to Do About the Regional Problem?" Lloyds Bank Review, No. 75 (January 1965), p. 49.

[2] G.C. Cameron and G.L. Reid, Scottish Economic Planning and the Attraction of Industry, University of Glasgow Social and Economic Studies, Occasional Paper No. 6 (Edinburgh: Oliver & Boyd, 1966), p.24.

[3] Toothill Report, p.75.

This judgment was based upon three research findings: 1) many input prices were standard throughout GB, 2) low to negligible transport cost/gross output (TCGO) ratios characterised much of British industry, 3) the higher transport costs often found in Scotland relative to the South of England were usually of little significance as a propotion of total costs and were normally offset by lower labour costs and lower rents. These findings in turn were derived from two industrial surveys and a detailed study of three Scottish firms having large markets outwith the region.

The first survey was subcontracted by the Committee to a small group of economists at Glasgow University under the direction of Dr.Sarah C. Orr. Postwar migrant[1] manufacturers to Scotland (135 establishments) together with manufacturers (excluding the postwar migrants) housed on industrial estates[2] in the Scottish Development Areas(177) comprised the sampling frame (312).[3] A mail questionnaire was employed by the survey team. It was accompanied by a letter from Mr. Toothill informing the recipient (usually a managing director) that the survey had the support of the Scottish Office, the BOT and the Ministry of Labour. Of the 45 questions asked of each establishment included in what can be called the University Survey, only two, Q.24 and Q.25, related specifically to transport costs. They read as follows:

> Q.24 What percentage of your sales or turnover is made up of: . . .
> (g) Cost of transporting inwards*
> (h) Cost of transporting outwards* . . .
>
> * (If deliverer or purchaser pays, estimate cost of transport if carried in your own vehicles. But where the price of an article purchased by you is sold at the same price all over U.K. and transport is paid by seller, treat transport costs as nil.)
>
> Q.25 If your transport costs are higher than they would be in a South of England location, by what percentage does this difference increase your costs?

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[1] As defined by the BOT.

[2] Blantyre, Caird's, Carfin, Carntyne, Chapelhall, Craigie, Craigton, Dundee, East Kilbride(Nerston), Hillington, Kilmarnock, Larkhall, Longman, Newhouse, Port Glasgow, Queenslie and Thornliebank.

[3] This total excluded establishments employing less than 10 workers.

In our view, these questions were as likely to evoke rough-and-ready responses as precise answers. Also, it is evident from the questionnaires returned to Dr Orr and her colleagues that a number of establishments misunderstood Q.24 and excluded own-account transport from their replies. It follows that the transport cost data in the Toothill Report are probably not as internally consistent or accurate as those in the 1963 Census of Production, for example, and that they understate reality, perhaps considerably, although the precise extent to which this is true is indeterminate. The response rate to the questionnaire was 53.5% (167 establishments). Interestingly, migrants (71) and non-migrants(96) contributed more or less equally to this result. No pronounced bias was found in the replies, i.e., the respondents were deemed to be reasonably representative of the sampling frame as a whole.

The industrial distribution of the respondents (in terms of the 1958 SIC) and their TCGO ratios are set out in Table 5.1. It can be seen that only 92 answered Q.24 satisfactorily, a figure equal to 29.5% of the sampling frame and 55.1% of the respondent total. Some of the sizable number of respondents who failed to specify a TCGO ratio pleaded confidentiality but a majority either ignored the question or were unable to answer it (so they said) because of a lack of cost information at the establishment level, i.e., the level to which the survey was addressed.

Table 5.1 relates to all respondents including non-migrants (as defined for Dr Orr by the BOT). We are primarily interested, of course, only in migrants. Thus, using the original questionnaires returned to the Toothill Committee, we compiled Table 5.2 which relates solely to migrant respondents. Our migrant total(73) differs slightly from that recorded by Dr Orr(71) because, in conformity with the MinTech list of migrant establishments underlying Appendix A below, it includes establishments which in 1960 were apparently but puzzlingly considered to be non-migrants. Table 5.2 is meant to be comparable to its predecessor although there may be some differences in the SIC codings since we have ourselves coded the entries in Table 5.2 whereas the ones in Table 5.1 were done by (or for) Dr Orr in 1960. However, any differences should be of little consequence. Our analysis is more detailed than that in Table 5.1 inasmuch as it extends to the MLH level.

Table 5.1: All Respondents to the University Survey Commissioned by the Toothill Committee, 1960, by Industry and TCGO Ratio

Order (1958 SIC)	Industry	No. of Respondents	No. of Respondents Providing a TCGO Ratio	No. of Respondents with a TCGO Ratio		
				2% & Under	2.1-4.0%	Over 4.0%
III	Food, drink & tobacco	10	7	2	2	3
IV	Chemicals & allied industries	7	3	1	-	2
V	Metal manufacture	9	7	4	2	1
VI	Engineering & electrical goods	59	35	25	9	1
VII	Shipbldg. & marine engineering	0	-	-	-	-
VIII	Vehicles	8	4	3	-	1
IX	Metal goods n.e.s.	13	6	4	1	1
X	Textiles	18	9	6	3	-
XI	Leather, leather goods & fur	2	1	1	-	-
XII	Clothing & footwear	10	7	4	2	1
XIII	Bricks, pottery, glass, cement	3	2	-	-	2
XIV	Timber, furniture	7	4	2	2	-
XV	Paper, printing & publishing	5	4	2	2	-
XVI	Other manufacturing industries	6	3	3	-	-
Totals		157	92 (100%)	57 (62%)	23 (25%)	12 (13%)

Source: Unpublished (roneoed) report (Paper 44, Ref. S.2/1) prepared for the Toothill Committee by Dr. Sarah C. Orr. Dr. Orr did not indicate why only 157 establishments appeared in her table showing the distribution of respondents by industry rather than 167 (the total number of returns received). Presumably 10 of the returns were seriously incomplete.

Table 5.2: Migrant Respondents to the University Survey Commissioned by the Toothill Committee, 1960, by Industry and TCGO Ratio

Order (1958	MLH SIC)	No. of Respondents	No. of Respondents Providing a TCGO Ratio	No. of Respondents with a TCGO Ratio		
				2% & Under	2.1-4.0%	Over 4.0%
III		5	3	1		2
	215	1	1	1		
	219	2	2			2
	240	2	0			
IV		6	4	3		1
	271.3	3	2	2		
	272.1	1	0			
	274	1	1	1		
	275.2	1	1			1
V		4	4		3	1
	311	2	2		2	
	322	2	2		1	1
VI		33	24	21	2	1
	331	2	1			1
	332	2	1	1		
	333	3	3	3		
	336	2	2	2		
	338	5	5	5		
	339	2	1	1		
	349	1	0			
	351	5	3	3		
	352	1	1	1		
	361	2	1	1		
	364	4	3	3		
	365	2	1		1	
	369	2	2	1	1	
VIII		2	2	1		1
	385	1	1	1		
	389	1	1			1
IX		4	2	1	1	
	392	1	1	1		
	393	1	0			
	399	2	1		1	
X		4	2	2		
	414	3	1	1		
	417	1	1	1		
XII		6	4	1	2	1
	442	2	1		1	
	443	1	1			1
	445	2	1		1	
	449.1	1	1	1		

Order (1968	MLH SIC)	No. of Respondents	No. of Respondents Providing a TCGO Ratio	No. of Respondents with a TCGO Ratio		
				2% & Under	2.1-4.0%	Over 4.0%
XIII		3	3		1	2
	461	1	1			1
	469.2	2	2		1	1
XIV	472	1	0			
XV		3	2	1	1	
	482	1	1		1	
	483	1	0			
	489	1	1	1		
XVI		2	0			
	491	1	0			
	496	1	0			
Totals		73	50 (100%)	31 (62%)	10 (20%)	9 (18%)

Source: Computed from University Survey questionnaires.

Comparing the two tables, it can be seen that the migrant group of respondents contained relatively more establishments with a TCGO ratio over 4.0% than the non-migrant group suggesting that a number of the migrants may have been local market-oriented rather than national market-serving as implied by the general conclusion in the Toothill Report quoted earlier. On the other hand, both groups were identical in terms of the relative number of establishments with a TCGO ratio over 2.0%. Anticipating later chapters, it is interesting to note that the average TCGO ratio for all Scottish manufacturers according to 1963 Census of Production data was only 2.2%. If one assumes that all industries having a TCGO ratio greater than 2.2% were relatively transport cost-sensitive (the 1963 transport cost/net output ratio equivalent to 2.2% was 5.9% - cf. Table 10.1), then it is readily apparent that relative transport cost sensitivity characterised between a third and 2/3ths, i.e., quite a high proportion, of the migrant sample analyzed for the Toothill Committee. By way of comparison, it will be recalled from the previous chapter that only about 13% of Luttrell's migrant sample were transport cost-sensitive.

The second industrial survey referred to earlier was supervised directly by the Toothill Committee. Questionnaires were mailed out to 197 manufacturers in Scotland not covered by the first survey. The sample was stratified; 158 usable replies were received, a response rate of 80%, i.e, an excellent result. Each firm was asked inter alia to indicate the main disadvantages inherent in a Scottish location. One-third mentioned 'transport costs to markets'; another 30% cited 'distance from markets'. However, by the nature of the survey, it was not possible to gauge the seriousness of these disadvantages. Obviously, the Committee did not attach much weight to the allegations concerning transport costs, in part perhaps because it felt that some firms could realize "appreciable economies" if they were to organize their transport arrangements more efficiently.

In addition to the two industrial surveys, the Committee obtained a detailed breakdown of the transport costs incurred by three firms with large markets outwith Scotland, viz., a food processor, a manufacturer of consumer durables, and a science-based company. The latter's TCGO ratio was picayune. In the other two cases, transport costs were relatively high but they were fully offset by relatively cheap labour and/or rents. While those findings are of interest, it is not clear from the Toothill Report precisely how the three firms concerned were selected for investigation and, therefore, how

representative they were. Presumably, however, their characteristics were viewed as providing a valid basis for generalisation.[1]

We turn now to a consideration of Cameron & Reid's criticisms of the Toothill Report as it related to the subject of transport costs and industrial mobility. They argued first (in part because they seem to have forgotten that the Toothill analysis of transport costs related more to non-migrant than migrant companies) that the University Survey sample was biased in the direction of low-TCGO-ratio establishments because it was confined to migrant companies already in Scotland: "It seems possible. . . that . . . immigrant companies were likely to manufacture products in which transport costs were not important, otherwise a Scottish location might never have been selected in the first instance." But our evidence suggests that this argument as stated is decidedly shaky; well over a third of the migrants in the University Survey sample would appear to have been quite sensitive to transport costs. In addition, it seems probable from the Toothill Committee's allegation of noticeably inefficient transport arrangements in parts of the manufacturing sector that a number of other migrants virtually ignored the distribution side of their business contrary to what Cameron & Reid were inferring.

It was argued secondly that the significance of the answers to Q.25 was possibly over-rated since "it is difficult to be certain whether companies could effectively measure the precise incremental saving in transport costs due to a Southern location." This caveat is valid, of course, as far as it goes but it is more in the nature of a debating point than a basic criticism.

Cameron & Reid seemed to be saying thirdly, although this argument was somewhat opaque, that the Toothill Report erred in not recommending long-term transport subsidies for migrant companies or at least recognizing the case for such subsidies. But their study, while interesting, scarcely constitutes a cogent counter-argument to the Toothill Committee's reasoned stance that freight subsidies were unnecessary.

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[1] For sake ofcompleteness, mention might be made of yet another survey, this one by the transport division of the Scottish Council, which revealed that 85% of an unspecified number of firms expected on a priori grounds to be transport cost-sensitive in fact discounted the importance of Scotland's transport cost handicap.

It was suggested fourthly that the Toothill Committee had glossed over the possible revenue-reducing consequences of remoteness from major markets. However, this assertion conflicts with the facts. Consider, for example, the following exerpt from the Toothill Report: "The chief disadvantage in operating at a distance lies . . . in the additional difficulty in obtaining supplies and in freighting goods without delays and uncertainty."[1] The underlined portion,[2] which reflects the general emphasis in the Report on the need for improved communications as one of the best, albeit permissive, ways of overcoming Scotland's undeniable relative remoteness(cf.our following section on specific transport modes and the Post Office), suggests that Cameron & Reid were setting up a straw man rather than finding serious fault with Toothill, et al. Yet they termed this point a "fundamental" criticism of the Toothill approach."

Cameron & Reid's final observation, viz., that "there is little point in minimising the importance of the incremental costs associated with a Scottish location if other assisted area alternatives exist which make these additional costs appear to be comparatively large," is certainly true as a commentary on the Toothill Report but to label it a "fundamental criticism" as they did seems unfair. In short, close examination suggests that Cameron & Reid's denigration of the Toothill Committee's conclusions on transport costs and industrial mobility was overdone. On the other hand, their more general views concerning transport costs and industrial movement to Scotland warrant careful consideration as an antidote to the inevitable complacency-inducing effects of the ToothillReport and the equally inevitable tendency to apply its conclusions more widely than originally intended.[3] They found in a mid-1960s survey of 18 migrant companies who had recently, after serious consideration, rejected Scotland as a location in favour of other "assisted areas" in Britain that the region's relative remoteness was cited as a reason for rejection more than any other single factor.[4] This disadvantage was considered to have two aspects: 1) increased transport costs, 2) reduced sales. That is why Cameron & Reid sought to

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[1] Toothill Report, p.79. (Underlining added).

[2] Which effectively summarises an argument advanced by Cameron & Reid in the paragraph straddling pp. 26-27 of their study.

[3] For example, see McCrone (1969), p.96.

[4] But see McCrone(1969), p.179. He argues that some of the replies to the survey undertaken by Cameron & Reid may have been the "expression of prejudice used to fob off the representatives of a disappointed region rather than the results of serious analysis."

show that the Toothill Report was "wide of the mark". But they appear to have been over-zealous in this regard, and in considerable degree, to have themselves shot wide of the mark. A corollary would seem to be that the Toothill Report's reputation with regard to transport costs and industrial mobility is on the whole well-deserved. Certainly, this is our judgment even after allowing for the caveats which we registered earlier concerning Q.24, etc. and the valid qualifications introduced by Cameron & Reid.

Summary

From this appraisal of research by the Scottish Council and the SEC over the 25 years, 1936-61, it can be seen that the Toothill Committee's stress on the importance of improved communications as a permissive factor in industrial mobility and development, and its concomitant de-emphasis of transport costs, were both foreshadowed by cognate bodies as far back as 1938-39. In contradistinction, another idea current at that time, viz., that transport subsidies might be necessary if the scourge of chronic depression were to be lifted from Scottish backs, received little sympathy from Toothill and his colleagues. But this reaction too had been anticipated by a cognate predecessor, viz., the Committee on Highland Transport Costs. It would seem then that what the Toothill Committee had to say of interest here was by no means new in terms of content. What was new, however, was the comprehensiveness of its arguments, the authority with which they were presented, the aura of official sanction which surrounded their utterance, and, most important of all, their highly propitious timing for, as suggested in the previous chapter, regional policymakers in 1962-63 were more ready to contemplate a radical departure from the status quo than at any time since policy began in 1934. That is why the Toothill Report had more influence than all of its SEC and Scottish Council predecessors combined. It was just what the country had been waiting for, albeit unconsciously; even the Economist was carried away by the mood of the moment, referring to the Toothill Report as a "radical and clinical" study, a "mixture of dynamism and mature wisdom," and "without hyberbole, the most raptly interesting economic document to appear from there [Scotland] since the days of Adam Smith."[1] This judgment augured that the Report's main conclusions were to prove of more than ephemeral validity. And indeed that has been the case. Many have stood the test of time extremely well including(obviously) those which corroborate our first two hypotheses.

[1] "The Most Acute Case," Economist, 25 Nov 61, p.732.

Communications in Scotland

Through a selective appraisal of the relevant literature, we try in this section to indicate the extent to which specific communications categories have been seen as important to Scotland's economic development over the period in which regional policy has been operative, i.e., since 1934. Inevitably, the analysis is both spotty in temporal terms and impressionistic. However, these characteristics are of no serious consequence. Particular attention is devoted to air and road transport, the two most important communications media at the present time for a majority of Scottish manufacturers.

Air Transport

The importance of air transport for Scotland's economic development was recognised as far back as 1934 when the Scottish Development Council first began pressing local authorities to provide airports. Indeed, the SDC campaign may have been responsible for the recognition by SAs Commissioner Douglas-Hamilton, as mentioned previously, that West Scotland needed a civil "aerodrome". Efforts started in 1935-36 to secure a transatlantic airbase.[1] In 1945, it was officially announced that Prestwick was to be one of Britain's international airports. The Ministry of Civil Aviation(MOCA) assumed control of the facility in April 1946. Events during the next few years, however, proved disappointing to many Scots and the development plans made public by the Minister of Civil Aviation in October 1949 were strongly criticized on a variety of grounds, e.g., they were short-term in nature, they would not be implemented till 1953 at the earliest, they failed to enhance Prestwick's second-string status, they gave no encouragement to feeder services, and they ignored demands for control by a Scottish Public Utility Corporation arising out of the need to relate Prestwick's use and development more closely to the requirements of Scottish trade and industry. In an effort to resolve the impasse which emerged, the Scottish Council early in 1950 set up an impartial committee on Prestwick's future. Several bodies appointed assessors to this committee including the MOCA, the Scottish Home Department, the Department of Health for Scotland(J.H. McGuinness[2]) and the Scottish

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[1] Fogarty(1947), p.159. The remainder of this paragraph is based on Scottish Council, Report of the Committee on Prestwick Airport (Edinburgh: Scottish Council, 1951).

[2] Now Chairman of the Scottish Economic Planning Board.

Advisory Council for Civil Aviation[1] (J.N. Toothill). In other words, its work was taken very seriously. The committee concluded inter alia that:

1) delay until 1953 or later was incompatible with the maintenance of Prestwick as an international airport; the need for action was immediate,

2) the MOCA's proposal to extend the existing 6,600-ft. runway to 7,000 ft. was inadequate; 7,500 ft. was required,

3) domestic feeder services should be encouraged; more specifically, BEA should abandon Renfrew Airport for Prestwick ("Renfrew at best has a short life before it") and the latter should be linked to Glasgow by rapid rail transit,

4) a major change in Government policy[2] would be necessary before responsibility for Prestwick could be devolved to a Scottish body (however, the committee did not argue in favour of such a change).

As is happened, only the last of the four conclusions cited had much of a short-run impact on Whitehall where it was taken as an endorsement of existing policymaking arrangements. The Royal Commission on Scottish Affairs reported in 1954 that the Scots' main criticism of what had become the MOTCA with regard to civil aviation centred on the Ministry's failure to develop Prestwick as a first-class international airport. One of the remedies suggested in evidence to the Commission was the devolution of control over Scottish airports and air services to the Secretary of State for Scotland.[3] However, the Commission, like the recent Select Committee on Scottish Affairs, recommended that contemporary civil aviation arrangements be left undisturbed. And undisturbed they were until 1966 and the formation

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[1]The origin and functions of this statutory body are outlined in App. VIII to the MOCA memo to the Royal Commission on Scottish Affairs. See GB, RCSA, Memoranda Submitted to the Royal Commission, Vol. III: Great Britain Departments Other Than H.M.Treasury and the Trade and Industry Departments (Edinburgh: HMSO, 1953), p.56. The Council did not oppose the Minister's plans.

[2]Under the 1946 Civil Aviation Act, the MOCA was made responsible for all civil air transport development policy in the UK. It set up a Scottish Division at Edinburgh in 1947 with executive powers but policy remained a Whitehall function. Cf. RCSA, Memoranda, III.

[3]The Scottish Chambers of Commerce were particularly keen on this proposal.

of the British Airports Authority(BAA). BAA was created to own and manage the State's main international airports, viz., Heathrow, Gatwick and Stansted in the London area and Prestwick. In 1967, the latter's maximum runway length was 2,987 metres, almost the same as Stanste (3,048) but considerably less than Heathrow(3,658). In terms of terminal passenger traffic and air freight, Prestwick was again third in the BAA league with 1967 totals of 294,709 and 10,196 (short tons) respectively; Heathrow and Gatwick were bigger. Failure to attract feeder services and competition from Abbotsinch, owned by Glasgow Corporation and a successor to Renfrew,[1] largely accounted for the relatively low passenger total.

In addition to Prestwick and Abbotsinch, there is a third major airport in Central Scotland, Turnhouse at Edinburgh. It has been owned by the BOT/DTI until this year(1971) when control is being transferred to the BAA. Turnhouse's new status does not mean that it is being converted into Scotland's second international airport; that could occur in due course but for the time being Turnhouse, like Abbotsinch, will remain UK-oriented.

The existence of three major airports within a very small area of Scotland suggests a serious lack of effective coordination in the past with regard to the provision of air facilities. This was precisely the point made by McCrone(1969), of course, as noted in the previous chapter. Not surprisingly, therefore, the Edwards Committee (1969) proposed that a new Civil Aviation Authority be set up in Britain with the function inter alia of long-range airport planning. This recommendation was accepted by the Wilson Government and subsequently endorsed by the Tories, but it is not expected to become effective before 1972. In the meantime, the present unplanned and indeed wasteful situation continues with little real prospect of change.[2]

So far we have been mainly discussing air infrastructure. As part of

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[1] Abbotsinch opened in May 1966. It will be recalled that its construction was strongly supported by the 1963 White Paper on Central Scotland.

[2] Cf. H.C. 267 (1969-70), para. III.29.

its novel stress upon the need for better rather than cheaper communications in Scotland, the Toothill Committee draw particular attention to the "unnecessary inhibiting" effects of the air services available in the region at the beginning of the 1960s when BEA still retained its domestic scheduled flight monopoly. The Committee alleged that existing services were quite inadequate to demand with "consequent injury to trade." Without going so far as to assert that good air services had become a governing factor in industrial location, Toothill and his colleagues observed that a "number of major industrialists whom we consulted about the reasons for their not setting up in Scotland referred to the difficulties of obtaining air transport to Scotland . . ."[1] Thus, they advocated an immediate enquiry into all aspects of air transport relevant to the region's economic progress emphasising the principle that seats should be available to businessmen on demand even if this meant direct subsidies. Several improvements in the existing air service spectrum were put forward as being immediately desirable, viz.:

1) adequate air services for Dundee
2) direct services between: i) Edinburgh and Manchester
   ii) Edinburgh and Birmingham
   iii) Scotland and the Continent
3) feeder services for Prestwick.

Little came of some of the Toothill Committee's recommendations but undoubtedly all were considered very carefully. During the decade, 1958/59-1967/68, passenger traffic grew enormously on the key Glasgow-London and Edinburgh-London domestic trunk routes as indicated by Table 5.3 suggesting a vast improvement in the quantity of air services available to Scottish businessmen. British Eagle International Airlines Ltd., a private carrier, began operating a scheduled service to both Lowland cities during 1963 in competition with BEA as a result of the pre-Toothill 1960 Civil Aviation (Licensing) Act. However, the firm was restricted as to the number of flights it could offer and decided therefore, in the face of heavy losses, to terminate its domestic services in February 1965. British United Airways Ltd., another private operator, thereupon applied to take the

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[1] Toothill Report (1961), pp.65-66.

Table 5.3: Passengers Carried, Glasgow-London and Edinburgh-London, 1958/59-1967/68 by Type of Air Carrier

Year	Glasgow-London			Edinburgh-London		
	Public Carrier (BEA)	Private Carriers (British Eagle, BUA)	Totals	Public Carrier (BEA)	Private Carriers (British Eagle, BUA)	Totals
1958/59	164,172	-	164,172	89,033	-	89,033
1959/60	207,995	-	207,995	108,884	-	108,884
1960/61	240,541	-	240,541	163,262	-	163,262
1961/62	332,284	-	332,284	192,441	-	192,441
1962/63	421,439	-	421,439	247,322	-	247,322
1963/64	508,941	6,117	515,058	319,472	2,885	322,357
1964/65	566,224	24,541	590,765	355,471	10,165	365,636
1965/66	605,330	33,155	638,485	389,057	2,749	391,806
1966/67	584,402	87,499	671,901	391,286	30,715	422,001
1967/68	577,557	103,576	681,133	405,772	37,402	443,174

Source: Edwards Committee Report (1969), p. 83.

place of British Eagle leading the latter to re-start its Glasgow-London service. Nonetheless, the Air Transport Licensing Board allowed the BUA applications. Thus, between 1965 and November 1968, when British Eagle went bankrupt, three carriers competed on the Glasgow-London route and two on the Edinburgh-London one. The result of this competition was greatly increased seat availability (but higher fares). During the summer of 1968, weekly round trip frequencies by carrier were as follows:

Carrier	Glasgow-London	Edinburgh-London
BEA (unrestricted)	85	61
BUA (restricted)	17	10
British Eagle (restricted)	12	-

Comparable figures[1] for April 1971[2] were:

Carrier	Glasgow-London	Edinburgh-London
BEA	71	52
Caledonian/BUA	30	23

Flying time was 65 minutes in the case of BEA operating from Heathrow and 70 minutes in the case of Caledonian/BUA operating from Gatwick.

With regard to the specific air service improvements deemed by the Toothill Committee in 1961 to be immediately desirable, some progress had occurred by 1970 but, as suggested in chapter 3, by no means enough to satisfy the Scottish Council. In the case of Dundee, several attempts were made by private carriers during the 1960s to establish Dundee-Glasgow and Dundee-London air services but none succeeded.[3] On the other hand, Caledonian/BUA operates a limousine service weekdays between Dundee and Turnhouse which only takes 130 minutes from beginning to take-off. Nonetheless, a recent report on Tayside's development potential suggested that many manufacturers in the area were far from happy with the existing situation:

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[1] It has not been determined what these figures mean in terms of seat availability although to do so would be relatively easy.

[2] It was reported on 4 Jun 71 (The Times, p.19) that, from October, Channel Airways, an independent carrier based at Stansted, would be providing a twice-daily London-Glasgow service using BAC 1-11 jets in competition with BEA and Caledonian/BUA.

[3] Cf. BOT, Cmnd. 4213(1969), para. 44 and GB, Scottish Office, Scottish Development Department, Tayside: Potential for Development (Edinburgh: HMSO 1970, p.108.

> Visits by or to customers are said to be time-consuming. While air transport can usually take visitors as far as Edinburgh, the continuation journey to Tayside imposes a substantial burden on customers' schedules. Similarly, when visiting customers, managers have to reconcile themselves to a whole day away from the office for a meeting which, elsewhere, might have been disposed of in half a day.[1]

Direct Edinburgh-Manchester and Edinburgh-Birmingham services were in existence by 1970 but Scotland-Continent services continued to be routed via London, Manchester or Birmingham as they had been a decade earlier. Interestingly, Sir John Toothill told the Select Commons Committee on Scottish Affairs in December 1969 that direct flights to the Continent from Scotland were commercially non-viable.[2] He therefore, recommended, in a reversal of his Committee's pro-subsidy stance in 1961, that Scottish flights be routed via Manchester thereby meeting commercial requirements while avoiding London and the need to change aircraft.[3]

Feeder services to and from Prestwick were virtually non-existent in 1970. However, BOAC announced plans during the year for a feeder service between Turnhouse and Prestwick to be operated under contract by British Island Airways.

In conclusion, Scotland today has much better air facilities and services than it had a decade ago. It also seems true that the region has as many air services as commercial considerations will allow. Indeed, it is questionable whether <u>any</u> of the existing services are breaking even or would be if they were meeting the true cost of the supporting aviation infrastructure.[4] It follows that proponents of new services such as the Scottish Council are really advocating even more subsidisation than prevails at the moment. But, as pointed out in chapter 4, the efficiency of regional air subsidies has yet to be determined. One can conclude, therefore, that

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[1] <u>Ibid</u>.

[2] Cf. GB, Select Committee on Nationalised Industries, <u>Second Report: British European Airways</u>, H.C. 673, 1967-68 (London: HMSO, 1967) where it was suggested by BEA'S Scottish Area Manager, Robert McKean (Q.1543) that direct Glasgow-Continent flights seemed hopelessly uneconomic as of mid-1967.

[3] "Sir John Defends Manchester as Air Gateway to Europe," <u>Scotsman</u> 15 Dec 69, p.7.

[4] Cf. H.C. 267 (1969-70), pp.35-36.

top priority should be given to research into the total costs and benefits of subsidisation. Only in this way can lobbyist urgings be properly evaluated and dealt with in a rational manner.

Roads

Roads currently are by far the most important single transport medium used by Scottish industry. But that was not always so to judge by the literature. As we have seen, the SAs Commissioners virtually ignored them while the SEC contented itself with a proposal that road bridges be built over the Forth and Tay.

Abercrombie & Matthew were highly critical both of the trunk road system in Scotland as it stood in 1946 and of contemporary roadbuilding plans. They described road planning in Britain generally during the interwar period as myopic. The result was inadequate postwar roads.[1] Not a single motorway existed in 1946. Worse, none was even contemplated for Scotland. Instead, the Government proposed to upgrade the Scottish trunk road network leading the Clyde Valley planners to comment:

> Surely this is a short sighted national policy. Efforts are being made to popularise this Development Area and to eliminate its sense of isolation. . . . We do not understand the official attitude.

They proposed that the existing trunk road program be brought under urgent review, that most of the proposed schemes affecting the Clyde Valley area be dropped, that they be replaced by a limited number of 'single-purpose motorways', that the A8 trunk road between Glasgow and Edinburgh be converted into a motorway, and that the new Scottish motorway system be joined to the analogous system already announced for England. It was suggested further that a regional authority be formed to coordinate road and rail transport with a view to channelling short-haul traffic to the former and long-haul traffic to the latter. Channelling was not expected to be wholly successful however - hence, the motorway proposals. Abercrombie & Matthew appeared to be saying, in other words, that since efficient transport was essential to industrial development, and since some firms would always prefer long-haul road transport to rail, then motorways must be built to make long-haul road transport as efficient as possible.

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[1] Cf. our discussion of roads in ch.4 (pp. 100-01).

Their bias in favour of the railways for long-distance freight movements reflected a prevalent contemporary feeling that the railways' statutory obligations made road-rail competition unfair; it was also felt to be wasteful.

Highway matters were the subject of more serious and widespread criticism than any other topic brought to the attention of the 1952-54 Royal Commission on Scottish Affairs.[1] The MOT at that time was responsible not only for all trunk roads in GB but also for 75% of the expenditure on category I, 60% of the expenditure on category II, and 50% of the expenditure on category III classified roads with local authorities making up the difference. Policy was set in Whitehall and implemented by an MOT Divisional Road Engineer based in Edinburgh.[2] It was alleged to the RCSA inter alia that Scotland's share of national road expenditure was inadequate, that expenditure decisions were sometimes needlessly delayed, that the general state of Scottish roads was impeding industrial progress, and that vehicle weight restrictions were inadequate. The protagonists of these viewpoints concluded that Ministerial responsibility for highways should be transferred from the MOT to the Secretary of State for Scotland.[3]

According to the Goschen formula,[4] which was used during the early postwar period to determine the Scottish share of total GB road expenditures

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[1] Cf. Munby (1954) who asserted (p.76) that "Most complaints in relation to Scottish transport facilities seem to refer to rail services and costs . . ."

[2] It was alleged by the FBI that all Scottish projects costing £5,000 or more had to secure the approval of MOT HQs in London: GB, RCSA, Minutes of Evidence: Fourth Day (Friday, 10th April 1953) (Edinburgh: HMSO, 1953), p.10, para. 63.

[3] One of these protagonists was the Convention of Royal Burghs who argued that "transport lies very close to the root of the economic prosperity and even of the economic viability of Scotland . . ."; GB, RCSA, Minutes of Evidence: First Day (Friday, 27th February 1953), p.11. Interestingly, the Scottish Council did not favour the devolution of additional responsibilities to the Secretary of State; it advocated instead greater decentralisation by selected GB Ministries, especially the MOT. See Minutes of Evidence: Fifth Day, (Wednesday, 27th May 1953), pp. 19-42.

[4] This formula dates back to 1918; it originally applied to education. Mr. Goschen was Chancellor of the Exchequer at the time.

by the MOT, Scotland was to receive 11/80ths of the amount spent in England and Wales, i.e., 13.75% of the total amount. However, this proportion bore no relationship to need. On the other hand, the Scots did better by the formula than they would have done had expenditure been allocated on a per capita basis. As shown in Table 5.4, MOT expenditures on trunk and classified roads in Scotland between 1947 and 1954 equalled 13.9% of similar expenditures in England and Wales. The Scottish population in 1952-53, however, was only 11.7% of the combined English and Welsh population. Interestingly, the RCSA was unable to improve on the Goschen formula. It noted, for example, that while road mileage in Scotland was equal to 30.9% of the total for England and Wales, the equivalent figure for vehicle registrations was only 8.2%. And what about relative traffic volumes, road widths, the general suitability of the roads,

Table 5.4: Road Expenditures in Scotland by the MOT as a Proportion of Similar Expenditures in England and Wales, 1947-1954

Year	Category of Road			
	Trunk	Classified	Trunk & Classified	
	%	%	%	(£m)
1947-48	15.9	13.1	14.0	(3.1)
1948-49	15.8	13.1	14.0	(2.8)
1949-50	14.6	14.5	14.5	(3.2)
1950-51	12.2	14.0	13.3	(2.9)
1951-52	14.8	14.4	14.5	(3.5)
1952-53	13.7	13.3	13.4	(3.7)
1953-54	13.3	14.1	13.8	(4.0)
1947-54	14.3	13.8	13.9	

Source: Cmd. 9212, Appendix V, p.116.

their condition, or the existence of alternative means of transport, it said; these criteria were also relevant to an allocation formula. It observed further that little new road construction had been undertaken anywhere in GB for several years.[1]

As for the other arguments in favour of devolution, the RCSA agreed that the Scottish Secretary of State with his wide range of responsibilities, including town and country planning, was better equipped than the Minister of Transport to determine relative expenditure priorities in Scotland. Thus, it recommended that jurisdiction over all matters pertaining to highways, ferries, vehicle licencing and road safety in Scotland be transferred from the MOT to the Scottish Home Department, and that future

[1] According to the FBI, industry everywhere in GB was affected equally by inadequate roads; Scottish conditions, while undeniably unsatisfactory, were no worse than those faced by firms further south. Minutes of Evidence: Fourth Day, Qq. 711-12.

public expenditure on Scottish roads be based, not on the Goschen formula, but on "an assessment of requirements" taking into account the several criteria noted earlier. As mentioned previously, these recommendations were accepted; they went into effect on 1 April 1956.

Prima facie, it would seem that the RCSA's road proposals clearly anticipated the widespread support for comprehensive regional economic planning which was to emerge in Britain a few years later. But it is also possible to take a more cynical view of its recommendations and to attribute them not to prescience but to political expediency.[1] According to this line of reasoning, the nationalist feeling in Scotland which lay behind the RCSA's appointment could only be assuaged by some sort of sop in the direction of home rule. Road devolution seemed the most innocuous option open to the RCSA. Of course, the Commissioners had to disguise their motives - hence, the emphasis in their Report on the efficiency aspects of local control. We have not been able to determine which of the two viewpoints mentioned is the correct one. But from the available evidence, we would lean more towards the latter than the former.

Be that as it may, it is interesting to note that expenditures on trunk and principal (formerly classified) roads in Scotland increased dramatically between 1956/57 and 1967/68 from £6m a year to £35m as indicated by Column 1 in Table 5.5. It can also be seen (Col.2) that

Table 5.5: Expenditures on Trunk and Principal Roads in Scotland, 1956-68, in Pounds and as a Proportion of Similar Expenditures in England and Wales[2]

Year	(1) Expenditures in Scotland £m	(2) (1) as a % of Expenditures in England and Wales
1956-57	6	13.6
1957-58	7	12.5
1958-59	9	11.5
1959-60	13	14.4
1960-61	15	15.6
1961-62	17	15.9
1962-63	20	15.5
1963-64	22	13.5
1964-65	24	13.7
1965-66	28	15.7
1966-67	32	15.5
1967-68	35	14.9
1956-68		14.4

[1] Cf. Andrew Hargrave, Scotland: The Third Choice, Fabian Tract 392 (London: Fabian Society, 1969), p.1 and Milne (1957), pp.20-21.

[2] Source of Col.1 data: "Memorandum by the Scottish Office," in GB, Commission on the Constitution, Written Evidence, No.2 (London: HMSO, 1969), p. 21.

Scotland's share of GB road outlays was actually higher in 1956-68 than it had been during 1947-64. In other words, devolution would seem to have lived up to at least some of its proponents' hopes. We return to this point in a moment.

The Toothill Committee had no serious complaints about the size of the trunk road network in Scotland but it was very critical of the fact that many of the existing roads were defective, i.e., suffering from excessive narrowness, poor alignment, a multiplicity of junctions and/or inadequate bridges. Thus, the Government was urged to accelerate radically its existing road improvement plans. This proposal evoked such an impressive response as exemplified by Cmnd. 2188 (1963) and Cmnd. 2864 (1966) that, for the time being at any rate, serious interurban road problems have been largely eradicated (see below).

On the key question of whether or not devolution has brought about closer integration between roadbuilding and other aspects of Scottish development, Mackintosh, writing in 1964,[1] i.e., before the creation of the SEPC and the SEPB but after the formation of the SDD, concluded that it had not:

> It is accepted doctrine that civil servants in the Scottish Office do not get out of line in either policy or administrative procedure with their opposite numbers in the English departments. . . .The salient point is that Ministers are members of a single Cabinet . . .[2]

Nothing occurred during the next four years to make him change his mind:

> The great pride of the [Scottish] civil service is not that it has developed special methods or a different emphasis in Scotland, but rather that no gap can be found between Edinburgh and London methods so that no politically awkward questions can be raised.[3]

This judgment was effectively reiterated the following year by Hargrave[4] who, commenting on the March 1969 White Paper on Scottish Roads in the 1970s,[5] argued that the road planners had paid "scant attention" to other

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[1] John P. Mackintosh, "Regional Administration: Has It Worked in Scotland?" Public Administration, XLII (Autumn 1964), 253-75.

[2] Ibid., 271.

[3] Mackintosh (1968), p.132.

[4] Andrew Hargrave, "Report from Scotland: Planning with a Restricted Brief," Financial Times, 20 Mar 69, p.15.

[5] GB, SDD, Scottish Roads in the 1970s, Cmnd.3953 (Edinburgh: HMSO,1969).

forms of transport and that, from a development viewpoint, their proposals were seriously lacking in imagination. Similarly, albeit somewhat predictably, a Scottish Nationalist MP, Mrs. Winifred Ewing, argued in her draft Select Committee on Scottish Affairs report that the de jure devolution of administrative responsibility for roads to the Scottish Office had de facto been of little consequence in development terms.[1] The Select Committee, on the other hand, received very little criticism of the Scottish road program.[2] It concluded: "Within the scale of what could reasonably be expected, we have no evidence that a general shortage of internal roads . . . has proved a deterrent to industry."[3] Nonetheless, the Scottish Office has recently announced yet another boost in road expenditure[4] although it is more in the nature of a counter-cyclical than a development program.

Rail Transport

As suggested in the previous chapter, railways in Scotland were privately-owned until the end of 1947 when they were taken over by the British Transport Commission. Much evidence was received by the RCSA in 1953 to the effect that rail freight charges were so high as to put Scottish industry, especially firms in the Highlands and Islands, at a disadvantage relative to competitors located nearer to main markets and sources of supply in the South. However, since rail charges schemes did not have to be submitted to the Minister of Transport for approval, the whole question of freight rates was effectively outwith the RCSA's remit. The Convention of Royal Burghs proposed to the RCSA that complete control over the Scottish portion of the nationalised railway system be devolved to some sort of local body responsible to the Secretary of State for Scotland. Similar if less extreme suggestions were put forward by a number of bodies. However, none was developed in any detail, and again they concerned matters largely outwith the remit of Lord Balfour and his colleagues.

While the Toothill Committee was reasonably satisfied with both the rail network and the rail passenger services relevant to Scottish industry,

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[1] H.C.267(1969-70), especially pp.107 (paras.14-15) & 111 (para.29).

[2] Ibid., para. VI.8.

[3] Ibid., para. VII.20. It will be recalled from ch.3 that the Scottish Council appeared to dispute this conclusion.

[4] "Government Gives Scotland £33m Jobs Booster," The Times, 14 Jul 71, p.1.

and while it displayed little apparent interest in rail freight charges, rail freight operations were criticised for being unreliable; it was argued that the combination of irregular transit times and unpredictable delays all too common at the beginning of the 1960s engendered a debilitating uncertainty with regard to deliveries in the minds of industrialists to the ultimate detriment of Scotland's economic growth rate. Not long after the publication of the Toothill Report, Beeching launched his program of retrenchment. Scotland was hard hit. But the worst may now be over particularly since rail interests have finally begun to compete effectively for traffic utilizing a variety of means including liner[1] and company trains, containerbases,[1] the formation of Tartan Arrow Service Ltd.,[1] and a program to finish electrifying the main West Coast line between Glasgow and London by 1974. On the other hand, in the guarded words of the NCF memo to the recent Select Committee on Scottish Affairs, the "Scottish Region is probably one of the least commercially profitable of British Railway Regions, in that its ratio of costs to revenue (before grants) is high."[2] In other words, the future of much of the 2,000-mile rail network extant in Scotland at mid-1969[3] is by no means assured. The Select Committee, as indicated earlier, recommended against any fragmentation of the responsibility for British Rail, i.e., it opposed any form of rail devolution.

Ports

On the topic of ports, it is perhaps sufficient to note first that the facilities available to Scottish industry at the moment would appear to be generally satisfactory,[4] and secondly that serious criticism in the literature have been relatively sparse - for example, there were none in the Toothill Report.

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[1] See e.g., National Freight Corporation, Annual Report and Accounts for 1970 (London: NFC, 1971).

[2] H.C.397, 1968-69, p.307.

[3] 12,500 miles were extant in GB as a whole.

[4] Cf. University of Glasgow (Department of Social & Economic Research) and University of Strathclyde (Departments of Urban & Regional Planning, Economics, and Civil Engineering), Final Report on Containerisation: Implications for Distribution and Transportation in West Central Scotland, submitted to the Scottish Development Department and the Glasgow Chamber of Commerce (Glasgow: Universities of Glasgow and Strathclyde, 1970).

Telecommunications & the Postal Service

Post Office policies in Britain are established at HQs in London. Since 1936, they have been executed in Scotland by a PO Director based in Edinburgh. While this arrangement came under attack from some of the more nationalist-minded bodies presenting evidence to the RCSA in 1953, the Commission itself proposed no changes. The Toothill Committee expressed satisfaction with the postal and telex services but the chronically inadequate supply of telephones was held to be indefensible. A decade later, as we saw in chapter 3, the Scottish Council was criticising all three services. Clearly, this situation, a patently retrograde one, can only harm Scotland in its quest for new industry. On the other hand, it is difficult to know how much weight to attach to PO services as a location factor, a problem poignantly illustrated by the fact that they were largely ignored in the 1963 and 1966 Scottish White Papers and by the recent Select Committee on Scottish Affairs, although our case studies (chs. 13-18) suggest that such services may be every bit as important as alleged by the Scottish Council.

General Surveys of Migrant Companies

We have already mentioned the most important migrant company surveys of direct relevance to Scotland, viz., those reported on by the Toothill Committee and Cameron & Reid. Such studies are noteworthy, of course, for the light that they might shed on our hypotheses. An interesting one which has not yet been discussed is that by Belcher(1955).[1] He was the U.S. Consul in Glasgow. A number of U.S.firms had opened branches since W.W.II on Clydeside, and he wanted to find out how they were faring. Thus, he sampled six unidentified engineering concerns during 1954. His findings formed the basis for an article written, it will be noted, for an American audience. His approach to the subject of industrial migration was entirely pragmatic.

It appears from Belcher's analysis that all of his sample firms had located in Britain to protect their sterling markets, all were profitable, all had expanded since their arrival, and all were "reasonably well satisfied" with their Scottish manufactory. On the other hand, each had found it necessary to hold much larger stocks of materials and subcontracted parts than was normal in the U.S., many problems had arisen in connection

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[1] Baylor G. Belcher, "American Factory Operation in Scotland Successful," Foreign Commerce Weekly (Washington, D.C.), 17 Jan 55, pp.15-17 & 22.

with subcontracting (cf. our IBM case study below), and the contemporary lack of a tool and die making industry in Scotland had made it necessary to utilize Midland firms for this sort of work leading to distance difficulties, e.g., an inability to solve problems through discussion as they arose.

Though it is nowdated, and though the underlying sample is small, Belchor's work remains valuable, partly for the glimpse that it provides into the motives behind the considerable postwar movement by U.S. firms to Britain, but more importantly for its portrayal of international migrants' reactions to a Scottish location. It is significant that, with the exception of the presumably temporary tool and die making problem, there were no recorded complaints about remoteness or inaccessibility. The inventory problem arose out of suppliers' failure to adhere to delivery dates and had little to do with location per se; it could have arisen just as easily in London or the Midlands as in Scotland.

Case Studies of Industrial Mobility

Published case studies of postwar industrial migrants to Scotland in which the firm involved is actually named appear to be non-existent. Perhaps the closest exception to this generalisation is the account in Edwards & Townsend(1965)[1] of how Ferranti came to be in Edinburgh. The firm began production there in November 1943 attracted by the ample supply of female labour; Toothill (of the Toothill Committee) was plant manager. He told a London School of Economics audience in 1952 that:

> The only disadvantages we have found in this area are problems of communication . . . We must know what the customer really requires, to keep abreast of new developments, and to maintain technical liaison with the people in the south at all levels. . . . Traditionally, the method of travel from Edinburgh is by night sleeper, but this is only easy to London during the period when there is no holiday traffic. The train services to other provincial centres are poor and this side of the transport problem is a major handicap to the establishment of new industries in Scotland. Civil aviation could, and we believe will, transform this situation, but so far the services are only about 5-10 per cent of what is required.[2]

It seems highly likely that Case 33 in Luttrell(1962) refers to entry 93 in Appendix A but we cannot prove this assertion. Mention might be made finally of a recent report on the metal container industry[3] which illuminates

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[1] Pp.155-57. See also Burns & Stalker(1966), ch.4 and entry 73 in App. A below.

[2] Edwards & Townsend(1965), p.156.

[3] GB, Monopolies Commission, A Report on the Supply of Metal Containers, H.C. 6, 1970-71 (London: HMSO, 1970).

Metal Box's decision to open a Scottish plant in 1961 (see entry 150 in App. A). As discussed in greater detail in the following chapter, 'cans and metal boxes' is one of the most transport cost-sensitive industries in Britain and Metal Box is the dominant UK can producer. These facts plus Scotland's sizable agricultural sector explain why the firm was attracted to the region. Arbroath near Tayside was selected as a location; output consisted of open top cans. Plans were announced by the company's Open Top Group in March 1970 for the construction of a second Scottish factory. It will be located in Glasgow, presumably to supply West Central and SW Scotland. Till now, this area has received its open top can supplies from Metal Box's Carlisle works. Indeed, Carnation Foods, which operates a milk cannery at Dumfries, was the Carlisle plant's principal customer until October 1966 when, following the lead of its U.S. parent, it began making its own cans. There are no commercial open top can makers apart from Metal Box in Scotland.

Metal Box's pricing policy and cost structure with regard to open top can production and the important role played by transport costs in determining the location of open top can factories are all dealt with in chapter 6. It is sufficient here to note that Scottish can buyers pay the same ex-works prices as their counterparts in England and Wales, i.e., they are not subject to the cost penalty confronting NI can users. But until Metal Box opened its Arbroath factory, fruit and vegetable canners in Scotland were paying higher delivered prices for cans than their English competitors "owing to freight charges" as reported by the SEC in 1938.[1] Even then, Metal Box was the major British supplier. Its long-time failure to establish a Scottish production unit was due to the small size of the regional market outside the SW.

Conclusions

Not surprisingly inasmuch as Scotland, unlike NI, is without any form of home rule apart from an administrative cadre and therefore fully exposed to all of the vicissitudes in regional policy emanating from Westminster and Whitehall, most of the conclusions in the previous chapter have direct relevance to the Scottish scene. This is wholly true of those pertaining

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[1] Cf. Dudley V. Howells, "Report on the Canning Industry in Scotland," in SEC, Light Industries in Scotland (1938), pp.109-54.

to the pre-1963 period when St. Andrew's House was completely devoid of professional economists and a doubting attitude characterised such thinking as did take place on the subject of communications and regional policy. Even the devolution of administrative responsibility for Scottish roads to the Scottish Office in 1956, which on the face of it might be construed as reflecting an awareness of the need for closer integration between communications and other types of regional expenditure, was in fact almost certainly carried out largely for political reasons; the enhanced scope for policy integration at the regional level which resulted was probably a strictly secondary consideration. Thus, it is perhaps fitting, though disappointing, that road devolution has not been particularly successful in practice from a policy integration point of view. Or, to put the matter in another way, the Scottish Office has not had markedly more success, despite its control over most aspects of roadbuilding, than its relatively emasculated regional planning counterparts in England at integrating either the various types of communications expenditure or communications generally with other aspects of regional development planning for five reasons: 1) the lack of a Scottish budget - resource allocation and expenditure control in the public sector are vertical rather than horizontal phenomena in GB leaving the Scottish Office powerless to divert funds voted for one purpose to another as it sees fit, 2) the pressure on the civil service in St. Andrew's House not to get out of line with Whitehall practice, 3) certain practical deficiencies in the theoretically sound Scottish economic planning machinery, 4) Whitehall's reluctance to devolve any aspect of its distribution of industry policy, a reluctance supported by the recent Select Committee on Scottish Affairs, and 5) the fragmentation of responsibility for communications in Britain and the lack of devolution apart from roads. In addition, there is no evidence to suggest that intra-civil service thinking on the subject of development has been any more imaginative or advanced in Scotland than elsewhere in GB. It can be concluded therefore that, while the Scots in the opinion of many informed observers have been more successful at the new game of regional development planning than the English, in relative terms, their successes have been modest. Looking to the future, signs are mounting that Scotland may not be able to maintain its historic lead in the planning field; the region has been badly demoralised by the current recession and the élan evident among its

development specialists during the middle 1960s is seriously flagging at the moment.

This leads us to the subject of Scotland's reputation as a regional development pioneer. There seems little doubt that this phenomenon derives not so much from the work of the Scottish Office, although its 1963 White Paper on Central Scotland certainly reinforced the region's burgeoning image, as from the activities of the Scottish Council, especially its Toothill Committee's report. This was the document, more than any other, which sparked off the zeal for infrastructural expenditure as a regional development tool that symbolized much of the 1960s and indeed has lingered on to the present day despite the buffeting which it received from the pen of Professor Brown in 1969 and an increasing awareness that Scotland, at any rate, may soon have a surfeit of transport capital without noticeable effect on the region's economic performance. Unfortunately, the Scottish Council has as yet been unable to repeat its previous spectacular success although the Centralisation and Oceanspan studies which it published in 1969 and 1970 respectively were valiant efforts in this regard. Consequently, its influence has been slowly but perhaps inevitably diminishing and with it Scotland's general image as a regional policy seedbed, a process compounded by the decline evident recently in the amount of regional research within Scottish universities relative to the 1960s. Hopefully, the latter is a temporary development. But it comes at a most inopportune time. Indeed, that it should coincide with a serious deterioration in the Scottish economy and the enormous uncertainties engendered by Mr. Heath's Common Market policy is surely supremely ironic.

CHAPTER 6

TRANSPORT AND COMMUNICATIONS IN NORTHERN IRELAND'S INDUSTRIAL DEVELOPMENT: THE POSTWAR EVOLUTION OF PUBLIC POLICY

Introduction

In this chapter, we analyse the literature pertaining to NI's postwar economic progress with a view to determining the role of transport and communications in the province's industrial development as seen by contemporary analysts, and the effect of this perceived role on public policy. The analysis is divided into a number of sections, to wit: policy or quasi-policy documents and cognate commentaries, transport cost surveys, general surveys of migrant companies, case studies of industrial mobility, industry studies, specific transport modes, telecommunications and postal services, and conclusions.

One would expect contemporary opinion to accord a great deal of weight to transport, especially transport costs, as a factor in industrial development because of NI's geographic position, and this was indeed the case until the early 1960s. But more recently, opinion leaders have been minimising the constraining effects of transport costs although the adequacy of transport facilities and services is still deemed to be vital; in fact, the latter considerations receive more attention now than ever before. It will be apparent that these ideological developments are very much in keeping with our working hypotheses. Paradoxically, during the lengthy period when transport costs loomed large in many people's minds, very little was done to bring about major improvements in the transport system or to integrate transport policy with industrial promotion activities. In contrast, the eclipse of the transport cost bogey more or less coincided with a surge of expenditure on transport infrastructure and the emergence of an interest in comprehensive development planning.

With regard to communications, one would expect the subject to be ignored until sometime after the publication of the seminal Toothill

Report in November 1961, and then for the emphasis to be placed upon the need for adequate facilities rather than diminished costs. As elsewhere in the UK, this proved to be the case in reality. Again, the prevailing viewpoint among NI policymakers is in complete harmony with our hypothesen.

We turn now to a more detailed exposition of these various themes.

Policy or Quasi-Policy Documents and Cognate Commentaries

The role of transport and communications in NI's postwar industrial development has been discussed from time to time in a variety of policy or quasi-policy documents. Some, such as the 1944 White Paper on industrial location,[1] focussed primarily on matters internal to the province. Others, such as Isles & Cuthbert(1957),[2] were more concerned with NI's links with GB. Our interest is predominantly with this latter group. Nevertheless, it is important to look at both sets of documents for two reasons. First, the part played by transport and communications in industrial development is not fruitfully bifurcated into intra-NI and extra-the province, and in fact few of the publications dealt exclusively with one aspect of the subject. Clearly, intra-NI matters are of more relevance for some firms than for others. For example, materials-oriented firms will have a greater interest in rail policy and highway developments than the management of the port-oriented GEC/AEI turbine plant in Larne. However, no company will be entirely indifferent to the state of internal transport. Second, the development strategy adopted by the NI Government in 1963, following receipt of the Matthew Report, called for the diversion of new industry wherever practicable from Belfast, the most popular destination historically, to other parts of the province. Obviously, a manufacturer refused permission to locate in the capital may decide not to locate in Ulster at all unless he is satisfied that the second-best location is linked to a suitable port by a modern road or, less likely today, by rail. Accordingly, we begin our survey of policy and quasi-policy documents with the 1944 White Paper referred to above. It is followed by Isles and Cuthbert(1957), the Hall Report(1962),[3] the Matthew Report

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[1] NI, Planning Advisory Board, Committee on the Location of Industry, Interim Report, Major D.M. Anderson, chairman, Cmd. 225(Belfast: HMSO, 1944).

[2] K.S. Isles and Norman Cuthbert, An Economic Survey of Northern Ireland(Belfast: HMSO, 1957). See also the 2 chs. by Isles & Cuthbert in Thomas Wilson, ed., Ulster Under Home Rule: A Study of the Political and Economic Problems of Northern Ireland(London: Oxford University Press, 1955).

[3] GB, Home Office, Joint Working Party on the Economy of Northern Ireland, Report, Sir Robert Hall, chairman, Cmnd. 1835(London: HMSO, 1962). Published in Belfast as Cmd. 446.

(1963-64),[1] the Wilson Plan(1965)[2] and the 1970-75 Development Programme(1970).[3] Interspersed by date of publication with these various HMSO items are three cognate commentaries: Florence(1957),[4] Dennison (1961)[5] and Cuthbert and Black(1964).[6] Our overall purpose in this section is three-fold: 1) to depict prevailing opinion with regard to the role of transport and communications in industrial development, 2) to illustrate the temporal evolution of opinion, and 3) to identify the proximate reasons for the observed changes.

White Paper on Industrial Location(1944)

This statement of intent by the Ulster Government may be viewed as the NI equivalent of the Barlow Report, an adumbration of later arguments in favour of growth centres, and an embryonic presentation of the need for selective investment in infrastructure. It was concerned with the unequal geographic distribution of industry within Ulster, especially its undue concentration in Belfast, and recommended that the balance be redressed by the attraction of new industry to the larger provincial towns. Rather naively, it suggested that the bulk of this industry might be created by local enterprise "reinforced by a sense of

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[1] NI, Ministry of Health and Local Government, Belfast Regional Survey and Plan: Recommendations and Conclusions, Cmd. 451(Belfast: HMSO, 1963); Robert H. Matthew, Belfast Regional Survey and Plan, 1962: A Report Prepared for the Government of Northern Ireland(Belfast: HMSO, 1964).

[2] NI, Economic Development in Northern Ireland Including the Report of the Economic Consultant, Professor Thomas Wilson, Cmd. 479(Belfast: HMSO, 1965).

[3] Robert Matthew, Thomas Wilson and Jack Parkinson, Northern Ireland Development Programme, 1970-75,(Belfast: HMSO, 1970); NI, Northern Ireland Development Programme, 1970-75: Government Statement, Cmnd. 547 (Belfast: HMSO, 1970).

[4] P. Sargent Florence, Industry and the State(London: Hutchinson's University Library, 1957).

[5] S.R. Dennison, "The Northern Ireland Economy," London and Cambridge Economic Bulletin, New Series, No. 38 in The Times Review of Industry, June 1961, pp.vi-viii.

[6] N. Cuthbert and W. Black, "Regional Policy Re-examined," Scottish Journal of Political Economy, XI(February 1964), 1-16.

local patriotism." Mentioned specifically as new industrial possibilities were food processing and building materials. The dearer transport problem implicit in non-Belfast locations was seen as the most important single impediment to the goal of decentralized industrial diversification. However, the Government felt that it could be mitigated, if not solved, by careful physical planning.

Florence(1957)

This survey of State interaction with industry in the UK, while largely irrelevant to our purposes, contains (p.182) an excellent summation of NI's economic dilemma as seen by many, if not most, informed outsiders during the nadir of British postwar regional policy in the mid-1950s:

> The deviation of Northern Ireland from the full employment pattern in other /formerly depressed/ regions demonstrates the limits of State planning in a free society. No firm is coerced to place its factories in any region or area, and firms seem to have considered Northern Ireland too out of the way and inaccessible from the rest of the British economy.

It will be noted that NI's lack of success in attracting sufficient new industry was attributed entirely to what appears to be a synonym for transport and communication difficulties.

Isles & Cuthbert(1957)

This exhaustive study of several years' duration by two economists at the Queen's University of Belfast was delivered to the NI Minister of Commerce in June 1955. Its purpose was analytical; recommendations were deliberately eschewed. As such it has been called "a most valuable fundamental analysis".[1]

One of the tasks facing the authors was to appraise the constraints on NI's economic development. Their conclusions played an important part in shaping yesterday's conventional wisdom.

According to Isles & Cuthbert, NI had no natural advantages relative to GB. Its comparative natural disadvantages were twofold: 1) no mineral resources apart from brick clay and sand, 2) isolation from major British markets as a result of the Irish Sea. To these it

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[1] Hall Report, para. 6.

was necessary to add, partly in consequence, the small local market.[1] The result was increased input and distribution costs relative to a GB location for most types of manufacturing activity, greater difficulty in obtaining contracts and extra problems in securing delivery of capital equipment and other inputs. These seemingly immutable facts of life had both narrowed the range of potentially viable industry and reduced expansion opportunities for the group already extant. Within these constraints, certain industries had managed to achieve a reasonable degree of prosperity in NI, viz.: a) local market-oriented industries, b) the brick and cement industries, c) female labour-intensive 'export' industries not greatly affected by transport costs, i.e., industries making goods with one or more of the following characteristics - i) made from locally-produced raw materials, ii) comparatively small, compact and light, iii) relatively high in value, iv) not involving a fuel-intensive manufacturing process.[2] Surprisingly in the view of the authors, one industry which had not developed as much as expected on the basis of these criteria was the processing of indigenous agricultural products.

Transport costs had also acted as a very serious obstacle to the

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[1] By 1975 the population of the province will still be only an estimated 1,506,000: 1970-75 Development Programme, p.63. The Economist has recently called for large-scale emigration: "Ulster: Peace at the Wrong Price," Economist, 27 Jun 70, p.64. This advocacy is understandable in light of press reports such as the following: "'Unless communal peace is restored quickly the economy of Northern Ireland will be in ruins. Indeed the damage done so far is almost immeasurable. It has set the industrial development programme back 20 years or more.'" A Belfast business commentator quoted by R.W. Shakespeare, "Catholics Return on Union Pledge," The Times, 3 Jul 70, p.24. See also Murray Sayle, "Will Ulster Festival Be Explo 71?" Sunday Times, 10 Jan 71, p.1. Mr. Sayle states: "There are now no new projects at all in the pipeline; in a few months, Ulster's industrial growth looks like ceasing altogether."

[2] A substantial portion of Ulster industry at the time of the Isles-Cuthbert Survey was fueled by coal imported from GB. The average price of this coal in Ulster was considerably in excess of the GB average. Indeed, the excess was said to be so large as to have "serious effects, even by itself" on the competitive position of NI firms. Isles & Cuthbert(1957), p.144. Coal costs relative to net output are shown in the Survey for 15 manufacturing industries; the data are taken from the 1935 Census of Production. The most coal-intensive industries in descending order of magnitude were paper, bricks and fireclay, earthenware and china, textile finishing, and butter and cheese. At the least intensive end of the scale were industries like mechanical and electrical engineering, shipbuilding and marine engineering, shirts and collars, bacon curing, preserved foods, and hosiery, i.e., industries which have developed on a fairly large scale in NI.

dispersal of industry within NI according to the Isles-Cuthbert Survey, in part because commercial transport rates were higher in Ulster than in GB. An industry suitable for location in the more outlying areas of the province not only required the characteristics of successful 'export' industries (as listed above); it also needed to be capable of operating economically on a limited scale. Perhaps the best embodiment of these various requirements was the textile industry. On the other hand, the number of suitable candidates was rather limited as reflected in the relative lack of manufacturing activity outside the Belfast area and the industrial towns of the Lagan valley and the upper Bann, none of which was more than 25-30 miles from the capital.

While the Survey did not advance policy proposals, alternative ways of minimising the adverse effects of the transport burden were outlined and briefly evaluated in terms of both desirability and practicability, e.g., reducing the distance taper in freight rate schedules, the postalisation of freight rates, a general subsidy to transport users, an operating subsidy to transport operators, subsidies on the transport of specific commodities, public investment in improved transport facilities, the creation of a government-owned provincial shipping service between NI and GB, and the encouragement of air freight services. Underlying this preoccupation with transport matters was the belief that a lowering of transport costs was one of the best ways of mitigating Ulster's relative isolation from the rest of the British economy. This belief was expressed succinctly as follows:

> . . . the handicaps suffered by firms in Northern Ireland in competition with firms in Great Britain mainly take the form of additional costs of transport. Financial and other measures designed to reduce these additional costs would have the two-fold advantage that they would not discriminate between particular industries, or particular firms, and they would attack directly the basic cause of Northern Ireland's industrial handicaps.[1]

On the other hand, Isles and Cuthbert rightly stress a point touched on earlier, viz.:

> The handicap of distance cannot . . . be entirely reduced to costs of transport. Even if transport were free there would still be disadvantages, involving either more expenditure or

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[1] Isles & Cuthbert(1957), p.387.

> lose earnings, through delays in delivery, the carrying of larger stocks, the lack of personal touch with customers, possibly higher costs in raising capital, etc.[1]

Dennison(1961)

While not denying the importance of lack of local raw materials, relative isolation and onerous transport costs as impediments to industrial expansion for a limited range of industry, Dennison considered these factors to be insufficient general explanations of industrial retardation in Ulster. Few industrial areas anywhere are endowed with an adequate resource base, raw material-oriented industries today are thin on the ground, transport costs are relatively insignificant both in the linen textile and many of the newer types of industry, and a large number of industries are essentially footloose. In other words, Isles & Cuthbert overstated their case: the range of industry suitable for development in NI is rather wider than they have allowed. Indeed, one has difficulty discerning any inherent disadvantage of a general nature arising out of Ulster's geographic location. Belfast is better situated than London for supplying the west coasts of England and Scotland given the relative prices, at least traditionally, of sea and land transport, and relative distances. Any locational disadvantages confronting NI producers are most likely attributable to special circumstances such as discriminatory sea freight rates or low quality sea freight services. Prima facie support for this assertion is provided by the appointment of the Hound Committee in January 1961(see below).

Dennison did allow the possible validity of the conventional transport cost argument in two situations apart from the obvious instances of local market- and raw material-oriented industries: 1) branch 'feeder'[2] plants (although even here he suggested somewhat cynically that complaints by some newly-established firms were inspired more by hope of extra government assistance than by genuine hardship), 2) firms exporting to foreign buyers but forced to use ports in GB for the purpose because of inadequate volume, dependence on long-standing shipping arrangements, etc., thereby incurring transhipment costs. However, it seems clear that he visualised these situations as exceptions. More general explanations for NI's undeniably disappointing rate of growth must be sought elsewhere, he argued, e.g., in the lack of "growing points",[2] the lack of a local

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[1] Ibid., p.265.

[2] The term was not defined.

capital market, and the shortage of indigenous management talent. Only the first item, he noted was of particular relevance to outside firms. They, on the other hand, were Ulster's main hope, at least for some time to come.

Hall Report(1962)

A working party of senior civil servants from NI and GB was formed during May 1961 to:

> examine and report on the economic situation of Northern Ireland, the factors causing the persistent problem of high unemployment, and what measures can be taken to bring about a lasting improvement.[1]

Sir Robert Hall (now Lord Roberthall), a non-civil servant but special adviser to the UK Minister of Transport[2] and ex-chief economic advisor to the British Government, was appointed chairman following the death in September 1961 of the original chairman, Sir Herbert Brittain. Hall's appointment, while in an obvious sense fortuitous, might also be taken as suggestive of the importance attached to transport matters by the working party(JWP) and its political progenitors.

The JWP laboured for over a year, reporting simultaneously to the British Home Secretary and the Ulster Prime Minister early in June 1962. Its efforts overlapped those of the Toothill inquiry in Scotland. However, the Toothill Report has since become much better known, and for good reason - it is generally a much more impressive document,[3] in part because it reflects original research as well as informed opinion. The Hall Report is based almost entirely on private testimony and memoranda, and of course on the views of the JWP's own membership.

Hall and his colleagues generally reaffirmed the importance attached to transport considerations in industrial development by Isles

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[1] Hall Report, para. 1.

[2] Hall chaired the Group appointed by the MOT that produced The Transport Needs of Great Britain in the Next Twenty Years(London: HMSO, 1963).

[3] Cf. Cuthbert & Black(1964), a highly critical academic post-mortem on the Hall Report. The Report was attacked generally in NI as being too conservative and pessimistic, not least because of its authors' failure to reach agreement on Stormont's wage subsidy proposal, and their support, albeit qualified, for an emigration policy.

& Cuthbert but with less conviction;[1] contrary to the latter's stand, the JWP stressed the effects of delay, damage and pilferage and the consequent need for larger stocks rather than transport costs *per se*. Available evidence with regard to transport cost differentials, they said, was "varied and inconclusive". On the other hand,

> on average transport costs form a less significant part of total costs than is often supposed, though their importance naturally varies according to the size and weight of the goods in relation to their value, and also according to the fineness of cost margins.[2]

This observation rests on evidence from established firms only; the Report accepts the point by Isles & Cuthbert that manufacturers for whom the cost of transport is really important are unlikely to have a production unit in NI.

Two specific transport issues were rejected as inconsequential by the JWP: 1) an allegation that Belfast harbour dues were excessively high, 2) Dennison's transhipment argument with respect to exports from NI. In the former case, the Report observed that harbour dues were no higher in Belfast than in other UK ports. In the latter, it was maintained that any transhipment problem that might exist should be seen in perspective - many exporters in GB had to bear the cost of more or less lengthy land journeys to the point of export; to quantify differential transport costs on exports from NI and GB would be extremely difficult.

Also rejected by the JWP were: a) the social overhead capital approach to economic development, and b) any form of permanent subvention to industry, including transport subsidies. The economic benefits of additional investment in SOC were considered to be too small and indirect. Transport subsidies were opposed on the ground that, once introduced, they would be difficult to discontinue. On the other hand, some members of the JWP were in favour of public support for the sea link between NI and GB claiming that the services involved were comparable to a road. Roads in GB are today financed entirely from

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[1] Undoubtedly they were influenced by Dennison (cf. the Hall Report, para. 6) and the 1960-61 inquiry into manufacturers' transport costs by the Northern Ireland Development Council (see below). It is not improbable that the JWP saw little need for original research on transport costs and industrial development given the availability of the NIDC inquiry results.

[2] Hall Report, para. 97.

public funds.[1] User levies in the form of petrol and road taxes are both indirect and unearmarked. Other JWP members, however, had a hard time reconciling the apparently unanimous opposition to permanent subventions with the proposal for *de facto* public subsidisation of the sea services to and from NI. Moreover, official UK government policy called for a shipping industry able to pay its way without subsidy. This lack of unanimity led the JWP to recommend that the question of a subsidy towards the cost of sea transport be examined further following the report of the House Committee.[2]

In 1953 the Ulster Government began subsidising the cost of industrial coal in NI. The purpose of the subsidy was to offset the cost of transporting the fuel from GB.[3] Isles & Cuthbert were generally critical of this policy innovation arguing, *inter alia*, that it was probably an inefficient way of stimulating industrial development.[4] The JWP was equally critical noting that the subsidy bore no relationship to employment, and that it was discouraging firms from converting to oil, a non-subsidised but otherwise cheaper fuel. However, the members could not reach agreement on a policy alternative. The GB representatives wanted the subsidy abolished. In sharp contrast, the NI members wanted it extended to cover all industrial fuels.[5]

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[1] NI still maintains a Road Fund.

[2] This Committee on shipping services was announced by the UK Minister of Transport on 31 Jan 61, i.e., prior to the formation of the JWP, in response to repeated representations from the NI Government. It was to evaluate the quality of the shipping services between NI and GB and the reasonableness of the user charges. Mr D.V. House was chairman. The Committee reported some months after the JWP. The latter body considered some of the matters implicit in the Committee's terms of reference at all only because of their obvious relevance to its own terms of reference, and the widely-held view that sea transport problems were causing great concern to industry. However, the comments on sea transport in the Hall Report were labelled "preliminary".

[3] Wartime controls on industrial coal prices remained in effect till 1953. The control programme included a general, UK-wide subsidy on the transport of coal in the form of a rebate of all freight charges over 16s 6d a ton. This rebate effectively offset the extra costs involved in transporting GB coal to NI. See Isles & Cuthbert(1957), pp.133-43.

[4] *Ibid.*, pp.143-44.

[5] The total amount available for subsidy between 1953 and 1964 was £750,000 a year. In 1961 this sum equalled 15.8% of the coal bill paid by manufacturing firms using solid fuel. The coal subsidy was extended to fuel oil by the Aid to Industry(Amendment)Act(NI), 1964; the annual amount available for distribution to manufacturers was raised to

On industrial development, the JWP advocated greater diversification. Particular stress was placed on the need for labour-intensive, non-local market-oriented industries producing high value/low bulk goods for which transport costs would be relatively unimportant.[1] While this attempt to define priorities might appear unexceptional, it did run counter to the blanket approach being pursued in 1961-62 by the NI Minoon. The Ministry argued on the basis of prior experience that selectivity was fine in principle but disappointing in practice given the limited population of expanding firms at any point in time suitable for location in Ulster.

The Hall Report specifically urged greater processing of agricultural products in NI. This theme had been discussed at some length by Isles & Cuthbert.[2] Hall and his colleagues noted that much had already been achieved in connection with pigs, eggs, fruit, potatoes and milk. Nevertheless, profitable opportunities still existed for further production of pigment, confectionery, cheese and ready-to-serve 'convenience foods,' and for the establishment of large-scale cattle abattoirs and related industries such as leather tanning and tallow melting.

£1,100,000. This figure was equivalent to 14.5% of industrials' fuel costs in 1964. By 1969, however, the percentage contribution had dropped to 10.5% as a result of greater fuel usage in the province and increased unit costs. The principal beneficiaries of the subsidy, of course, have been fuel-intensive industries such as cement manufacturing (fuel accounts for about 20% of the cement industry's variable costs - cf. Adrian Hamilton, "Big North Thames Gas Contract," Financial Times, 4 Mar 71, p.21), viscose filament yarn production (see the study of Courtaulds's Carrickfergus plant below), grain milling and papermaking. As suggested by Isles & Cuthbert, and as corroborated by a quick scan of the UK and NI censuses of production, fuel-intensive industries would appear to be synonymous with transport-sensitive industries, at least in a number of important instances. However, the 1964 fuel subsidy extension had little to do with manufacturers' transport costs. Hall Report, paras. 55-56, 102-06, 211; personnal letter from F. McDonald, NI MinCom, 7 Jul 70; McGovern(1965), p.37(for full reference, see below). See also NI, MinCom, NI Coal Inquiry Committee, Final Report, B.J. Fox, chairman, Cmd. 460 (Belfast: HMSO, 1963; GB, National Board for Prices and Incomes, Report No. 21 - Coal Distribution Costs, Cmnd. 3094(London: HMSO, 1966); and "The Coal Industry," ch. 4 in Reid & Allen, Nationalised Industries(1970), pp.82-105. The latter study provides a more general view of coal and its future in NI and the UK as a whole. It also mentions a number of additional references.

[1] Cuthbert & Black(1964) criticised the JWP for not exploring the merits of a selective approach to industrial development. This criticism would appear to be somewhat unfair given the explicit advocacy of selectivity in the Hall Report.

[2] E.g.,(1957), pp.397-99.

Cuthbert and Black(1964)

Black was a colleague of Cuthbert's at Queen's. Their article had two purposes: 1) to assess the findings of the Hall Report, 2) to discuss the adequacy of the supporting analysis. We have already noted that their conclusions were caustic. Interestingly, hardly a word was said about transport or communications! Either the authors found themselves in substantial agreement with Hall and his colleagues on this topic or the omission was inadvertent. Prima facie, the first alternative would appear to be the correct one.

Matthew Report(1963-64)

Matthew, a professor at the University of Edinburgh, was commissioned by the NI Ministry of Health and Local Government in mid-1960 to prepare an "advisory outline" physical plan for the Belfast region, a loosely-defined area bounded roughly by Larne, Ballymena, Portadown and Downpatrick, i.e., by the limits of practical commuting.[1] At the same time, the plan was to be placed within a provincial context. Matthew completed his remit in October 1962. His policy recommendations and conclusions were submitted to the Stormont Parliament in the form of a Blue Paper on 26 February 1963 "for information, discussion and comment". The rest of Matthew's report was not published until April 1964, the long delay being occasioned by printing difficulties.

One of Matthew's official tasks was to "relate" his plan "in the broadest terms" to the economy of NI as a whole. Yet he was not given access to the Hall Report which, while it did not appear in public until October 1962, was in the hands of the NI Prime Minister, as we have seen, early the preceding June. Needless to say, this situation is not entirely comprehensible, especially since Matthew was able to meet with H.A. Benson to discuss the latter's official inquiry into the future of Ulster's railways(see below). Political considerations may have been involved but, on the face of it, this exercise in secrecy smacks of maladroitness. In the event, Matthew drew heavily for his economic intelligence and inspiration upon three sources: 1) Isles and Cuthbert(1957), 2) the Teothill Report, and 3) a mail questionnaire survey in 1961 of all manufacturing firms in the Belfast area with more than 10 employees.

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[1] Cf. Matthew Report(1964), p.185; Jean Forbes, "Mapping Accessibility," Scottish Geographical Magazine, LXXX(No. 1, 1964), 12-21.

His plan called, inter alia, for the official designation of 15 "centres for development" in Ulster, joined together and linked to the outside world by an improved communications network. Nine of the proposed centres were within the plan-region, viz.: Antrim, Ballymena, Bangor, Carrickfergus, Downpatrick, Larne, Lurgan, Newtownards and Portadown. Six were outwith the plan-region, viz.: Londonderry, Coleraine, Omagh, Dungannon, Enniskillen and Newry. There is little doubt that Matthew was strongly influenced in his advocacy of growth centres by the Toothill Report and ipso facto that he saw them primarily as development tools. Accessibility was the main criterion used for their selection tempered, sometimes strongly, by political feasibility. Accessibility was measured in terms of public transport, alternative data being neither available nor necessary according to Miss Forbes, the principal planner involved. Interestingly, development potential was not an explicit consideration in the growth centre selection process although the six centres outwith the plan-region were felt to be more or less obvious choices once political considerations had been taken into account. Within the plan-region, three of the nine centres - Ballymena, Lurgan and Portadown - were singled out as "priority areas for development" in order to distinguish them (implicitly) from the more political designees. Lurgan and Portadown together were further distinguished by being made "the focus of a substantial new Regional Centre, with an ultimate population in the region of 100,000 people . . ." In other words, Ballymena, in the opinion of the planning team, was more important as a growth point than six of its fellow "centres for development" inside the plan-region, but less important than Lurgan-Portadown.

Matthew had two main goals: 1) to limit the population of the Belfast Urban Area to 600,000, 2) to increase the attractiveness of other parts of Ulster. Both were to be achieved simultaneously. Growth centres and better communications, particularly roads, were to be the means. With regard to the latter, Matthew obviously drank deeply from the cup of his economic mentors arguing that good communications were "of the greatest possible significance to the present and future of Northern Ireland . . ." Neither he however nor any member of his team had any real expertise in the transport field. Thus it is perhaps not surprising that the recognition in his report's transport section of the virtual bankruptcy of the railway system did not prevent him from recommending in another section that existing rail

services between the "centres for development" and the port of Belfast should not only be kept open but improved! It is true that such a recommendation need not imply naivety, but it is hard in this case to come to any other conclusion. More realistic was Matthew's observation that Ulster's transport system was "both economically and technically . . . in a state of fluidity" but lacking in coordination.

Not unexpectedly in view of the foregoing, Matthew had relatively little to say on the importance of transport for specific industries. Apart from noting that recent "science-based" industrial migrants to NI were characterised by relatively standardised products, low transport cost/sales ratios and international markets, and that transport considerations explained a great deal of the historical propensity of new industry to cluster in the Belfast area, he simply echoed Isles & Cuthbert. What is significant about his report from our viewpoint is: 1) his reconfirmation of the importance of good communications for NI's industrial development, 2) the linking of this reconfirmation to his advocacy of a growth centre policy for the province, and 3) the impact of his ideas on the government - his principal recommendations were accepted as official policy within a few months of their initial presentation.

Wilson Plan(1965)

Captain Terence(now Lord) O'Neill became Prime Minister of NI in March 1963 upon the retirement of Lord Brookeborough due to ill-health after almost two decades in office. Ulster's economic situation was gloomy. Unemployment in February 1963 had affected 11.2% of the labour force, an unusually high figure.[1] Yet the recent Hall Report offered little succour, being widely regarded as "an austere and unpromising, if thorough, document."[2] Owing partly to this state of affairs, economic planning was coming to be viewed more and more favourably. Abroad, there was the example of the French, and growing encouragement from the OECD mandarins in Paris. At home, there was Neddy, the planning exercises in Central Scotland and NE England, Matthew's physical plan for the Belfast region, Benson's proposals concerning the railways, and, most importantly, the patent failure of previous policy initiatives to remedy the province's intractable economic disabilities. This was the environment in which O'Neill

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[1] Cf. 1970-75 Development Programme, p.60.

[2] Terence O'Neill, Ulster at the Crossroads, with an Introduction by John Cole(London: Faber and Faber, 1969), p.31.

announced on 22 October 1963 that he had "set on foot" an interdepartmental inquiry into the "useful scope of economic planning and co-ordination in Northern Ireland, with a view to the publication as soon as possible of a comprehensive Plan . . ."[1] Professor Thomas Wilson of the University of Glasgow drafted the final plan in his role as economic consultant to the planning group. It was presented to O'Neill late in December 1964.

Wilson's plan related to a 6-year period, the financial years, 1964/5 to 1969/70. It called for the creation of 30,000 new jobs in manufacturing, an increase of two-thirds on the unplanned results of the previous six years. Important means to this end included "a substantial inflow of new firms," support for MinCom's blanket approach to industrial promotion and Matthew's growth centre proposals,[2] and heavy emphasis on the need for adequate and efficient transport and communications. The rationale for the latter theme was reiterated again and again with forthrightness and candour. For example:

> There is no disguising the fact that Ulster seems a discouragingly remote area on the very fringe of Europe . . . An industrialist . . . will want to know whether a factory established in Northern Ireland will incur both heavy additional transport costs and the penalty of falling out of touch with modern developments in technology and in marketing.[3]

> There can be no doubt that Northern Ireland's apparent remoteness has been a serious obstacle to industrial development . . . it would be foolish to deny that . . . the Irish Sea imposes some genuine handicaps . . .[4]

> The fear of incurring heavy transport costs is believed to be a powerful deterrent to firms that have been invited to consider the desirability of establishing factories in Northern Ireland.[5]

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[1] Wilson Plan, p.22.

[2] Note was made of the closeness of some of the growth centres in the Belfast area: "their identification as separate boroughs is of little significance from an industrial point of view . . . it is appropriate to regard several towns as constituting, in effect, a single complex." Ibid., p.41.

[3] Ibid., p.39.

[4] Ibid., p.58.

[5] Ibid., p.61.

While he acknowledged the existence of a transport cost impediment to industrial development in NI, Wilson believed that it could be overcome, not by a general transport subsidy which he opposed, but by an objective presentation of the facts. These were first that the extent of the problem had been greatly exaggerated, and second, that it was more than offset for a "wide range" of manufactories by NI's positive advantages as an industrial location. As confirmation of the second point, Wilson stressed Ulster's recent success in attracting new types of industry. On the first point, he was unable to be quite as precise as he might have wished:-

> While the available information about the costs actually incurred by established manufacturers is far from complete, enough evidence exists to show that the cost of transport is, in fact, much less burdensome than is assumed . . . Probably about 2 per cent of costs is needed for transport on the average, and the figure is rarely as much as 3 per cent . . . what is significant is the differential between . . . Northern Ireland and . . . Great Britain. Unfortunately there is very little precise information about this differential, but it must usually be quite a small percentage of a firm's total expenditure.[1]

By available evidence, he undoubtedly meant the transport cost surveys by Isles & Cuthbert and by the NIDC. These are discussed below in some detail. At this juncture, it is sufficient to note that they are far from definitive, an observation with which Wilson would have little quarrel.

A "Government Statement on Economic Development" accompanied the Wilson Plan. It endorsed most of the plan-proposals including the new job target, the concept of "growth areas" and the need for coordinated development of infra-structure.

1970-75 Development Programme(1970)

In the event, NI came within 1,200 jobs of meeting the target set by the Wilson Plan, a heartening performance given the difficulties besetting the UK economy from mid-1966 and the civil unrest locally from October 1968. Manufacturing employment continued to diversify during the plan-period but showed little aggregate growth because of closures and continued contraction in shipbuilding and "traditional textiles". Unemployment rose slightly, especially among males, although Minnow had notable success in its campaign to attract a higher

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[1] Ibid., p.61

proportion of male-employing industries.

At least 90 new factories were established in NI between July 1964 and the end of 1969, or roughly 16 per annum, "with the co-operation of the Ministry of Commerce". Their size distribution in terms of "jobs promoted" is high-lighted in the following table showing the number and size of all new factories assisted by MinCom since January 1945 and still extant in July 1964 and December 1969 respectively.[1]

	Number of Employees(Anticipated)						
	0-99	100-199	200-299	300-499	500-999	500+	Totals
No. of firms							
1945-July 1964	75	35	24	11	8	24	177
1945-69	147	48	29	13	6	24	267
Net increase	72	13	5	2	-2	0	90
Proportion of jobs promoted							
1945-July 1964(%)	7.1	10.1	12.1	7.7	7.0	56.0	100.0
1945-69(%)	9.6	11.6	11.9	7.3	4.4	55.2	100.0
Change(+/-)	+	+	-	-	-	-	

Clearly, most of the firms set up during the Wilson Plan-period were small, employing fewer than 100 people. In contrast, a relative handful of larger firms such as Michelin, Goodyear and Rolls Royce accounted for a sizable proportion of the new job total. The existence of these larger firms is not evident in the table, presumably because of closures affecting some of the previous postwar migrants.[2]

Especially noteworthy industrial developments during the 1964-69 period were: 1) the expansion of the man-made fibre complex that had come into existence between 1950 and 1963, and the formation of additional forward linkages including warp knitting and crimping, 2) the launching on a substantial scale of rubber processing, an industry

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[1] Cf. Wilson Plan, p.37; 1970-75 Development Programme, p.73. The figures are not comparable to those in App. B below as explained in the introductory notes to the latter.

[2] E.g., the huge H.M.V. Ltd. factory in Londonderry which closed in 1967 and moved to East Kilbride. H.M.V. produced gramophone turntables. Cf. John Elliott, "Ulster's Search for a New Prosperity," Financial Times, 26 Jan 70, p.19; John Clare, "Where Being Without Work is Almost a Way of Life," The Times, 13 May 71, p.4.

entirely new to Ulster, 3) continued diversification in the engineering sector, and 4) the emergence of a tobacco complex.[1] Over half the jobs promoted (i.e., 53%) were concentrated in three centres: the Belfast Urban Area(28%), Lurgan/Portadown or Craigavon(13%) and Londonderry(12%). Belfast reached its target population of 600,000 twelve years earlier than planned owing largely to a lack of formal overspill arrangements and a failure to expand some of the growth areas, e.g., the crucial centre of Craigavon, as quickly as expected. Transport developments during the Wilson Plan-period are discussed in some detail below. In general, they were on a scale commensurate with requirements leading the development consultants to remark: "Communications with Britain are vastly improved compared with 10 years ago."[2]

The new Development Programme envisages the establishment of "six or seven really large new factories" and the creation of 35,000 new manufacturing jobs during the quinquennium, 1970/71-1974/75, on the twin assumptions of an early end to civil strife and no significant changes in prevailing variation and levels of financial inducement. However, these quant-targets may no longer be realistic as augured by the consultants' admission that "As the /political/ situation continued to grow worse, a numbed sense of unreality began to creep over our deliberations."[3] Equally important, even if the quant-targets are achieved, unemployment at the end of the period is still expected to remain unacceptably high. In view of this situation, the consultants contemplate three additional courses of action in their report. Two of these courses, increased EEC expenditure and more public enterprise, are not viewed very favourably, although they are not rejected outright. The

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[1] Gallaher Ltd. began in what is now Ulster over a century ago; currently, it has large plants in Ballymena and Belfast. Carreras Ltd. bought the tobacco manufacturing business of Murray, Sons & Co. Ltd., Belfast in 1953 and opened a cigarette plant in Carrickfergus during 1964. Cigarette Components Ltd. commenced making filter rods on the Castlereagh Industrial Estate, Belfast in October 1965. Gallaher traditionally has been one of its major customers. Molins Machine Co. Ltd., the main British manufacturer of tobacco machinery, started production of components on the Maydown IE, Londonderry in October 1966. Cf. two reports by the UK Monopolies Commission, Report on the Supply of Cigarettes and Tobacco and of Cigarette and Tobacco Machinery, H.C. 218, 1960-61(London: HMSO, 1961); A Report on the Supply and Exports of Cigarette Filter Rods, H.C. 335, 1968-69(London: HMSO, 1969).

[2] 1970-75 Development Programme, p.28.

[3] Ibid., p.8.

third, greater financial inducements to private industry, receives more sympathetic consideration. Nevertheless, after lengthy debate, it too is rejected, the burden of the argument being that existing inducements should be reformed rather than augmented. Various proposals to this end are duly put forward. Inducements automatically available at the beginning of 1970 in NI are valued very roughly at 4% of a typical light engineering firm's gross output per annum, and at 7% of its net output. These figures are contrasted with transport cost/gross output and transport cost/net output ratios for NI and the UK from the 1963 Census of Production.[1] It is concluded, despite the obvious limitations of the latter, that geographic transport cost differentials "over a wide range of industry" are a relatively unimportant barrier to industrial development in Ulster. Perhaps for this reason, the question of transport subsidies is entirely ignored by the Development Programme.

The term, 'growth centre', is discarded by the consultants as pejoratively emotive. Two analogous expressions, 'centres of accelerated industrial growth' and 'key centres' appear in its place. Londonderry, Ballymena and the Greater Belfast Area[2] comprise the former group; it is recommended that they be promoted henceforth as the province's main industrial centres. Key centres represent a lesser order of growth centre. Eight are designated: the Coleraine Triangle, Downpatrick, Dungannon, Enniskillen, Larne, Newry, Omagh and Strabane. However, their prospects are frankly admitted to vary widely. It will be noted that the accelerated industrial growth and key centres together include not only the 15 centres for development designated by Matthew but a further designee as well, viz., Strabane. Also, in addition to the innovation of the GBA, Coleraine becomes a triangle. Certainly, new industrial migrants will not lack for choice! The consultants recommend that cash inducements to industry be made available throughout the province. Nevertheless, they expect that most new firms will be attracted to one of the accelerated growth or key centres by a combination of labour availability, superior infrastructure, and standard factories or land ready for occupancy.

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[1] We supplied special calculations to the consultants at the request of Professor Wilson. They appear as Appendix IX to the Development Programme, pp. 225-27.

[2] A new planning concept, the city-region. The GBA is roughly triangular in shape with the Belfast Urban Area, Antrim and Craigavon at the points. Carrickfergus, Bangor and Newtownards are "inner growth centres". Ulster's two main external communications foci, Aldergrove(air) and

Although the 1970-75 Programme reiterates its predecessor's emphasis upon good communications, and expresses some concern about the adequacy of the external services extant in 1970, one gets the impression, as implied earlier, that communications facilities and services, actual and planned, are considered generally to be more or less adequate for the time being. Indeed, a cutback is recommended in the Government's proposed roads programme.

As required by their remit, the consultants give considerable attention to the integration of their socio-economic and physical planning proposals. Such integration had not been attempted in the Matthew or Wilson Reports; on the other hand, it was not expected, not least because of the enormous difficulties involved. Integration, of course, implies continuous communication between the relevant departments of government, and coordinated action. Despite improvements during the Wilson Plan-period, "departmental isolationism" remains a serious problem at Stormont largely because of the Ulster Government's deliberate policy of 'step-by-step with Westminster', and inadequate leadership by the Ministry of Finance. Another problem has been insufficient coordination within the Key Ministry of Development, the super-department created as a consequence of the Matthew and Wilson Reports to handle infrastructure matters.

In its Statement on the Development Programme, the NI Government commits itself to "speedy and energetic implementation" although some of the consultants' proposals are rejected or modified. For example, increased financial inducements to private industry are announced despite consultant arguments that increases, on balance, are undesirable. Also, Ballymena is nominally accepted as a centre of accelerated industrial growth, but will receive no more emphasis in practice than the Key centres. To operate its two-tier growth centre strategy, the Government is setting up immediately (mid-1970) an interdepartmental committee under the chairmanship of MinDev.

Summary

Our objectives in this section have been first to portray contemporary opinion in NI during the postwar period on the topic of transport and communications as a factor in industrial development, secondly,

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Belfast(sea), are both within the GBA giving it a significance unrivalled by its nominal peers, Londonderry and Ballymena.

to trace its evolution, and thirdly, to identify the proximate reasons for the temporal changes. Transport problems have always been seen as perhaps the most important single endogenous impediment to industrial development in the province, although very recently they may have been superseded by political instability. Initially, attention was concentrated upon the obviously adverse transport cost differential confronting manufacturers in Ulster producing for the UK market, a problem compounded by the province's seemingly perverse industrial dispersal policy designed to steer movers away from Belfast towards hinterland locations, and remedial measures by MinCom and other government agencies took the form of compensatory financial subsidies. Explicit transport subsidies were eschewed. Later, opinion altered. Surveys revealed transport costs in many industries to be much less significant relative to gross output than had been anticipated; transport cost differentials were sometimes negligible. In other words, the earlier preoccupation with transport was based more on a priori reasoning and opinion than on fact. In addition, NI was proving attractive as a location to a growing range of industry suggesting that the traditional transport cost bogey was indeed less potent than feared. Simultaneously, integrated development planning was coming into vogue. Thus, attention turned increasingly to the need for physical improvements in transport facilities and services, the argument being that even if transport costs were less important than hitherto imagined, industrial expansion could still be impeded by inadequate infrastructure. This latter point was not now, of course, but for years it failed to give rise to substantive action due to the bifurcation of the responsibility for transport between Stormont and Whitehall, the lack of effective coordination within Stormont between transport and industrial promotion policy, and the almost complete absence of planning generally. Today transport problems are accorded much less attention than at the beginning of the post-war period for three reasons: 1) they have been put into a more realistic perspective, 2) in many types of industry, financial inducements have offset any transport cost differential, and 3) historical deficiencies in transport facilities and services have been largely eliminated. This conclusion augurs well for NI's future provided that it does not induce complacency.

Transport Cost Surveys

As discussed at length in ch. 9, transport cost data have been collected regularly in NI since 1951 as part of the province's annual Census of Production. However, our concern here is not with this body of material, but with the results of two ad hoc surveys of transport costs, one by Isles & Cuthbert in 1950(but not published until 1957), and one a decade later by the NI Development Council.

Isles & Cuthbert(1957)

Transport cost data were obtained on a confidential basis during the first half of 1950 from 13 selected manufacturers in NI producing largely for 'export'. Transport costs were defined as including freight charges, losses owing to damage or pilferage in transit, expenditure on extra packing in order to reduce damage costs, and losses owing to delays in the delivery of equipment and materials. While the latter item proved particularly hard to quantify (its main forms theoretically being loss of production time, loss of markets through irregular or slow delivery, the need for extra stocks of equipment, materials and finished goods, and the cost of extra storage accommodation), it proved equally difficult to obtain reliable data for any of the cost variables except freight charges. It was hypothesised however that damage considerations, extra packing costs or delay would be of major importance only in the case of fairly perishable or fragile goods. Otherwise, transport costs would equate roughly with actual rates paid.

Great difficulty was experienced in getting information on the costs of inward transport except for coal. Respondents were unable to identify the transport component of most input prices, materials from abroad being purchased usually c.i.f. Belfast, and materials from GB being purchased usually on a delivered basis. On the other hand, important instances were found of higher prices in Ulster than in GB for similar commodities.[1] In other words, while the transport penalty facing producers in NI was often hidden, it was nonetheless real.

It was found that the firms with relatively high outward transport costs as a percentage of selling price were also relatively fuel-intensive and above average in their transport outlays in connection with

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[1] Isles & Cuthbert in 1955 asserted strongly, though on the basis of very limited evidence, that "in most cases" NI producers paid higher prices for inputs made in GB than their GB competitors. Wilson(1955), p.106.

raw material inputs. Conversely, firms making high value/low weight products were not transport-sensitive with regard either to output or inputs, and were not particularly fuel-intensive. While the facts supporting these findings are unsystematic and rather patchy, nevertheless they have a strong aura of authenticity. Unfortunately, they were not related to specific MLHs, though four of the firms with relatively high value per ton products were said to belong to the textile industry.

In 1955 Isles & Cuthbert alleged that

> In most of the unsheltered industries which have thriven [sic] in Northern Ireland, the actual [outward] freight charges form only a small percentage of the selling value of the goods - often less than 1 per cent.[1]

Although no evidence was provided for this statement, it seems highly probable that the 1950 survey referred to above was the main source. It follows that the statement reflects a strong element of induction rather than fact. Its significance should be judged accordingly.

Isles & Cuthbert cautioned that any statistics on differential transport costs between NI and GB were bound to understate the importance of the differential as a retardative influence on the former area because any industries for which the gap was ruinously large would either not be represented in NI at all or would be found there only on a very small scale. In other words, the industries already established in NI would, as a result of a natural selection process over time, be those for which the transport disadvantage was least important. This point is perhaps an obvious one. Yet, like many seeming commonplaces, it is frequently overlooked.

Northern Ireland Development Council(1962)[2]

An inquiry into the magnitude of transport costs in NI's manufacturing sector was carried out by the NIDC, a quasi-public adjunct of

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[1] Ibid.

[2] NIDC, Fifth Report, 1960-61(Belfast: NIDC, 1962). This report is extremely difficult to obtain. Indeed, the copy in the library of the NI MinCom (the copyright holder) may be the sole one extant in institutional hands. The NIDC was superseded in 1964 by the NI Economic Council. McGovern(1963 - for full reference, see below) referred (ch. 3) to a study by the National Union of Manufacturers(NI) entitled Inquiry into Cross-Channel Freight Charges(Belfast, 1961). NUM(NI) is now extinct and it has not been possible to obtain a copy of this publication. However, MinCom believes that it was prepared as a result of the NIDC inquiry; personal letter from Mr W.J. Burns, 27 Aug 70. Undoubtedly, another and perhaps more important consideration was the setting up of the House Committee.

MinCom, during 1960-61, inspired in large part no doubt by the work of Isles & Cuthbert and the general paucity of data on *total* transport costs as opposed to transport payments (as defined by the Census of Production). Questionnaires were mailed out in February 1961 to all manufacturing concerns employing more than 50 persons with two very large exceptions, viz., Harland & Wolff Ltd. and Short Bros. & Harland Ltd., who were felt to be unrepresentative. The usable response rate was 21%, not a particularly high figure considering the general interest in the problem under investigation, its alleged seriousness, and the exclusion from the sampling frame of the smallest manufactories, i.e., those least likely *a priori* to reply to a mail questionnaire. On the other hand, the NIDC professed to be "reasonably" satisfied with the result inasmuch as non-response was more important in the case of small than large firms. That is to say, while the usable replies represented only 21% of the total number of firms surveyed, they accounted, according to NIDC calculations, for 42% of the relevant sales total. In absolute terms, 570 questionnaires were sent out; 155 replies were received but 34 of these were incomplete leaving a total of 121 for analysis.

It appears to have been the NIDC's original intent to use the inquiry findings "for the guidance of firms considering the establishment of new industry"[1] but not to make them public. However, in view of "the widespread public interest in the effect of transport costs on manufacture" the NIDC was prevailed upon to reverse its decision on publication and a detailed press release was issued. Later, a more complete statement of the survey results was published, though with little comment beyond explanatory notes, as an appendix to the NIDC's *Fifth Report*. Extracts from this appendix are reproduced in the table on the next page.

The NIDC data can be evaluated in several lights. One should ask, for example, what is the quality of the data and, a related point, are they internally consistent? Column 4 in the table offers some guidance on the first part of this question. Clearly the response to the NIDC inquiry varied widely by industry. In some cases, it was excellent. In others, as the NIDC itself points out, it must be termed "disappointing". Overall it appears to have been reasonably good, especially when one considers that while the sales data in Column 3 relate to establishments employing 25 or more persons, the denominators

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[1] Both this quotation and its successor are taken from a personal letter dated 30 Sep 70 from W.G. Clarke of the NI MinCom.

Extracts from an Enquiry into Transport Costs in NI's Manufacturing Sector by the NI Development Council, 1960-61

(1) Industry	(2) MLHs (1958 SIC)	(3) Total Sales as Shown by Report on 1959 Census of Production £'000	(4) Sales by Firms Replying to NIDC Enquiry as % of (3) %	(5) Raw Material, Fuel & Power Costs (Enquiry Data) as % of (4) %	(6)[e] Outbound Transport Costs (Enquiry Data) as % of (4) %	(7)[f] Inbound Transport Costs (Enquiry Data) as % of (4) %	(8) Column 4 Sales by Market: Within NI %	(9) GB %	(10) Export: Via GB Ports %	(11) Export: Shipped Direct %	(12) Raw Material Purchases: Bought Within NI %	(13) Bought at: Standard UK Prices %	(14) Bought at: Differential Prices %	(15) No Information %
Flour milling & animal feedstuffs	211,219	36,071	46.8	77.9	0.7	0.2	99.4	0.2	0.2	0.2	6.1	60.0	40.0	NIL
Bacon curing, meat & fish products	214	21,774	61.8	83.6	2.2	0.05	17.8	81.5	0.6	0.1	95.2	33.5	34.7	31.8
Milk & other food products	215,217-18, 239.2/3	24,790	21.5[a]	69.0	4.9	1.1	21.1	72.8	6.1	NIL	76.4	13.8	33.9	52.3
Light engineering	n/a	20,382	36.5[b]	44.9	0.6	1.9	19.5	39.8	40.5	0.2	2.7	57.2	39.4	3.4
Spinning & doubling	412	20,003	62.4	58.8	0.9	0.7	24.9	39.1	22.1	13.9	6.0	37.2	18.6	44.2
Weaving	413	16,885	54.0	61.5	1.1	0.3	21.2	53.5	24.7	0.6	38.8	30.6	22.2	47.2
Hosiery	417	3,563	85.2	41.4	0.8	0.1	6.0	91.0	2.9	0.1	11.1	83.9	15.6	0.5
Household goods & fancy linens	422.1(part), 810.4(part)	22,378	13.7[c]	66.1	1.5	NIL	7.9	67.3	23.8	1.0	22.1	32.0	n/a	68.0
Bleaching, dyeing & finishing	423	5,762	18.6[d]	34.8	2.6	1.0	72.4	24.4	3.2	NIL	7.8	29.2	n/a	70.8
Miscellaneous textiles	411,414-416, 418-21,422.2 429.1	17,707	51.4	54.6	2.8	1.9	11.5	79.6	8.4	0.5	12.6	72.5	27.5	NIL
Leather & footwear	431-33,450	2,673	99.6	55.9	1.0	0.6	2.6	75.1	22.0	0.3	10.9	46.0	19.4	34.6
Shirts & pyjamas	444(part)	9,457	49.5[d]	62.5	1.2	NIL	0.5	98.5	1.0	NIL	1.8	33.6	17.6	48.8
Other clothing	441-49 exc. 444(part)	14,171	18.7[c]	62.4	1.0	1.1	5.6	93.8	0.5	0.1	3.9	37.8	7.4	54.8
Paper, printing & publishing	481-83,489	5,714	40.7	57.5	1.0	1.5	62.0	34.4	0.1	3.5	0.7	73.3	26.7	NIL
Chemical, rubber & other industries	271-77,491, 493-99	6,716	51.3	37.5	1.2	0.5	26.6	56.6	10.9	5.9	12.5	85.9	10.9	3.2

Notes: Columns 8-11 inclusive add to 100% as do columns 13-15.

a A major concern in this industrial grouping gave the NIDC figures for only one of its several NI factories, arguing that the data were representative of its total operations. Thus, at least part of the seemingly low response can be explained.
b Eleven useful replies were received. Returns from the heavy engineering industry were insufficient to permit separate publication.
c Many of the firms in this industry employ 50 persons or less and were thus excluded from the NIDC enquiry.
d A "disappointing" response in the opinion of the NIDC.
e In a few cases, respondents' selling prices were set on an ex-works basis and outbound transport costs were recorded as nil.
f To an indeterminate extent, the percentages in this column represent the differential cost of transporting raw materials to a NI factory from an associate plant in GB. Differential costs = the extra costs borne by the Ulster producer.

Source: Taken or adapted from NIDC, Fifth Report, p.12 with the exception of column 2 which is based on the Report on the Census of Production of NI, 1959.

underlying Column 4 pertain to establishments employing more than 50 persons. In other words, the NIDC was not strictly comparing like with like when it set its inquiry findings against analogous Census results. The effect of this dissimilarity has been to understate the percentages in Column 4 by an amount more or less proportional to the number of establishments included in the 1959 Census of Production but excluded by the NIDC inquiry.[1] However, the degree of understatement in most, if not all cases, is probably marginal.

But not all of the figures in Column 4 can be taken at their face value for another reason. They are based, it is claimed, upon Column 3, i.e., upon published total sales data from the 1959 Census of Production; this assertion is borne out for many of the industries by a careful examination of the Census Report. Yet reservations of varying degrees of seriousness must be expressed in no less than five instances, viz., milk and other food products, light engineering, miscellaneous textiles, paper, printing and publishing, and other industries. In each of these cases, the sales total attributed to the Census by the NIDC understates the actual published total. More specifically, the NIDC ignores completely, but without adequately informing the reader and indeed misleading him, the following segments of the manufacturing sector:

Industry	1959 Sales £
Bread, biscuits & flour confectionery	13,265,000
Miscellaneous food, drink & tobacco trades	157,911,000
Mechanical & electrical engineering, metal containers, etc.	12,172,000
Trade hematitching	1,499,000
Mineral products	7,087,000
Timber & furniture	5,485,000
Printing & publishing books, newspapers & periodicals	2,415,000

These omissions total £199,834,000, a figure not very much less than the sum of Column 3, £228,046,000. It should be added that our list of omissions excludes £48m in sales attributable largely (but not entirely) to the shipbuilding and aircraft industries purposely disregarded by the NIDC survey. The principal effect of the omissions is to distort five of the percentages in Column 4, thereby suggesting a wider degree of coverage than existed in fact.

Being unofficial, the NIDC survey may not have been taken

[1] We are assuming that the NIDC data relate to 1959 but are unable to confirm that this is a certainty.

seriously by questionnaire recipients in the same way that a government census would have been, even by those who bothered to respond, i.e., quality may have suffered on this count. It has not been possible to obtain a copy of the NIDC questionnaire; consequently, we are uncertain whether it was accompanied by detailed notes of the type issued with Census of Production questionnaires. Thus, we cannot determine from the published survey results the precise meaning of outbound and inbound transports costs or whether the intended meanings conform to Census usage.

The quality question can be viewed in another way. While we know that the data are generally biased in favour of the larger firm, we are unsure whether such a bias is significant. That is to say, are large firms inherently different from small firms with regard to the questions asked? We could speculate on this theme here but to little real avail.

Turning to the second part of our opening question, the answer must be no, the data in the table are not always internally consistent. Consider, for instance, the shirts and pyjamas industry. Inbound transport costs are shown to be nil yet a sizable proportion of raw material inputs were purchased at differential prices. Less blatant but similar ambiguities can be found.

A second method of evaluating the NIDC data is to compare the results relating to transport costs with analogous figures from the 1959 Census as we have done in a limited way below:

Industry	(1) Census %	(2) NIDC %	(3) Difference (2)-(1)
Flour milling & animal foodstuffs	0.6	0.9	+0.3
Bacon curing, meat & fish products	2.1	2.25	+0.15
Spinning & doubling	1.2	1.6	+0.4
Weaving	0.4	1.4	+1.0
Hosiery	0.9	0.9	NIL
Household goods & fancy linens	1.4	1.5	+0.1
Bleaching, dyeing & finishing	2.0	3.6	+1.6
Shirts & pyjamas	1.4	1.2	-0.2

Our selection of industries is based on nothing more than Census data accessibility; the figures in Column 1 are taken directly from the Census Report. Two further points warrant mention: i) the Census figures are payments for transport as a percentage of gross output, ii) the NIDC figures are thought to be total transport costs (although this remains conjecture rather than certainty) as a percentage of total

sales. Payments for transport should normally be less than total transport costs (the difference being outlays on own-account transport) and by definition can never exceed them. Total sales do not equal but are very close to gross output. It follows from the foregoing that the NIDC figures should normally exceed those from the Census though occasionally the two may be the same. This tentative conclusion is in fact supported by Column 3 in the above table with one exception, the shirts and pyjamas industry, although, as we have argued earlier, the veracity of the NIDC transport cost figures for this industry is in some doubt.

A third way of assessing the NIDC findings is to ask to what extent did they fill a need. Isles & Cuthbert had argued that transport costs were very important to manufacturing industry in NI but were unable to quantify adequately this assertion because of a severe lack of up-to-date and comprehensive factual information. Dennison's debunking polemic was almost entirely non-numerate. The Census of Production was of limited help because it ignored own-account transport. Seen in this light, the NIDC data were a major step forward. Not only did they fill a critical void for the policymaker, both public and private; they held out hope of an improvement in the pointedness and utility of academic debate. It is little wonder that a demand arose for their publication.

We turn now to a brief examination of what the NIDC actually discovered. It will be evident first that transport costs in 1961 were not generally as important as contemporaries might have been led to believe by the cumulative force of the Isles-Cuthbert arguments.[1] The highest total transport cost/sales ratio calculable from the NIDC table is 6.0% (milk and other food products), not a particularly high figure and yet one considerably in excess of those for most of the other industries or industry groupings. One-fifth(3/15ths) of the total cost/sales ratios exceed 3.0%, four fall between 2.0% and 3.0%, six fall between 1.0% and 2.0%, and two are less than 1.0%. Secondly, whereas Isles & Cuthbert experienced great difficulty obtaining information on inbound transport costs, the NIDC, for unexplained reasons, appears to have avoided this problem. Thus, its findings represent an important advance. They show that inbound costs are normally less

[1] This observation in no way refutes the Isles-Cuthbert thesis which relates primarily to differential rather than absolute transport cost ratios.

than outbound, frequently by a sizable margin, although in one-fifth of the cases inbound costs predominate. Thirdly, while information analogous to that collected by the NIDC on the market distribution of manufacturers' sales is available from the annual Census of Production, there is one important difference, i.e., the NIDC distinguishes between exports shipped via ports in GB and exports shipped direct from NI. This distinction enables us to identify industries presumably subject to significant transhipment costs, e.g., light engineering, weaving, household goods and fancy linens, spinning and doubling, and leather and footwear. Such industries, according to Dennison, could possibly display an above-average susceptibility to transport cost arguments of the type advanced by Isles & Cuthbert. One wonders if Dennison would have been so disparaging of transport costs as a factor in industrial development had he realized the extensiveness of the transhipment cost phenomenon.[1] It is also interesting to note from the NIDC sales data that export shipments direct from NI ports in 1961 were unusual almost to the point of being rare, with one exception, the spinning and doubling industry. Finally, the NIDC figures on raw material purchases by NI manufacturers are, so far as can be determined, unique.[2] They show that few firms a decade ago were able to obtain the bulk of their raw material supplies within Ulster, the major exceptions being certain parts of the food group. Industrial expansion and diversification during the 1960s have undoubtedly ameliorated this situation somewhat although one would guess that the theoretical scope for additional backward linkages remains considerable. The data on raw material purchases offer some support for the Isles-Cuthbert assertion that input prices are often higher in NI than in GB, but more noteworthy is the extent of standard pricing. In some industries, e.g., hosiery, it exceeds 80%. Generally, the set of survey questions on raw material purchases appears to have given respondents more difficulty than any other.

On balance, the NIDC survey, despite a variety of defects and shortcomings, must be seen as a timely and important addition to the largely non-quantitative body of information on the role of transport costs in NI's industrial development extant at the beginning of the 1960s. It has not been given the attention in the literature that it deserves.

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[1] Presumably he had not read Isles & Cuthbert in Wilson(1955) who stated quite categorically (p.102) that most exports from NI were "sent initially to Great Britain." Regrettably, they did not support this assertion with evidence; thus, acceptance becomes an act of faith.

[2] Analogous information was collected by Professor Matthew in 1961 as part of his Belfast regional plan project, but only for firms in the Belfast area.

General Surveys of Migrant Companies

Three surveys have been published of postwar industrial movement to Ulster: Mitchell(1956),[1] Law(1964)[2] and McGovern(1965).[3] In addition, McGovern wrote a Ph.D. thesis(1963)[4] on the cognate subject of industrial dispersal within the province. Each study is examined briefly, focussing on the author's objectives and on his findings/conclusions relevant to our interests. Because they overlap, the two McGovern analyses are discussed consecutively.

Mitchell(1956)

In an article very similar in approach, findings and style to Belchor(1955), Mitchell, U.S. Consulate General in Belfast, recounts the experiences of the first four postwar migrants to NI from the U.S. The firms are not named but it would appear from Appendix B below that they were Berkshire International (MLH 417), Hughes Tool (333), Mission Manufacturing (339) and Norton Abrasives (469.1). Transport cost/net output ratios from the 1963 Census of Production for the MLHs in brackets are given below for NI, Scotland and the UK.

Industry	1963 TCNO Ratios NI %	Scotland %	UK %
VI-333	n/a	2.7	1.8
VI-339	n/a	2.3	3.1
X-417	4.2	1.8	2.2
XIII-469.1	n/a	n/a	3.5

n/a = not available

Clearly, none of the migrants was in a particularly transport-sensitive industry although from the one observation available and common sense it would appear that each faced larger transport bills (assuming national markets) than its competitors in GB. Indeed, the migrants had expected this to be the case; initially, each had planned to locate in GB closer

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[1] G.C. Mitchell, "US Plants in Northern Ireland," Anglo-American News, November 1956. This article first appeared in Foreign Commerce Weekly published by the U.S. Department of Commerce.

[2] David Law, "Industrial Movement and Locational Advantage," Manchester School of Economic and Social Studies, XXXII(May 1964), 131-54.

[3] P.D. McGovern, "Industrial Dispersal," Planning, XXXI, No. 485 (February 1965), 1-39.

[4] P.D. McGovern, "Problems of Industrial Dispersal in Northern Ireland" (unpublished Ph.D. thesis, University of London, 1963).

to suppliers (90-95% of total suppliers were of UK origin) and markets. However, labour shortages there, together with the blandishments of Ulster's MinCom, persuaded them to take a close look at NI. As it turned out, all were satisfied with their ultimate choice of location. Nonetheless, there were some grievances. For example, on average, British suppliers took 1/3 longer to make deliveries than their counterparts in the U.S. Some never did manage to meet U.S. tolerance specifications; many more were guilty of poor quality control, and rejection rates at the input end of the NI plants were quite high at first. Consequently, it proved necessary to maintain larger stocks than anticipated. On balance, however, the migrants recommended NI to sterling area-oriented U.S. migrants in light industries with low TCNO ratios.

McGovern(1963)

McGovern was a member of Professor Matthew's planning team and his Ph.D. thesis drawn heavily on Matthew's industrial survey. As we have seen, Matthew restricted his mail questionnaire to firms within the Belfast area. McGovern was interested in industrial dispersal within Ulster as a whole; thus he extended the Matthew survey during the summer of 1962, with assistance from MinCom, to include all firms opening manufactories outside the Belfast area since 1945. The two mail surveys together yielded 371 useble replies representing 60% (304 firms) of the Belfast area sampling frame and 56% (67 firms) of the other. McGovern's purpose was to assess by means of comparative studies the implications of the decision by Stormont to divert new industrial development away from Belfast, and to examine alternative ways of implementing a dispersal policy. He had concluded from a perusal of the literature on industrial mobility, especially Luttrell(1962), that successful industrial transplants often owed more to "the form and quality of a firm's internal organisation" than to the nature of its product or location. This belief underlay his entire approach to the subject of dispersal and contributed to a general de-emphasis of the role of transport costs.

Each of the firms outside the Belfast area was asked inter alia why it had come to NI. Several mentioned local markets, local materials or an "associate firm" in Ulster, all of which connote a desire to reduce transport outlays or improve communications. For example, the Metal Box Co.[1] established a plant at Portadown to avoid the onerous

[1] McGovern does not name his respondents but a number of the names can be deduced by collating information from more than one source.

transport costs concomitant with metal can imports from England (see below). The plant dominates the open top tin can market in both NI and Eire. An electrical components manufacturer set up a factory to supply Short Bros & Harland. An animal feed manufacturer set up a plant to supply the local market generally. Like Metal Box, a cardboard box producer[1] was attracted by the Irish market as a whole. A concrete product firm located in NI mainly because its parent company already had a plant there. British Oxygen Chemicals opened an acetylene plant in July 1960 to supply Du Pont's newly-opened synthetic rubber production unit; both firms are located in Londonderry. Local materials were mentioned by 18% of the 28 firms locating in outer Ulster during 1945-50 and by 21% of the 14 firms locating there during 1951-56; but they were apparently irrelevant however to the 25 firms locating outside the Belfast area during 1957-62 giving rise to an interesting question, viz., have materials-oriented firms diminished in importance everywhere or is the NI experience unique?

Transport difficulties were the main locational disadvantage faced by firms locating in outer Ulster (although some of the problems were common to firms in and around Belfast). A domestic electrical appliance producer in Portadown for example, on the edge of the Belfast region, said that intra-NI transport costs formed an appreciable part of his total transport outlays in connection with inputs from London. A camera manufacturer 47 miles from the capital, and several clothing firms, complained of transport delays and related problems rather than transport costs. A small lace company found fault with the adequacy of Ulster's internal transport facilities as did a small knitwear firm. One was located in the Ards Peninsula; the other had its factory in a part of Co. Armagh from which railway services had recently been withdrawn. Several firms found it necessary to operate their own road vehicle fleets because of the allegedly swingeing freight rates being charged by the Ulster Transport Authority, the monopolistic inter-urban commercial road haulier. Their products included bricks, furniture, earthenware and concrete items. A synthetic fibre producer experienced distance-related difficulties in communicating with technical staff in GB during the startup of its Ulster works. Two branches cited remoteness from English HQs as a locational handicap. One made shoe uppers and had about 50 employees. The second had 500 employees and

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[1] Almost certainly Reed Corrugated Cases which commenced production at Warrenpoint (Co. Down) in April 1948.

made nylon hosiery. Company policy required close contact between the latter branch and a central sales office in London. Because of distances and alleged inadequacies in Ulster's air services, misunderstandings were frequent. On the other hand, there were no transport cost problems. Inputs arrived carriage paid and output was despatched direct to retailers by parcel post! In general, problems in getting goods, messages, etc. to and from Ulster were mentioned more often than intra-NI difficulties. Transport delays were of greater concern than freight rates. The relative frequency of complaints rose with the distance of firms from Belfast. Particularly troubled by poor communications were textile and clothing firms making fashion goods.

A number of postwar firms in McGovern's Belfast area sample were local market-oriented. For instance, a manufacturer of jigs, tools and special-purpose machines was heavily dependent on close contacts with customers because of the non-standardised nature of his products. A fancy box-making machinery producer sold 2/3rds of his output to Ulster firms manufacturing containers for the textile and food industries. Similarly, a sheet metal specialist catering to the air conditioning, heating and ventilating equipment trades had 2/3rds of his market in NI.

Another postwar migrant to the Belfast area, a manufacturer of coated abrasives (probably Norton), 'exported' his entire output, 'imported' every raw material input with the exception of a small quantity of local sand, and found NI "inconveniently distant" from main suppliers and markets. He only came to the province because of the availability of a subsidised government factory.

Noteworthy also is the case of a long-established brushmaker in Belfast who imported most of his raw material inputs and exported 75% of his output despite relatively heavy delivery costs. For example, on consignments to London, transport outlays comprised 15% of total unit costs. The advantage of NI to this firm was the specialised labour force which it had built up over the years.

One-half of McGovern's Belfast area sample mentioned closeness to shipping under the questionnaire heading, "what is the principal advantage to you (if any) of being in the Belfast Area?" This being the case, it is readily understandable that many firms outside the Belfast area attached great importance to good communications! Overall, however, McGovern viewed transport <u>costs</u> as a "secondary, though important, consideration" in industrial location. They were a primary consideration,

be argued, for only a limited range of products, e.g., metal cans, heavy furniture, fertiliser, paper containers, beverages, and bakery products. It followed that dispersal was technically feasible for many contemporary companies located in the Belfast urban area. Positive measures to this end would be: 1) the designation of several dispersal or growth centres at the edge of the Belfast region and in outer Ulster, e.g., Portadown, Ballymena and Newry, all of which were embryonic transport nodes, 2) selective dispersal with a view to the creation of at least one industrial complex outside Belfast, 3) the establishment of faster, more reliable transport services between the growth centres and the Belfast docks, other ports and the new civil airport at Aldergrove, 4) closer coordination between transport and industrial development policy. Better air services would strengthen NI's attraction as an industrial centre generally by mitigating the difficulties at present confronting firms heavily dependent on sales divisions or other HQs staff outwith Ulster.

It will be noted that these conclusions simply embellish those reached earlier by Matthew. However, McGovern's analysis is much more substantive and his proposals are more visibly rooted in empirical reality. On the other hand, certain doubts remain as to the quality of the information yielded by a mail questionnaire.[1] Be that as it may, McGovern's work from our viewpoint must be seen as a major step forward, not least because of its contribution to the undermining of the Isles-Cuthbert argument concerning transport costs and industrial development.

McGovern(1965)

This monograph is analogous to McGovern's thesis but is confined to postwar industry. It is based on information collected by mail questionnaire and interview[2] during 1961-62 from 100 firms representing 55% of the eligible manufactories in Ulster. While he seems to have added 33 firms from Matthew's Belfast industrial survey to his own survey of firms outside the Belfast area, McGovern does not make the sources of his 100-firm sample entirely clear.

The monograph offers several new insights from our point of view.

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[1] Cf. ch. 12 below.

[2] McGovern's thesis, as we have seen, was based entirely on mail questionnaires. The amount of interviewing done for the monograph would appear to be minimal.

First, every manufacturing Order (as listed by the 1958 SIC) and 65 MLHs were represented by McGovern's sampling frame (approximately 180 firms). Not all of the firms were 'migrants' as we have used the term elsewhere in this study, an indeterminate but small number being indigenous. Nonetheless, the industrial breadth of migration to the province between 1945 and 1961-62 is impressive; the principal 'absentees' were motor car assembly plants[1] and primary metal producers. McGovern rightly concludes (p.11):

> there is little evidence to support the theory that long-distance dispersal must be confined to a limited range of industry with special characteristics in relation to transport, markets or any other technical consideration.

Seventeen per cent of his sample were local market-oriented. A further 12% were attracted to Ulster by the availability of raw materials. Interestingly, only half of the firms that one might have taken *a priori* to be closely linked to either local markets or materials in fact cited such linkages as primary location factors. For the remainder, other considerations such as labour availability or government influence were of greater significance, although it should be borne in mind that mail questionnaire results can be misleading. Also, they seem peculiarly prone to misinterpretation.

Secondly, 47 different localities were represented by McGovern's sampling frame indicating *prima facie* a very large amount of dispersal. However, the following table showing the nature of the dispersal relative to Belfast suggests that the spatial spread was in reality not particularly impressive, 70% or so of the firms being clustered within 30 miles of the capital:

new firms locating	in Belfast	34%
new " "	within 15 miles of Belfast	13%
new " "	15-30 miles from Belfast	24%
new " "	over 30 miles from Belfast	29%
		100%

Thirdly, the most intractable transport problems encountered by the migrant firms were, not surprisingly, difficulties outwith their direct control, viz., delays, damage in transit, and transhipment costs.

Fourthly, and, as we can corroborate from our Scottish case studies,

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[1] Car assembly plants are not wanted in NI, according to the *Economist*, because they would probably entail inflationary wage rates and inflammatory labour relations: "Reckoning at Stormont," *Economist*, 7 Dec 68, pp.61-62.

an extremely important point, McGovern argued (p.21), as had Luttrell (1962), that:

> Many of the difficulties experienced by dispersed factories owing to their being out of touch with sales, design and general policy divisions could be corrected by administrative changes within the firm.

Finally, he came out strongly against permanent subsidies, e.g., freight rebates, to industry as a means of promoting dispersal because, in his view, they were both economically undesirable and politically awkward. On the other hand, he felt that existing dispersal policy was not focussing enough on the need to reduce migrant firms' operating costs. His solution was the comprehensive area development programme ("area development is the key to dispersal") featuring the creation of counter-magnetic growth areas centred on vital transport nodes, etc. as noted earlier.

Law(1964)

This piece of empirical research by an economist at Queen's University had three objectives: 1) to test the conventional wisdom as enunciated by Isles & Cuthbert and the Hall Report that NI producers are at a locational disadvantage relative to other UK producers because of the province's remoteness, its lack of indigenous raw materials, and the small local market, 2) "to assess the extent to which there are compensating advantages", 3) to supplement analogous studies in GB. Interviews were held with the local executives of 28 firms (26 were branches), all of which had been helped financially by the provincial government under the Industries Development Acts to establish themselves in NI. An attempt was made to select firms of different sizes from a wide range of industries and with diverse origins. That is to say, Law's sampling procedure was purposive rather than random. In the event, roughly 2/3rds(19) of the interviewees originated in GB, one-fifth(6) were American, one was European, one came from Eire, and one was native to Ulster. Their industrial distribution was even more varied. The most numerous group (7 firms) made "intermediate metal goods", 6 firms made electrical equipment, 5 were categorized as miscellaneous, 4 produced knitted goods, 3 made "final metal goods", and 3 were chemical

concerns.[1] Seven foreign firms gave access to the UK market as an important consideration governing their decision to locate in NI; the eighth, from Eire, was "particularly interested" in securing access to the NI market. Four of the British firms, including the sole Ulster native, were also local (NI) market-oriented; all appear to have made intermediate goods. The remaining firms located in Ulster for a variety of non-market reasons, the most important being labour availability.

Law included a table in his article showing the disadvantages of a NI location as experienced by the 28 interviewees. It is reproduced below. He discovered an average of two complaints per interviewee. The most complaint-minded firms were those producing final metal goods. Intermediate metal goods producers, on the other hand, registered the least number of disadvantages. Only three firms out of the 28 or 11% admitted to no disadvantages whatsoever.

The Disadvantages of a NI Location as Experienced by Law's 28 Interviewees

Disadvantages	Number of Disadvantages by Type of Industry						
	Chemicals	Knitted Goods	Electrical Equip.	Inter. Metal Goods	Final Metal Goods	Misc. Industries	Totals
Distance Factors	6	8	9	10	8	8	49
a) higher transport costs	2	2	3	3	2	3	15
b) larger stocks	2	3	3	2	1	3	14
c) unreliable transport	1	1	2	2	2	1	9
d) slow transport	0	1	1	2	1	1	6
e) higher communication costs	1	1	0	1	1	0	4
f) greater risk of damage/loss	0	0	0	0	1	0	1
Other Factors	0	3	1	1	3	1	9
a) contacts	0	2	0	0	1	0	3
b) labour	0	0	0	0	2	1	3
c) ancillary services	0	1	1	1	0	0	3
Total No. of Disadvantages	6	11	10	11	11	9	58
Total No. of Firms	3	4	6	7	3	5	28
No. of firms with disadvantages	3	4	4	7	3	4	25
No. of " without " "	0	0	2	0	0	1	3
Average no. of disadvantages per firm	2.0	2.75	1.67	1.59	3.67	1.8	2.07

Source: Adapted from Law(1964), Table V, p.138.

[1] Law did not classify his interviewees by MLH. He did mention, however, that three of the U.S. firms manufactured non-competing varieties of oil well equipment, and that his sample included producers of pottery and cutlery. Almost certainly, the oil well equipment firms were Camco, Hughes Tool and Mission Manufacturing, the pottery producer was Wade (Ireland), and the cutlery maker was Oneida but those assertions have not been confirmed.

Of the 58 disadvantages cited to Law, 49 or 84% were related to distance as defined in the table. If one were to add 'contact' and 'ancillary services' to this total, as seems reasonable, 55 or 95% of the expressed disadvantages would be distance-related. Furthermore, these 55 disadvantages were spread over all of the 25 firms mentioning any sort of handicap. That is to say, every disadvantaged firm (or 89% of all interviewees) complained of remoteness; three also said labour was a problem. Unfortunately, Law does not make clear the extent to which his interviews were structured, the amount of time spent interviewing, or whether he prompted his interviewees in any way. However, these matters are of fundamental importance. For instance, if prompting were absent, his findings could be taken as a ringing confirmation of the conventional wisdom which he set out to test. Clearly, the disadvantages mentioned would need to have been felt rather strongly for them to have been on the tips of the local executives' tongues as it were, especially if the interviews were relatively short. Law expressed surprise that the distance factor did not affect all firms in the same way; "indeed there were no cases where even all of the plants within a single industrial group were handicapped in the same way." Yet this outcome is surely not surprising given a lack of prompting. If, on the other hand, considerable prompting was involved, or if highly-specified questionnaires were given to the interviewees, Law's findings assume considerably less significance. Once the seed of doubt has been planted in an interviewee's mind, even small or faintly-felt grievances can become magnified to the point where it seems appropriate to vocalize them. But Law, of course, does not provide us with a Richter scale by which to gauge the intensity of interviewee feelings; disadvantages, once expressed, were accorded equal weights.

Fifteen firms told Law that their transport costs were higher than they would have been in GB. However, in six of these cases, the higher outlays had a negligible effect on total production costs; in four others, the increase in total costs was under 1%. Another firm could provide no cost figures. Thus, we are left with only four instances where total costs were raised by more than 1% and none of these exceeded 2.5%. When one considers that most of these percentages were probably guesses or, at best, rough estimates, and ipso facto that they may have reflected the conventional wisdom as much as fact (the business world is not without its fashions), it becomes difficult to take the bogey of higher transport costs very seriously on the basis of this

evidence in isolation. Moreover, Law cautioned that some of the percentages were overstated. On the other hand, his findings do not dispose of the caveat by Isles & Cuthbert that transport-sensitive industries are not likely, ceteris paribus, to locate in NI in the first place.

Law's findings can be checked, albeit very imperfectly, by looking at the transport cost data from the 1963 Census of Production. Expressing transport cost/gross output ratios for NI as a percentage of comparable ratios for the UK, we get the following results:

chemicals and allied industries	50
hosiery and other knitted goods	211
electrical engineering	114
mechanical engineering	93
iron castings, ships, vehicles, metal goods	100
bricks, pottery, glass, cement, abrasives	55
all manufacturing	71

Clearly, no pattern emerges. In chemicals, NI shows up very well. In knitted goods, it does not, and so on. On balance, the census figures would appear to be even less clear-cut in their implications than the evidence assembled by Law.

Fourteen of Law's interviewees complained of the need to hold larger stocks in NI than in GB. In nine of those cases, the stock differential reflected the "irregularity and unreliability" of cross-channel shipping. In the remainder, it mirrored the relative slowness of the sea link. Law calculated that in the case of the firm most affected by the need to hold extra stocks, total production costs were raised by a mere 0.4%! The average effect was less than 0.25%. In other words, the need to hold extra stocks was found to be less of a locational impediment in NI than higher transport costs. Three of the 14 firms mentioning stocks complained that they felt more vulnerable to transport difficulties in NI than in GB because of the lack of alternatives to the sea link.

Only one firm complained of damage or loss separately from unreliable and slow transport but evidence from elsewhere suggests that companies making products peculiarly subject to damage, e.g., IBM, have not located in NI for that very reason.

Four firms cited higher communication ("telephone and personal") costs relative to GB as a disadvantage to locating in NI. In one case, total production costs were raised by 0.5% as compared with Southern England. In the remaining cases, the cost differential with GB was

less than 0.25%.

Three firms mentioned contact difficulties. Either it was hard to establish and maintain contact with buyers (2 cases) or NI offered few localisation economies in the Hooverian/Isardian sense.

Law, like Hall's JWP two years earlier, found relatively little evidence of forward and backward linkages within NI. However, it is difficult to evaluate this discovery in terms of the conventional wisdom concerning transport and industrial development as espoused by Isles & Cuthbert. It may or may not mean something. Only four of his interviewees were in 'heavy' industries, a finding fully in keeping with the conventional wisdom. Three were local market-oriented. The fourth exported most of his output at ex-works prices. An inverse relationship was discovered between a firm's value added ratio and the ratio of transport costs to total outlays. Again, this finding supports the conventional wisdom. Only four of the 23 branch plants marketing mainly outside NI were responsible for their own sales; 19 branches were "simply production units". Significantly, several members of this latter group felt that they would have been at a disadvantage in NI if they had been responsible for marketing. Finally, Law corroborated Luttrell's findings[1] that: 1) a branch plant's degree of independence is a function of its distance from the parent company, and 2) a corollary, the degree of independence is positively related to branch size.

While 25 out of the 28 firms interviewed by Law considered themselves to be at a distance-related locational disadvantage of one sort or another in NI, all claimed compensating advantages, e.g., lower efficiency-wages and government financial assistance. That is to say, on balance, Law's sample of firms found NI to be a satisfactory location. It follows that the protagonists of the conventional wisdom concerning NI's geographic handicaps have been largely right in their diagnosis but not necessarily in their prescription. NI is at a locational disadvantage from a transport point of view. However, ameliorative measures need not be confined to the transport field *per se*; they can, and indeed should, take a variety of forms. This conclusion is expressed very succinctly by the Toothill Report which, while it was written with

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[1](1962), I, pp.179-84.

Scotland in mind, has considerable, albeit fortuitous, relevance for NI: "The answer is not the application of a dramatic remedy but a simultaneous attack at a large number of points."[1]

[1] Toothill Report, p.186.

Case Studies of Industrial Mobility

The literature contains only one genuine case study of industrial mobility but a second can be pieced together from a report of the Monopolies Commission. Courtaulds and Metal Box (respectively) are the two companies involved. Courtaulds's Carrickfergus plant was the subject of a special study published in 1965.[1] The author was a company employee. Other sources have been used to bring his treatment up to date. Metal Box was one of the first postwar migrants to NI. It has recently been investigated by the Monopolies Commission as the dominant supplier of metal containers in Britain.[2] A by-product of this investigation is a fascinating amount of detail on the role of transport costs in metal container plant location decisions. Interestingly, both case studies corroborate the Isles-Cuthbert thesis on the importance of transport considerations for Ulster's industrial development.

Courtaulds Ltd.

Courtaulds began producing viscose filament yarn at Carrickfergus in June 1950. Its £9m plant was built from scratch on a 275-acre site. High tensile tyre yarn production was added in March 1953 and viscose staple and tow in September 1967.[3] Employment in 1965 exceeded 1,300

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[1] R. Garnsey, "The Experience of Courtaulds Ltd. in Northern Ireland," in Papers on Regional Development, ed. by Thomas Wilson, supplement to the Journal of Industrial Economics, XIV(Oxford: Basil Blackwell, 1965), pp.54-61.

[2] GB, Monopolies Commission, A Report on the Supply of Metal Containers, H.C. 6, 1970-71(London: HMSO, 1970).

[3] The latter development was anticipated by Garnsey although it occurred some two years after the publication of his article. It was geared specifically to the needs of the Irish linen industry (i.e., the flax spinners). The prices of the three products made at Carrickfergus about the time of their introduction were as follows:

viscose textile yarn	48d a lb or £448 a ton
viscose tyre yarn	47d a lb or £439 a ton
viscose tow	22d a lb or £205 a ton

Cf. GB, Monopolies Commission, A Report on the Supply of Man-Made Cellulosic Fibres, H.C. 130, 1967-68(London: HMSO, 1968), p.92. For a description of the production process and management structure in a viscose yarn plant (probably the now-defunct North British Rayon Ltd. plant in Jedburgh, Scotland), see Tom Burns & G.M. Stalker, The Management of Innovation(2nd ed.; London: Tavistock Publications, 1966), pp.79-83.

persons. It seems probable that the factory would be assigned to MLH 411 by the Census of Production. Unfortunately, because of the risk of disclosure, the Census traditionally has lumped MLH 411 with MLHs 415, 416, 418, 421 and 429.1. However, 411 would appear to dominate this grouping and we can reasonably assume that the published figures are not unrepresentative of the man-made fibre producers. In 1963, the total transport cost/net output ratio from the NI Census of Production for the industry grouping containing MLH 411 was 4.5%. The comparable UK ratio was 3.0% suggesting, though not of course conclusively, that man-made fibre plants in NI were at a transport cost disadvantage relative to plants in GB. Carnegy confirms that this seeming disadvantage was indeed a reality. The Carrickfergus plant, for example, consumed about 50,000 tons of coal annually during the early 1950s, all of it imported from GB and all of it subject to the cost of transport across the Irish Sea. In addition, Courtaulds initially sent all of the final product, textile yarn, to buyers in Lancashire and Yorkshire, many of them outwith the Courtaulds Group. The principal uses for the product were men's suit linings, narrow fabrics (e.g., ribbon), and some types of furnishing fabrics. While rayon yarn is neither difficult nor particularly costly to transport,[1] obviously the NI plant was at a transport disadvantage relative to plants closer to the main UK markets. On the other hand, this disadvantage did not extend to the main raw material supplies, woodpulp and sulphur, both of which were imported directly to NI from abroad.

While the Carrickfergus plant did face extra transport costs, there were compensations. Suitable labour was available in the area, water supplies were cheap and abundant, liquid effluent disposal facilities were on hand, coal subsidies began in 1953, capital grants became available in 1954, Dunlop Textiles opened a tyre fabric plant at Londonderry[2] in November 1958 and began taking a major portion of the tyre yarn output from the Carrickfergus plant, and so on. In short,

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[1] Cf. H.A. Silverman, "The Artificial Textile Industry," in Studies in Industrial Organization, ed. by H.A. Silverman, Nuffield College Social Reconstruction Survey (London: Methuen & Co. Ltd., 1946), pp.302-55. According to the report by the Monopolies Commission (op. cit.), Courtaulds usually quoted its prices on a UK basis. Therefore, proximity to a Courtaulds plant was of no particular benefit to a buyer.

[2] It appears from McGovern(1963), p.45, that Londonderry was chosen over other NI sites on the basis of labour availability.

the plant was considered (in 1965) to be a success and the future looked bright.

Garnsey made several other pertinent comments on transport matters. Echoing (though perhaps not consciously) Isles & Cuthbert, for example, he postulated two "serious drawbacks" to industrial development in NI: 1) the lack of indigenous coal, 2) the necessity of transporting "most" raw materials and finished products across the Irish Sea. The fuel subsidy largely offset the first problem, however, while the second did not rule out industrial development across the board. He suggested that local industries "would like to see rather more competition, . . . for cross-channel freight traffic" to help keep freight rates down. To Courtaulds, he said, contemporary transport problems such as the curtailment of rail activities attendent on the Benson Report, and the development of Carrickfergus harbour, "are vitally important and the closest liaison is maintained with local and regional officials."[1]

In light of the foregoing, Courtaulds's decision to cease production of viscose textile yarn at Carrickfergus, effective June 1970, is something of a surprise, especially when one considers that the company is the sole UK producer. Clearly, Garnsey's optimistic conclusion with regard to the future of the plant is somewhat misleading. Because of a decline in sales, Courtaulds closed one of its viscose textile yarn factories in GB during 1965, presumably shortly after Garnsey completed his article. Sales continued to decline during the remainder of the decade in the face of a static market and intense competition in the export field. Higher costs (as a result of increased wages, salaries and raw material prices), a notably unsympathetic Monopolies Commission[2] and a reluctant Prices and Incomes Board[3] combined to make a further retrenchment inevitable sooner or later. The Carrickfergus plant was plagued additionally by aging machinery and rising repair and maintenance expenditures. Closure was decided upon in principal about the beginning of 1969. The actual closure date was postponed, however, pending discussions with the Government of NI on alternative

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[1]This is scarcely the sort of claim that would be made by a firm with relatively little interest in transport!

[2]H.C. 130.

[3]GB, National Board for Prices and Incomes, Report No. 119 - Man-Made Fibre and Cotton Yarn Prices (First Report), Cmnd. 4092(London: HMSO, 1969); Courtaulds, Statement by the Chairman, Lord Kearton, at the 57th Annual General Meeting (London: Courtaulds, 1970), pp.4-6.

uses for the buildings. Carrickfergus was not the only plant affected by the deteriorating sales situation; the Wolverhampton works was also closed during 1970-71. Production continues for the time being (at least) at Flint in North Wales and at Preston, Lancashire, i.e., at the two largest textile yarn plants.

Some 350 jobs were affected by Courtaulds's decision to close part of its Carrickfergus factory complex. On the other hand, the company has announced plans to open a polyester yarn plant there in mid-1971 demonstrating as nothing else could its continued confidence in the viability of the location.

Metal Box Co Ltd

The Metal Box Company, London, was one of the first postwar industrial migrants to NI, opening a plant at Portadown in April 1946 for the production of open top[1] tin cans. It remains the only such commercial[2] producer in the province, and indeed is by far the most important metal can manufacturer in the UK, a fact which led to the industry being referred to the Monopolies Commission. The ensuing investigation took place during the period, October 1967/February 1970. 'Cans and metal boxes' (1958 SIC: IX-395) is one of the most transport-sensitive industries in Britain, the transport cost/gross output and the TC/net output ratios from the 1963 Census of Production being 3.4% and 11.7% respectively. As mentioned earlier, McGovern(1963) singled out metal cans as an example of an industry subject to strong transport cost pressures. Fortuitously, the report of the Monopolies Commission enables us to see those pressures in an unusually strong light.

Metal containers are not cheap, representing on average 20-25% of users' total manufacturing costs. Many (15) users manufacture at least part of their own requirements, e.g., Heinz, Nestlé, Carnation Foods and Rockitt & Colman. Open top cans are invariably mass-pro-

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[1] As opposed to general line cans. In the words of the Monopolies Commission, "Open top type (most commonly used for thermally processed foods) . . . are supplied to the customer with an open top of full aperture, the closure for which is seamed on after filling . . ." H.C. 6, para. 7. See Learned, et al. (1965), p.365 for an interesting diagram of the metal can production sequence.

[2] The Nestlé Co. Ltd. operates two milk and cream canneries in rural NI, each of which has its own metal can-making department largely to avoid the high transport and handling costs involved in bringing empty cans from elsewhere.

duced on fully automatic, high-speed production lines. Normally, non-user manufacturers such as Metal Box deliver directly to their customers although in NI collection ex-works by customers is not unusual. Customer holdings are usually minimal because metal containers are bulky and take up a lot of space. Thus, deliveries tend to be frequent, regular and quick.

Metal Box today has 12 open top factories in the UK. Together, they comprise the Open Top Group, the manager of which is responsible to the Managing Director (Home) in London. There are five Metal Box Groups in total. Each handles its own production and sales, and serves as a profit centre. In addition to the groups, there are seven Central Service Departments, including transport, each of which is responsible for providing its particular service throughout the organisation.[1]

Open top can prices are quoted on an ex-works basis. Delivery charges are added separately. The company's profit target is a 10% return on sales. Actual returns during the 6-year period, 1963-68, on open top production ranged from a low of 10.2% in 1963 to a high of 12.1% in 1966. The returns on capital employed were somewhat greater, ranging from 16.9% (1963) to 22.5% (1966). In 1968, the net sales value of open top production was made up as follows:

tinplate and other materials	approx.	64.0%	
other manufacturing costs		17.5%	
total manufacturing costs			81.5%
delivery costs		2.4%	
other non-manufacturing costs*	approx.	5.6%	
total non-manufacturing costs			8.0%
trading profit			10.5%
net sales			100.0%

*research, packing, administration, selling costs, services to customers

Metal Box's open top factory location policy provides a classic illustration of the trade-off between transport costs and internal

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[1] According to the 1963 UK Census of Production, transport payments accounted for 76.4% of the total transport costs incurred by the can and metal box industry. In fact, inasmuch as the industry was dominated by Metal Box, these so-called payments would appear by and large to have been own-account transport expenditures. This general point is discussed at length in ch. 8. The confusion arises out of the census methodology; it is not the fault of the census respondents.

economies of scale. As explained by the Monopolies Commission:

> All its open top factories are sited in centres of demand. This decentralisation, it is claimed, has enabled Metal Box to achieve exceptionally low average delivery costs of only 2 per cent on sales without sacrificing significant economies of scale. With the exception of the two factories in Scotland and Northern Ireland, which are situated in remote areas to which delivery from other points of manufacture would be costly, none of the company's factories is below eight lines in size, a number which is regarded as the minimum for yielding the benefits of scale production while yet able to be controlled by a simple management structure. The company considers a 12-line . . . factory to be the maximum size for optimum efficiency. Further economies could be achieved by operating larger factories, but transport costs would be increased and there would be a real risk of diseconomies arising from labour problems and loss of flexibility.[1]

Metal can prices in NI corroborate the assertion made by Isles & Cuthbert(1957) that manufacturers in NI sometimes pay more for raw materials than their competitors in GB. Metal Box publishes two price lists for standard sizes of open top can. One applies to GB. The other, containing higher prices, applies to NI and Eire. Open top cans consist almost entirely of tinplate. This material represents some 60% of their ultimate sales value. Thus, its price has a very important bearing on Metal Box's total costs and profit margins. UK tinplate production is concentrated in South Wales. Delivery costs to NI are apparently higher than to GB points. Consequently, tin can prices are higher in NI. Imports of tinplate from abroad are not a viable alternative to the South Wales product because UK prices are allegedly the lowest in the world.

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[1] H.C. 6, para. 221. Learmod, et al. (1965) mention (p.369) that the radius of economic distribution for a metal can plant in the U.S. is 150-300 miles depending on the size and weight of the cans. It was argued recently by the EEC Commission that, because of high transport costs, cans cannot economically be moved more than 300 miles or so. See David Blake, "U.S. Company Faces Action by Six over Cans Market," The Times, 15 Mar 71, p.15.

Industry Notes

In fact, only one NI industry is discussed here, viz., meat packing (MLH 214). It was selected for special study because of its exceptional characteristics, the most important of which from our point of view are: 1) a high location quotient (2.43 and 2.93 in 1963 and 1958 respectively), 2) an exceedingly high transport cost/net output ratio (28.0% in 1963), and 3) an unusually large adverse transport cost differential between NI and the UK generally (the respective 1963 TCNO ratios were 28.0% and 13.2%).

Meat Packing

A recurring theme throughout the postwar literature has been NI's apparent failure to capitalize fully on the manufacturing opportunities implicit in its agricultural sector. Meat slaughtering and processing is an important case in point. On the one hand, the province has developed a large and, until recently, thriving bacon-curing industry. In contrast, beef packing has languished. As will become evident, transport costs explain much of the latter situation; they also are responsible in part for the hard times which have overtaken bacon curing.

Despite a sizable outbound transport cost disadvantage relative to GB producers, and in the face of strong, albeit controlled, import competition, especially from Denmark,[1] NI has managed to build up a large bacon-curing industry geared mainly to the GB market but heavily dependent on imported feedstuffs and, to a lesser extent, on special remoteness grants from the UK Government (see below). In 1962, NI had 43 bacon factories or 16.8% of the UK total. These factories processed over 94% of the province's pigs. More than 80% of the factories' output was sold in GB by a central marketing agency owned jointly by the NI Pigs Marketing Board and the Ulster Curers' Association. Recently, the industry's prospects have begun to deteriorate as a result of rising world feed grain prices and an increasingly autarchic UK feed grain policy. Because of climatic conditions, the latter benefits the eastern counties of England much more than NI. English feed grains cost

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[1] Cf. David Jones, "A Cure for the British Bacon Industry," The Times, 1 Feb 71, p.15; "Dane Accuses Britain over Bacon Agreements," The Times, 5 Mar 71, p.4; "Denmark Complains over British Subsidized Bacon," The Times, 10 Mar 71, p.17. Top grade Danish Bacon was selling in Britain during December 1970 for £370 a ton. Three months later the price had fallen to £290 because of the UK Government's subsidy to bacon curers.

more in NI than in GB because of transport costs. Consequently, pig output in Ulster has declined and with it the output of the bacon-curing industry. The NI Ministry of Agriculture(MinAg) has called for a freight subsidy on feed grains from GB to prevent a long-term drop in the province's production of pigs (and poultry). This recommendation received a remarkably lukewarm reception from the drafters (Professors Matthew, Parkinson and Wilson) of the 1970-75 NI Development Programme who argued in the best laissez-faire tradition, but somewhat illogically given the economic artificiality of much of British agriculture, that "if economic forces have tended to operate against pig and poultry production in Northern Ireland, then these industries should contract and Northern Ireland agriculture should seek to develop other products where the economics of production favour Northern Ireland." Not surprisingly, this seemingly harsh verdict was rejected by the Ulster Government. Nonetheless, the outlook remains cloudy, and will likely become more so if Britain is successful in joining the EEC.[1]

GB is the main market for NI beef. However, until recently, beef slaughtering and processing in the province was largely limited by the demands of the local market. Export "across the water" took the form predominantly of live animals. Prior to W.W.II, NI farmers commonly shipped store cattle to GB for fattening after arrival. The 600 or so "back-yard" abattoirs in Ulster supplied local needs. Farm prices were lower in NI than in GB by an amount equal roughly to direct and indirect (e.g., shrinkage) cross-channel shipping costs. The advent of war brought two important changes. First, the UK Ministry of Food, in order to stimulate domestic production, offered uniform prices throughout the kingdom. NI farmers benefitted more from this policy than their GB counterparts. Second, animal slaughtering in NI was concentrated in 17 abattoirs managed by the NI MinAg as agent for MinFood. This situation lasted until meat decontrol in July 1954. Farmers in Ulster

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[1] Cf. two helpful booklets by Barclays Bank, The Agricultural Policy of the U.K. and E.E.C.(No. 1) and Farming Facts: The E.E.C. and the Four (No. 2), London, 1970. The bulk of this paragraph is based on two sources: 1) GB, Committee of Inquiry into Fatstock and Carcase Meat Marketing and Distribution, Report, W.R. Verdon Smith, Chairman, Cmnd. 2282 (London: HMSO, 1964); 2) NI Development Programme. Ensuing paragraphs draw heavily on NI, MinAg, The Production and Marketing of Northern Ireland Meat(Belfast: HMSO, 1967).

had more of an incentive to fatten their cattle locally but carcase meat shipments to GB were officially prohibited as uneconomic.

In anticipation of decontrol, Stormont passed the Slaughter-Houses Act (NI) 1953 requiring that abattoirs be licensed by MinAg with a view to guaranteeing a limited number of modern municipal abattoirs sole access to the NI carcase meat market. The favoured municipalities were selected so as to minimise transport costs. Several private abattoirs were licensed shortly after decontrol to export carcase meat.

Decontrol meant the reappearance of the traditional differential in farmgate prices between NI and GB. As compensation Whitehall offered to pay annual 'remoteness grants' to the NI MinAg for distribution to Ulster fatstock farmers, two-thirds of whose output was 'exported'. The explicit purpose of the grants was to offset, at least in part, the Irish Sea's effects on the prices of fatstock output. Until 1957, the amount of each year's grant was determined by negotiations between the two governments. For the next five years, the grant was fixed at £1m per annum. This amount was raised to £1.25m a year during the following quinquennium. A variety of special schemes intended to raise farm productivity have been used by MinAg to distribute the grant, e.g., Cattle Headage Payments and Silage Production. The overall effect has been to raise the income of Ulster fatstock farmers closer to the UK average while helping to ensure an adequate supply of relatively low-cost inputs to NI meat processing plants.

While 'export' slaughterhouses were allowed in NI from 1954, they did not increase in number very rapidly despite their eligibility for financial assistance from MinCom. Early licencees claimed that, without access to the NI market, they were unable to achieve adequate throughput on a year-round basis. The market situation similarly deterred potential investors. Isles & Cuthbert attempted in 1956 to determine why the Ulster Government was not more helpful. They concluded that two considerations might be relevant. First, the politicians appeared to fear adverse farmer reaction. It was generally expected that Ulster carcase meat would command a lower price in GB than English or Scottish meat. Thus abattoirs in NI would be unable to pay as much for their fatstock inputs as farmers were getting by exporting live animals. Secondly, Whitehall may have looked unfavourably on the development of a major beef packing industry in NI, and the NI MinAg was anxious not to upset existing intergovernmental arrangements by

offending its counterpart in London.[1] These points remain somewhat speculative. In any event, Stormont did not reverse its 1955 abattoir policy until April 1965 with the coming into force of the Slaughterhouses Act (NI) 1965, the main effect of which was to give export plants access to the local market. Five factors appear to account for this change of heart. First, the municipal abattoirs had proven unable to develop an adequate export trade of their own, and some were becoming obsolescent. Secondly, NI needed jobs, and major new abattoirs seemed an eminently suitable course. Thirdly, it appeared increasingly possible with better quality control and an improved marketing programme to reduce or even eliminate the traditional price differential in GB between NI and English/Scottish carcase meat. Fourthly, during the peak period for live animal marketing in the autumn, it was difficult to secure adequate cross-channel shipping space; this problem did not extend to carcase meat. Finally, it was felt to be more humane to slaughter fatstock in NI than to ship them live to GB. The timing of the 1965 Slaughterhouses Act was determined largely by the need to wait for Westminster reaction to the report of the Verdon Smith Committee. Appointed in April 1962, the Committee presented its findings to the UK Government 21 months later in January 1964. They were published almost immediately. While eschewing a stand on the export plant question in Ulster, the Verdon Smith Report did suggest that the cost savings involved in shipping carcase meat rather than live animals to GB were being over-estimated by the NI Mintg.

By the beginning of 1966, eight export abattoirs were in operation in Ulster. Only one or two predated 1963 while the two largest were not opened until late 1965 suggesting that the policy reversal by the NI Government was the major factor in the sudden expansion of the industry. However, this seemingly golden era was extremely short-lived. On 1 February 1965, Eire began subsidising its meat packers; some NI farmers started sending their cattle south across the relatively open border, attracted by the ensuing jump in fatstock prices. Cattle marketings in Ulster remained highly seasonal making it difficult for the abattoirs to cover even their overhead costs during the slack periods in the winter and spring. Most importantly, the continuing carcase

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[1] Wilson(1955), pp.148-49, 160-61.

meat price differential in the key GB market made it very hard to persuade NI farmers to divert cattle from the live animal trade. The overall result was seriously inadequate throughput; the abattoirs in 1966 operated on average at less than one-third of capacity and suffered sizable financial losses. Indeed, the largest and newest export plant closed at the end of the year. Others simply 'ticked over'. Eventually the NI MinAg was forced[1] to give financial help directly to the abattoirs to enable them to keep going. This situation still prevailed in 1970. The 1970-75 NI Development Programme concluded(p.196):

> clearly such aid as is necessary must continue as long as the meat plants in the Republic are subsidised on the present basis and until the Northern Ireland plants become fully competitive. But the whole position is thoroughly unsatisfactory . . .

It is instructive to look more closely at the relative costs involved in shipping animals on the hoof and the hook from NI to Manchester, one of the two main receiving points in GB (the other being London) for Ulster's export abattoirs. It will be recalled that the cost difference provides much of the rationale for slaughtering in NI rather than in GB.

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[1] Funds from the UK Government became available for the subsidisation of the Eire meat plants as of 1 Jul 66 with the coming into effect of the Anglo-Irish Free Trade Area Agreement!

The following table is adapted from Appendix II in the 1967 MinAg review of meat production and marketing in NI.

A Comparison of the Costs of Shipping a Live 10-cwt Bullock and a Dressed 600-lb Carcase from NI to Manchester, August 1967

Live Animal	Costs £	Dressed Carcase	Costs £
Loading at mart, transporting to Belfast & unloading at shipping pens	0.85[a]	Loading of carcase at meat plant including muslin, refrigerant & labour	0.26[a]
Pre-shipping charges	0.31	Road transport to Belfast	0.17½[c]
Through transport charge, Belfast-Manchester	2.56½	Shipment, Belfast-Manchester, by insulated container (normal cost range = £2.00-3.00)	2.21½
Port charges in GB	0.62½	Unloading at Manchester	0.03½
Unloading in Manchester & conveyance to abattoir	0.17½	Direct transport costs	2.68½
Direct transport costs	4.52½	Reduced offal return (normal range = £0.62½-1.25)	0.94[d]
Apparent loss in "killing out" weight	1.91[b]	Apparent loss in carcase weight	0.67½[e]
Total shipping costs	6.43½	Total shipping costs (normal range = £3.99-4.61)	4.30

Live animal/dressed carcase cost difference = £2.13½ (normal range = £1.82-2.45)

a) Assumes that the mart or meat plant is located 30-40 miles from Belfast.

b) Assumes that animals shipped live from NI & slaughtered in England weigh 2.81% less than animals slaughtered in NI. At a carcase value of 11p a lb, this factor costs £1.91 per beast. Since weight loss is not a direct transport cost, this amount is shown separately.

c) Assumes the use of the exporter's own lorry.

d) Although reduced offal return is not a direct transport cost, it is necessary to take the NI-GB differential in offal returns into account since the return is lower in NI.

e) Carcases shipped from NI to GB lose about 1% more weight than the carcases of GB-killed animals owing to the longer time in transit. At a carcase value of 11p a lb, this factor costs £0.67½ per beast. Not being a direct transport cost, this amount is shown separately.

Carcase meat exports, according to the table, involve an average saving in shipping costs of £2.13½ per 600-lb shipment relative to an equivalent weight of live animals or less than ½p(1d) per dressed lb.[1] Yet historically the price disadvantage of NI carcase meat in England has never been less than 1d a lb; frequently it has been higher. This intractable (but not necessarily immutable)fact is the quintessence of the problem facing NI's export abattoirs. Only by mitigating the price problem in the GB market, perhaps by raising the quality of the meat killed in NI, can they hope to make worth while for Ulster's fatstock farmers to curtail their live animal shipments.

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[1]The NI MinAg told the Verdon Smith Committee that savings might average £3.25 per animal. We have already noted the Committee's belief that this figure was an overstatement. Apparently MinAg too had second thoughts.

Specific Transport Modes

Transport in the context of NI is usefully divided into two categories, internal and external. These categories can be disaggregated in turn into road and rail on the one hand and cross-channel shipping and air on the other. Our purpose in this section is to sketch briefly the nature of each of these four modes and to note apposite references in the literature.

Internal Transport/Roads

No part of NI is more than about three hours by road from Belfast. Not surprisingly, the physical adequacy of the road system has been the source of very few complaints in the literature. There is a suggestion in the 1944 White Paper on industrial location that the road system was not entirely up to scratch. However, any problem was soon remedied. Dennison cites the lack of congestion on NI's roads as a positive advantage in industrial promotion. Hall and his colleagues argued that Ulster had a surfeit of roads relative to its size and needs. Matthew attached great importance, as we have seen, to the quality of the roads linking his centres for development with one another and with the external transport system but had no significant criticisms to make. Wilson too expressed satisfaction at the general state of the roads and endorsed the Government's ambitious motorway and trunk road programme announced on 13 February 1964,[1] i.e., while his plan was under preparation. In fact, NI spent roughly 1½ times as much on roads per capita as GB during the years, 1965-70. By the end of this period, its 370-mile trunk road and motorway network was greatly superior to that in the rest of the kingdom in terms of usage relative to design capacity although blemishes remained, e.g., the Lisburn-Newry and Ballymena-Coleraine sections. A further ambitious roads programme was proposed by MinDev for the years, 1970-75. However, some of its parts were strongly criticised by the three development consultants - Matthew, Wilson and Parkinson - as wasteful. They recommended that cost-benefit

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[1] NI, Ministry of Home Affairs, "Transport Policy - Statement by the Minister of Home Affairs /to Parliament/ on 13th February, 1964," Belfast (roneoed). The Minister, in an historic speech, announced that the Government intended to provide NI with a transport system "second to none in Europe." First priority was to be given to the forestalling of traffic congestion.

Trunk roads today are the responsibility of MinDev. For the majority of the postwar period, however, they were assigned to MinCom. MHA's interim period of hegemony was shortlived.

analysis be introduced to road planning and that per capita expenditures in NI be reduced to at least the GB level. This view prevailed. MinDev's programme was cut by £11m over the new plan-period, from £142m to £131m.

A commonplace today in NI is the desirability of coordinating road expenditures with other development programmes. Needless to say, this was not always so. For one thing, development planning was eschewed until the mid-1960s. Trunk road planning was moreor less divorced from similar activity at the local authority level between 1945 and the appearance of the first instalment of the Matthew Report in 1963 despite a plea for greater coordination in the public sector by the 1944 White Paper. On the other hand, the government department responsible for trunk roads during this period, MinCom, was also responsible for industrial promotion, and one can only assume that the two responsibilities were seen as being interrelated. The need to coordinate trunk road planning with infrastructure planning generally was recognized by the Minister of Home Affairs in his 1964 statement on transport policy, prompted no doubt by Matthew and Wilson. One of MinDev's primary functions is to coordinate trunk and local road planning with the Government's growth centre strategy and with MinCom's promotional efforts. As noted earlier, it was somewhat less than successful at this task between 1965 and 1970. Nonetheless, the objective remains.

Perhaps the most important complaint in the literature with regard to road transport was the high cost of commercial road haulage relative to GB during most of the postwar period. Isles & Cuthbert asserted that the for-hire rates in Ulster hampered the dispersal of industry from the Belfast area. We have already mentioned McGovern's finding that these rates compelled several migrant firms to operate their own road vehicle fleets when they would have preferred to contract out the transport function.[1] Behind the high charges lay the near-monopoly of inter-urban for-hire road haulage between 1935 and 1 July 1966 of first the NI Road Transport Board(1935-48) and later the Ulster Transport Authority. One of the objectives of the near-monopoly policy was

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[1] As touched on earlier, some clothing firms making fashion goods for 'export' complained to McGovern about the unreliability of for-hire transport and the postal service generally; despite their location on main transport routes, they had taken to operating their own lorries.

road-rail coordination with all that implies for cross-subsidisation and the perpetuation of uneconomic services. This situation was finally terminated by the Transport Act (NI) 1966; private road hauliers were once again allowed to compete for inter-urban traffic. UTA's lorries and related assets were taken over by Northern Ireland Carriers Ltd., a jointly-owned[1] subsidiary of UTA's successor, the Northern Ireland Transport Holding Company and NITHC's GB counterpart, the Transport Holding Company (now the National Freight Corporation[2]). NI Carriers had 800 vehicles in 1969 making it the biggest single road operator in the province; the firm made money in spite of unrestricted competition with the private sector.

Internal Transport/Rail

NI had 1,200 miles of railway in 1914. Only 297 miles remained open, however, when Benson reported on the future of the system in July 1963;[3] all were part of the public sector.[4] Benson had been asked in February 1962 to assess the implications of the railways' desperate financial straits for their owner, the UTA, and the province generally, and to make recommendations. Noting the lack of long hauls in NI (Belfast-Londonderry is only 75 miles by road), the absence of sufficient high-volume traffic of a type suitable for transport by rail such as coal or steel, the temporal shrinkage in the rail network, the rapid decline in rail freight movements, the chronic and growing deficits on rail freight traffic, and the extensive road system, he concluded that the rail freight services had no economic future and recommended their complete cessation over a 4-year period beginning in October 1963. This judgment was endorsed by the Government in its major transport policy statement early in 1964 despite Matthew's earlier representations to the contrary, although no time limit was put on the closure programme, and it was made subject to mandatory review. Several services were

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[1] 50-50.

[2] NFC wholly owns Lawther and Harvey Ltd., a Belfast-based company specialising in road transport, warehousing and the shipping agency business. This subsidiary works closely with Containerway and Roadferry Ltd., another NFC subsidiary and one of Europe's biggest organisers of through transport. Lawther and Harvey was profitable in 1969 despite the loss of its Belfast HQs through fire during a riot on 15 Aug 69. Cf. NFC, Annual Report and Accounts for 1969 (London: NFC, 1970), pp.28-29.

[3] NI, Ministry of Home Affairs, Report on Northern Ireland Railways, by Henry Benson, Cmd. 458 (Belfast: HMSO, 1963).

[4] Nationalisation took place over the period, 1948-58.

withdrawn in February 1965, and some track was closed. Under the Transport Act (NI) 1967, the responsibility for operating rail services on the remaining 205 miles of track was transferred from UTA to the Northern Ireland Railways Co. Ltd., another NITHC subsidiary. Enjoined to operate commercially, NI Railways made a small operating profit in 1968-69 but failed to cover the bulk of the relevant depreciation and interest charges. Matthew, Wilson and Parkinson recommended that the Belfast-Newry line via Portadown be refurbished with a view to facilitating trade with Eire but that the other 'long-distance' inter-urban line, Belfast-Londonderry via Ballymena, be closed by 1975. The latter recommendation proved unacceptable to the Government. However, the future of the Londonderry line beyond 1975 is by no means assured.

The railways have attracted very little attention in the literature. They are mentioned as being important for industrial dispersal in the 1964 White Paper. Isles & Cuthbert argued that rail rates were so high as to impede dispersal. A firm complained to McGovern about the withdrawal of rail services from its area in Co. Armagh. Carnsey noted that Courtaulds's Carrickfergus plant received its coal requirements by rail via Belfast and that any curtailment of rail services would greatly increase the importance to the company of Carrickfergus harbour. Matthew attached considerable significance to the railways but his reasoning was tenuous. Wilson was somewhat ambivalent on the subject; he did caution, however, against precipitate action. Yet, despite these several references, it is only when you get to the 1970-75 Development Programme that you find any substantive discussion on the mode (apart of course from the Benson Report and the Government's 1964 policy statement). Even more importantly, a proper economic evaluation of the role of the railways has never been made public, and it is most unlikely that one has even been attempted. While Benson's study might appear to vitiate this conclusion, in fact his report was financial rather than economic in its orientation.

External Transport/Cross-Channel Shipping[1]

For a long time, cross-channel shipping received more attention in the literature than all other transport modes put together. Isles & Cuthbert devoted considerable attention to the subject. In essence, they alleged that the few shipping companies involved were guilty of

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[1] Cf. "That Other Island - Ireland: A Survey," Economist, 29 Mar 69, pp.xxxiii-xxxiv.

collusion aimed at keeping rates needlessly high, and of general inefficiency through the absence of genuine competition. Because of its lack of control over cross-channel freight rates, Stormont was virtually powerless to intervene. Theoretically, it could have operated its own ships, utilising the UTA; it could even have subsidized selected classes of freight but to do so would have meant higher taxes. If they were raised in NI, as seemed most likely, the benficial effects of the subsidies would have been nullified. One way out of this dilemma would have been to apply the £750,000 annual coal subsidy to the improvement of ships, docks, coal discharging facilities, and coal distribution instead of paying it out to industrial coal users. Alternatively, some of the overhead-reducing, lump-sum financial inducements to migrant firms under the 1945 Industries Development Act might better have been spent on a cross-channel freight rate subsidy. Indeed, Stormont did suggest to Whitehall at one point that such a subsidy be initiated. Given the disadvantages of operating (as opposed to capital cost) subsidies, however, and the very real danger of precedent, it was unlikely in the opinion of Isles & Cuthbert that Whitehall would agree to Stormont's proposal.

Hall and his colleagues also spent a considerable amount of time, albeit inconclusively, on the subject of cross-channel shipping despite the existence of the House Committee: "The question of a subsidy towards /sea/ transport costs is frequently raised . . . it is so important that we have given some preliminary thought to it."[1]

The House Committee[2] chose to interpret its terms of reference very narrowly, explicitly eschewing the implications of its findings for NI's industrial development. Much to the astonishment one would guess of Hall, et al., and of many of those who gave evidence before the Committee, it concluded that the types, frequency and standards of the shipping services between GB and NI were generally satisfactory, and that existing rates were reasonable. Most of the complaints brought before it were dismissed as being exaggerated, unreasonable or not substantiated. Textile exporters, for example, who complained of the inadequate opportunities for direct shipment from Belfast to the U.S., South Africa,

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[1] Hall Report, para. 4.

[2] GB, Ministry of Transport, Committee of Inquiry into Shipping Services to NI, Report, D.V. House, chairman (London: HMSO, 1963). The Report was presented to Ernest Marples, Minister of Transport, on 26 Oct 62.

Australasia and the Far East necessitating transhipment at Liverpool, were told simply that, with existing traffic volumes, their plight was "inevitable". The following quote with regard to delays in transit, a major source of grievance, illustrates both the nature of the complaints and the Committee's penchant for cavalier responses:

> It was alleged to us that it was possible to ship goods from Northern Ireland to the U.S.A. in a shorter time than to the south coast of England; that goods from Belfast to the main centres of commerce in Great Britain frequently took 10 days; that it seemed illogical to overseas customers that the average period taken to transport goods from Belfast to London was one week; that services from England to Northern Ireland took a minimum of 3 weeks; and so on. It will be clear from these examples that much of the evidence on this point was conflicting and rather general in its nature.[1]

In general, the Committee concluded, land rather than sea transport accounted for most of the delays that did occur. On the difficulty of tracing consignments delayed because of a lack of documentation by carriers, another major source of complaint, the Committee observed that, while the liner service of the British Transport Commission, one of the two main liner services to NI,[2] was indeed at fault, the problem was again inevitable given the overwhelming importance of BTC's rail operations relative to its sea services and the frequent use of through (as opposed to port-to-port) rates. In other words, 'it's too bad chaps, but that's the way it is.'

Professor Wilson, in his development plan for the province, summed up informed reaction to the House Report tactfully but pointedly, albeit in language akin to that of the civil servant:

> it is hard to avoid the conclusion that the House Report, helpful though it may be in some respects, does not fully meet the needs of the situation. It would be appropriate if, in due course, the Board of Trade were to institute a full enquiry [into shipping services to NI] . . . In making this suggestion, it is not implied that charges or profits are, in fact, too high. But this question has attracted much attention and, in fairness both to the public and to the shipping lines themselves, the evidence should be adequately presented.[3]

However, he failed to persuade the NI Government; it concluded in its

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[1] House Committee Report, para. 59.

[2] The other being Coast Lines Ltd.

[3] Wilson Plan, para. 7, pp.59-60.

statement on his plan that an immediate further investigation was neither necessary nor desirable. Despite his disappointment with House, et al., Wilson acknowledged that, with the recent advent of containerization and roll-on/roll-off services between NI and GB, many of the difficulties formerly associated with cross-channel sea transport, specifically delay, damage and theft, had been greatly reduced.

Law received a number of complaints concerning the sea link with GB; they have been presented earlier. Also noted previously was Garnsey's suggestion that more competition for cross-channel freight traffic would be a good thing, although he would appear to have been voicing a private enterprise shibboleth rather than making a serious complaint.

There was considerable investment in cross-channel freight facilities and services during the Wilson Plan-period according to the 1970-75 Development Programme, and continuous expansion of the popular container services. Nonetheless, the three development consultants received conflicting reports on the efficiency and competitiveness of the cross-channel services extant at the end of the 1960s. MinDev told them that competition was intense, owing partly to the termination of UTA's near-monopoly of intra-NI, for-hire transport services. One might also mention the 1969 experience of Containerway and Roadferry Ltd., a major operator on the Ulster-Preston routes, who found that its Irish services generally were subject to "continuing fierce competition and a heavy pressure on rates".[1] Some of this competition undoubtedly came from subsidiaries of the Liverpool-based Coast Lines Ltd.; the parent reported in 1969 that its unit load companies "have been more than able to hold their own against competition" for GB-Ireland traffic.[2] The linen industry, on the other hand, complained of spiralling freight rates and delays in the movement of goods both into and out of the province. Delays in the movement of small traffic were cited by the NI Chamber of Commerce and Industry. Faced with this conflicting evidence and holding that for "long periods in the past" the cross-channel shipping services had "not been developed in an energetic way," the consultants, while pinning their real hopes on continued competition,

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[1] NEC, Annual Report, 1969, p.28.

[2] Coast Lines Ltd, Annual Report and Accounts, 1969 (Liverpool: Coast Lines Ltd., 1970), p.6.

recommended that the Government give consideration to the launching of an immediate inquiry into the validity of existing complaints with a view to taking remedial action if and where necessary. It was further recommended that Stormont consider the setting up of permanent machinery to advise on any new complaints. While the Government did not appear to take these proposals very seriously, it did agree to investigate the need for advisory machinery of the type suggested.

External Transport/Air

While it has not been ignored by the literature, air transport has received much less attention than cross-channel shipping. Isles & Cuthbert(1957) called for the encouragement of air freight services as a way of mitigating manufacturers' traditional dependence on sea transport. The Hall Report reiterated this theme, urging Stormont and Whitehall to launch a detailed inquiry into the feasibility of a specialised air freight service between NI and GB. Three benefits were cited in support of such a service: 1) a reduction in air freight rates, 2) encouragement to new industries producing high value/low bulk goods, i.e., the types of industry especially suited to NI, and 3) reassurance for industrialists, particularly potential in-migrants, worried about the province's apparent remoteness. The Report also recommended that the adequacy of passenger services between NI and GB be kept under close review by the Ministry of Aviation (as it was then called). Business executives had repeatedly told Hall and his colleagues that the NI-GB air links were inadequate, especially during the summer and other holiday periods. Although the alleged problem was largely occasional rather than general, and difficult to assess in economic terms, the JWP agreed that its psychological aspects could adversely affect Ulster's industrial development efforts. Thus, it was decided to recommend continuous surveillance of air passenger transport requirements despite immediate steps by British European Airways, the monopolist air carrier (until 1963) on the scheduled routes joining Belfast and GB, to rectify the situation.

We have already noted the complaints about Ulster's air services uncovered by McGovern and Law. Wilson advanced the basic principle that "business travel must never be delayed by lack of facilities" as part of a general statement on the importance for management of fast and reliable air travel services. This maxim was promptly endorsed by the Ulster Government. However, the professor did not probe into

the economics of seats on demand very deeply, an important omission since NI's air services have been chronic moneylosers, and he was opposed to permanent transport subsidies. Thus, one is left wondering how seriously he intended his aphorism to be taken and whether its endorsement by the Government was anything more than a gratuitous expression of desirability. Be that as it may, seats on demand was a long-term objective. In the short run, Wilson hoped that the relatively minor problem of insufficient seat availability during peak periods could be solved by some form of discriminatory pricing, the assumption being that business demand for plane seats was less elastic than non-business demand. Otherwise, seat availability was judged to be adequate. Looking to the future, he advocated an extension to the runway at Belfast Airport with a view to enabling "modern jets" to land and possibly attracting "one or more" of the trans-Atlantic services. On the topic of air freight, he seemed generally to be less enthusiastic than Hall, et al. while retaining a positive mien. Noteworthy is his concise account of past obstacles to the development of special air cargo services, his suggestion that the passenger airlines experiment with marginal cost pricing to attract more belly freight, and his circumlocutional and indeed reluctant advocacy of a temporary subsidy for an all-cargo service given the right conditions.

It is appropriate at this point to look briefly at actual postwar developments in the air transport field as they relate to NI. BEA was given a monopoly of all scheduled intra-UK air passenger services by the 1946 Civil Aviation Act, and, as we have seen, the airline maintained this monopoly position until 1963. The main NI airport at Belfast (Nutt's Corner until 26 September 1963, then Aldergrove) has been owned and managed continuously by a central government ministry (initially the Ministry of Civil Aviation, then the Ministry of Transport and Civil Aviation, then the Ministry of Aviation, and then the Board of Trade). Under the 1960 Civil Aviation (Licensing) Act, private airlines were allowed for the first time to compete with BEA for domestic traffic on a scheduled basis. An independent Air Transport Licensing Board was set up as a regulatory body. Licensing commenced in March 1961.

British Eagle International Airlines Ltd. was authorised to operate a scheduled service between Belfast and London in November 1961 but did not begin operations until 1963. However, the service proved unprofitable, in part because the maximum flight frequency allowed was inadequate, and British Eagle withdrew from the route in February 1965. A few

months later, its licence was revoked and British United Airways Ltd. was granted permission to fill the gap. During 1966-67, in the face of strong opposition from BEA, BUA's maximum frequency was raised from 7 to 12 round trips a week. A new application from British Eagle, on the other hand, was turned down on the ground that a third service was neither necessary nor desirable. At mid-1968, 67 round trips a week were being flown between Belfast and London, 55 by BEA and 12 by BUA. A one-way trip took approximately 70 minutes.

Terminal passengers handled by Belfast Airport (Aldergrove) in 1967 totalled 982,755. Air freight movements totalled 22,502 short tons. Although Aldergrove is a relatively large airport, being the 5th-biggest in the UK (after Heathrow, Gatwick, Glasgow and Manchester) in terms of passenger throughput, it incurred a deficit on its operations and did not begin to meet the separate cost of the air navigation services provided by the BOT.

Growth in passenger traffic on the busy Belfast-London trunk route during the decade ending in 1967-68 is portrayed in the following table.

Passengers Carried, Belfast-London, 1958/59-1967/68
by Type of Air Carrier

Year	Public Carrier (BEA)	Private Carriers (British Eagle, BUA)	Totals
1958-59	126,237	..	126,237
1959-60	159,729	..	159,729
1960-61	211,869	..	211,869
1961-62	256,984	..	256,984
1962-63	298,138	..	298,138
1963-64	356,840	4,973	361,813
1964-65	390,155	10,983	401,138
1965-66	430,699	4,955	435,654
1966-67	452,803	25,520	478,323
1967-68	416,504	38,266	454,770

Source: Edwards Committee Report(1969), p.83.

The extent to which BEA dominated the route even at the end of the period is readily apparent. It will also be noted that total traffic declined in 1967-68. The Edwards Committee attributed this fall-off to two factors, increased fare levels and a decrease in the rate of real income growth. Changes in these two variables during the period, 1959/60-1967/68, are shown below.

Rates of Change in Passenger Traffic Growth and Fare Levels on the Belfast-London Trunk Route and in UK Personal Disposable Income, 1959/60-1967/68

Year	Traffic Growth	Fare Levels	Personal Disposable Income Current Prices	1958 Prices
	%	%	%	%
1959-60	+27	+1.3	+6.4	+5.7
1960-61	+33	-7.4	+7.1	+6.2
1961-62	+21	-0.2	+7.6	+4.5
1962-63	+16	-5.3	+4.8	+1.0
1963-64	+21	+3.6	+6.0	+4.6
1964-65	+11	+3.8	+7.1	+4.0
1965-66	+ 9	+7.5	+6.9	+2.2
1966-67	+10	+6.9	+6.1	+2.3
1967-68	- 5	+14.9	+3.7	+1.5

Source: Ibid.

Notes: 1) Calculated from 'total' column in preceding table.
2) BEA's passenger revenue per passenger-mile on the Belfast-London route.

Edwards and his colleagues came to no conclusion concerning the relative importance of changes in fare levels and personal disposable income as determinants of traffic growth. We tried linear regression and correlation analysis with the following results. Taking traffic growth as y and fare levels as x,

$$y = 19.8122 - 1.4068x \text{ and } r^2 = 0.72.$$

Substituting personal disposable income at constant price for fare levels,

$$y = -1.4743 + 4.8834x \text{ and } r^2 = 0.66.$$

Clearly, for the time span shown, changes in fare levels would appear to correlate more closely with traffic growth than changes in personal disposable income.

As we have seen, air transport received considerable attention in the Wilson Plan. Even more loquacious on the subject is the successor plan. This plan is also more detailed involving itself in relatively arcane matters such as timetable construction and air navigation facilities in addition to more familiar topics. As was the case with its predecessor, strong emphasis is placed on the importance for regional development of adequate and reliable air travel facilities. A recommendation in the Hall Report is reiterated, viz., that a close watch be kept on air passenger requirements. But the 1970-75 Programme goes further, encouraged apparently by the views of the Edwards Committee on air services and regional development, to suggest that "if necessary"

the Ulster Government should consider taking a financial interest in a domestic airline to ensure that any significant gaps in flight availability are filled. Noting that BUA has been allowed from April 1970 to operate 17 flights a week between Belfast and London, the Programme strongly endorses competitive air services. It also comments favourably on the "extensive development" of services to and from NI since the publication of the Wilson Plan. In 1970, scheduled flights were being operated to some 19 centres in GB including the Isle of Man and Jersey, and to three foreign destinations: Dublin, Shannon and New York. Perhaps because of the greater variety of services, the continuing problem of inadequate peak capacity receives much less emphasis than it did in earlier reports. Air freight developments in NI during the latter half of the 1960s were somewhat less than spectacular, and the Programme contains no new proposals although it continues to stress the importance for industry of having facilities available to meet emergencies and urgent requirements. It might be mentioned finally that the responsibility for Aldergrove Airport is being transferred from the BOT to the Government of NI in 1971. Concomitantly, the runway at Aldergrove is being extended to 9,100 ft.

In its Statement accompanying the publication of the Development Programme, the NI Government agreed with the consultants' endorsement of competitive air services and, rather cryptically, noted that discussions had already commenced with the BOT on NI's "special" need for "efficient" air services. 'Special' has a variety of connotations and its intended meaning in the White Paper is not made clear. Also unclear is the intention behind the selection of 'efficient' as an adjective. It is possible of course that there was no particular intent!

In sum, it seems evident that air transport is now widely accepted in NI as an important element in the continuing struggle to attract new industry. This was not always the case. Prior to the Hall Report in 1962, the importance of rapid communications, hence air travel, to businessmen was seldom mentioned, let alone made the subject of official action. The need for air freight services was noted by Isles & Cuthbert in 1957 but they did not attach a lot of significance to the point, and subsequent events have yet to substantiate the early promise of this transport development. Awareness of the need for improved passenger services was aroused by the Hall and Wilson Reports but, air transport being entirely a central government responsibility, Stormont could do little except make periodic representations to BEA and the

authorities in Whitehall. However, BEA has always lost money on its services to NI; at the same time, its freedom to act has been constrained by the need to achieve a target rate of return on its overall investment. Thus, it has never been able to go as far towards meeting NI's air transport requirements as the development planners wished. Whitehall, on the other hand, has never consciously and explicitly used air policy as a development tool although, as a result of the Edwards Committee Report, the subject has been brought under study. There seems little doubt that this same Report has simultaneously led the Ulster Government to raise its expectations and instilled greater confidence that they will ultimately be realised.

It remains to be asked whether or not industrial development in NI has been seriously retarded by air transport inadequacies. In general, the answer must be no although some companies might have located more non-production functions in the province had services been consistently optimum. More functions of this type would have meant more jobs. It is questionable whether they would have entailed more sales.

Telecommunications & the Postal Service

Telecommunications were overlooked by the literature until Law's brief comments in 1964 (see section on general surveys of migrant companies). Wilson in 1965 devoted a paragraph of his Plan to the subject. Recognising the importance of telex to industry as a means of overcoming possible feelings of remoteness, he recommended that "any new requests for installations should be met without delay." The 1970-75 Programme comments unfavourably on the telephone service. For example, it admonishes the Post Office for not proceeding faster with the introduction of international STD to Ulster (the absence of which was felt particularly strongly no doubt during the recent postal strike), and suggests that the capacity of the telephone links between NI and GB has never been fully adequate. On the other hand, the waiting list for new telephones has been "virtually cleared".

The postal service has given rise to little complaint historically with the exception of the charge by fashion good producers mentioned earlier that the intra-NI service was subject to significant delay.

Have the defects in the telecommunications or postal services retarded industrial progress in Ulster? Available evidence, although it is very limited, suggests that they have not done so.

Conclusions

That transport and communication costs are not an important constraint on the development of many industries in NI, or pari passu on interregional migration to the province as suggested by one of our working hypotheses, emerges clearly from the foregoing. This is particularly true of the key engineering and electrical goods sector which increased in size by almost 10,000 workers between 1960 and 1968 despite a decline in aggregate manufacturing employment. Professor Wilson in 1964 estimated that the transport cost/gross output ratio for all manufacturing was about 2%. In fact, it was even less, i.e., only 1.7%, according to our upward revision (see ch. 9) of the 1963 Census of Production results published in 1966. More important (from a private cost viewpoint) than the absolute size of the ratio, of course, is the differential between NI and GB. Wilson guessed that this differential must be quite small relative to total costs. Our figures show that it was actually in NI's favour in 1963 at the gross output level (1.7% NI vs. 2.1% UK) but against NI at the net output level

(6.2% vs. 5.8%). The gross results obviously conflict with expectations and can be viewed as corroborating the Isles-Cuthbert caveat that firms in high differential industries, and indeed high differential firms generally, may eschew NI altogether given the limited size of the local market and the consequent importance of extra-provincial sales. In other words, census data in practice are a very imperfect guide to the magnitude of differentials. More realistic statistics, however, can only be collected by special, ad hoc survey methods. It is questionable in light of the census figures whether new surveys would be worth the expense. We think not.

Despite the general validity of our first conclusion, transport costs remain very important and even decisive for <u>some</u> types of manufacturing industry. The examples of meat packing and metal cans have been presented at length. Also apropos is primary metal production. Assembly industries such as motor cars will continue to avoid Ulster because of their triple dependence upon volume production, mass markets and material inputs from a large number of dispersed suppliers. One could go on to compile quite an extensive list of transport-cost-sensitive manufacturing activities. It should also be noted that transport costs have risen in relative importance recently, across the board, as a consequence of the 1968 Transport Act. Furthermore, Ulster's industrial dispersal policy has made it necessary for potential migrants unable to mount a strong case for a port location on the east coast to take intra-NI transport costs into account when deciding whether or not to open a production facility in the province. Undoubtedly, these extra costs have been the marginal factor leading some firms (although surely not a large number) to decide against a NI location. It follows that there are no grounds for complacency on the transport front. But having said that, it remains true that what might be called transport-cost-insensitive industries are in the overwhelming majority.

Transport cost insensitivity for most manufacturers, of course, is a relative concept. Few producers can afford to ignore transport costs altogether. Low TCNO ratios tell one nothing about profit margins, and need not always imply transport cost insensitivity, although usually that will be the case since even a 100% increase in a minor cost item will have a negligible effect on total costs. But no firm can contemplate with equanimity the prospect of an increase in a major cost item or simultaneous increases in several cost categories no matter how unimportant each may be singly. It can be argued that, for at least

some industrial migrants to NI, transport costs are seemingly insignificant only because the province offers a variety of compensatory advantages. Transport costs for these firms are both important in the sense that they are closely watched and higher than they would have been in, say, GB but, because other costs in NI are often lower, the adverse transport cost differential can be accommodated. Courtaulds's Carrickfergus plant is a case in point. That it is not an isolated one is suggested by the findings of Mitchell and Law. For one to claim then that transport costs are insignificant per se across a wide range of industry would be misleading; transport cost insensitivity is best seen in a broad context encompassing both total costs and profitability. This qualification should be kept in mind when evaluating the implications of our previous conclusions.

The NI experience fully corroborates our working hypothesis concerning the importance of a good interregional transport and communications network for interregional industrial migration. As documented by Law for example, NI's locational disadvantages are real. This consideration, together with the province's industrial dispersal policy, is one of the main reasons why such emphasis has been placed upon the need for improved transport and communications infrastructure in recent years, and why, referring now particularly to air and telecommunications, most of the postwar migrants have been little more than production units. These disadvantages have been reduced since Law reported in 1964. But unfortunately for the province, it usually takes a while for reputation to catch up to reality when the latter is undergoing change. Thus NI probably still seems more remote to many potential migrants than the facts warrant in spite of government publicity to the contrary.

Given the importance of a good communications network for industrial migrants, it might be considered surprising that industrial promotion policy in NI has never been tailored to the capacity of the key cross-channel shipping services inasmuch as the former has been much more amenable to Stormont control than the latter. But in fact there are good reasons for this situation. First, little information is readily available on the traffic-generating effects of specific types of industry. Secondly, MinCom for many years had deliberately eschewed a selective approach to industrial promotion. Thirdly, it has generally been assumed that shipping capacity would more or less automatically expand in concert with demand. On balance, MinCom's position, i.e., a pragmatic reliance on the market supplemented by occasional prodding,

would appear to be the most sensible one.

Our third hypothesis is also corroborated by some of the research pertaining to NI, especially the work of McGovern. We have suggested that organisational flexibility can often be more crucial to the success of an interregional move than distance costs. McGovern's thesis was partly based on the same premise; he concluded that the postulate conformed to reality although his methodology - a mail questionnaire - was not particularly appropriate to the purpose and cannot really be claimed to have yielded a definitive answer.

Several other conclusions can be stated on the basis of the material in this chapter. First, Ulster firms are not forced by their location to hold significantly larger stocks than GB competitors. The argument has sometimes been advanced that, while transport cost differentials per se might not prevent potential migrants from moving to Ulster from GB, other distance-related costs such as interest charges on money tied up in higher stocks could tip the balance adversely. Law went into this subject in some detail. He found that where additional stockholding costs were experienced at all, they were usually trifling relative to total production costs. Furthermore, a majority of the firms mentioning higher stockholding costs blamed them on the irregularity and unreliability of cross-channel shipping. As we have seen, such shipping has improved considerably in recent years. It might also be mentioned that many firms historically do not appear to have subjected their distribution function including stockholding to periodic cost analyses[1] although the steps involved are relatively straightforward. Even fewer have worked out their return on investment in distribution. On balance, the stockholding argument would not appear to have much force as a determinant of location decisions.

Secondly, it now appears unlikely that explicit transport subsidies will ever be used as a general stimulus to NI's industrial

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[1] Two large firms in Ulster, a migrant and a native, have been much in the news recently because of their failure to keep a watchful eye on costs generally. One, Rolls Royce, opened a factory at Dundonald in November 1966. By the beginning of 1971, it was employing 1,000 workers. Two months later, however, its future looked exceedingly bleak owing to the RB 211 engine debacle. The other firm, Harland and Wolff, is losing millions of pounds on its current order book. Until a few years ago, it had no proper cost estimating or control system.

development.[1] At one time, they were a frequent topic for discussion; the latest provincial development plan, however, ignores them completely. Transport subsidies are analogous to industrial derating in the sense that significant benefits accrue to only a few; for most firms, the benefits are marginal. Industrial derating has been abandoned in England and Wales. It still prevails in NI but the concession is soon to be cut from 75% to 50% because of insufficient efficacy and the meagre social benefits relative to the cost.

Finally, although the transport cost bogey associated (particularly) with Isles & Cuthbert may have set the stage, it was the advent of comprehensive development planning, technological developments such as containerisation, and the economic obsolescence of the railways that gave the real boost to the heavy expenditures on improved transport and communications in NI during the 1960s. Indeed, it is somewhat ironic that these expenditures were contemporaneous with the deflating of the Isles-Cuthbert argument by the NIDC, Dennison, etc. The irony is heightened by the fact that the infrastructure investments were almost certainly not subjected to a rigorous economic assessment; on the contrary, intuition, political considerations and budgetary constraints would appear to have been the main investment criteria, supplemented in some cases by financial analysis.

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[1] Implicit subsidies such as a failure to charge economic tariffs are another matter. Usually, however, they are unplanned.

CHAPTER 7

POSTWAR INDUSTRIAL MOVEMENT TO SCOTLAND AND NORTHERN IRELAND

Outside interests have set up many manufacturing operations in Scotland and NI since World War II, largely as a consequence of various government measures, but also in response to growing local market opportunities. This process is known generally, although somewhat inaccurately, as interregional industrial movement or mobility. The inaccuracy stems from the fact that a majority of interregional 'moves' to date have involved the establishment of new branches rather than transfers and branches usually connote additional space, not the movement of existing capacity. However, we will henceforth ignore this semantic difficulty and follow current convention. The purpose of this chapter is to determine the nature and magnitude of postwar industrial migrant flows to Scotland and NI and to place them in perspective. More specifically, an attempt is made to indicate the volume, origins and periodicity of movement; the areas' relative attractiveness to migrants; some of the employment benefits both in absolute terms and relative to total employment and unemployment; the industrial distribution of the movers; and their locations.

A Digression on Movement Records in GB

Until the publication of R.S. Howard's pioneering study[1] in September 1968, there was little systematic information available on the total volume of postwar movement by manufacturing establishments to British destinations. This information vacuum by no means precluded empirical research[2] but, as David E. Keeble has suggested,[3]

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[1] GB, BOT, Distribution of Industry Division, The Movement of Manufacturing Industry in the United Kingdom, 1945-65: An Analysis of the Transfer of Manufacturing Establishments Between Areas and of the Opening of New Manufacturing Branches, by R.S. Howard (London: HMSO, 1968).

[2] Cf. chs. 4-5.

[3] Keeble, "Industrial Decentralization," p.1.

all of the published studies have been restricted either in their coverage of the total population of migrant firms or in their areal coverage. Indeed, many suffer from both types of restriction.

Several factors have contributed to this state of affairs. Only the central government for example has been in any sort of position to maintain a consistent record of industrial mobility over time but, quite apart from questions of incentive, its legislative authority for doing so has been revised several times since 1940. Furthermore, this mandate has not been fully comprehensive since mid-1948 (see below). The result has been an indeterminate but significant amount of incompleteness in those government records which have been kept on a more or less routine basis, ie., as a by-product of various administrative procedures. Keeble found in his study of industrial decentralisation from NW London between 1940 and 1964 that 40% of the entries on his final list of moves were unknown to the relevant government agencies.[1] It would be unwise to suggest that a gap of this magnitude prevails for all parts of GB but clearly the amount of movement which has gone unrecorded under normal circumstances has probably been considerable. A further problem facing students of mobility is the secrecy surrounding much of the relevant information in government files. Howard's study represents an important departure from the usual standard of circumspection maintained by the BOT, the erstwhile guardian of the main record store.[2] Although the mantel of responsibility has now passed to new hands, ie., first to Mintech[3] and latterly to the Department of Trade and Industry,[4] it is unlikely that the rules on disclosure will soon be relaxed still more.

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[1] Corroborative evidence is provided by D.L. Munby, Industry and Planning in Stepney, report presented to the Stepney Reconstruction Group (London: Oxford University Press, 1951), p.349.

[2] "The Research Branch of the Distribution of Industry and Regional Division in London is responsible, in consultation with the Ministries of Labour and Town and Country Planning, for research and location records". GB, Select Committee on Estimates, "Second Report: The Administration of Development Areas", in Reports Together with the Proceedings of the Committee and the Minutes of Evidence ..., H.C. 97, 1946-47 (London: HMSO, 1947), p.xxix.

[3] Effective October 1969.

[4] Effective October 1970.

Keeble did not specify which government migration records he found wanting but presumably they were the property of the BOT and had been kept by it in connection with some or all of three types of activity: 1) the work of the Control of Factory and Storage Premises Department, 1940-45, 2) the control on building, 1945-June 1948, and 3) the industrial development certificate (i.d.c.) control procedure, July 1948-1964.

With the outbreak of war in 1939, vacant factory space quickly disappeared. The BOT was given the task of factory allocation to ensure that war production requirements were met on an national a basis as possible. A special section was formed for this purpose in 1940. While it proved to be the forerunner of the Board's postwar Distribution of Industry and Regional Division, this Factory Control unit was conceived initially as a temporary expedient. Like many other government agencies at that time, it began, to use the words of E.A.G. Robinson, "in a state of almost complete statistical nakedness".[1] Statistics of various sorts were soon developed to narrow this gap but the nature of the collection reflected immediate needs almost entirely. Although a kind of location of industry policy was more or less explicit in the operations of the Factory Control, its aims were derived primarily from the war effort rather than from longer-term socio-economic considerations. Indeed, Dame Alix Meynell, the first head of the Control Unit, has referred to this wartime policy as an "excrescence".[2] Given these circumstances, it is improbable that migration records were kept as such. If any records did emerge as a byproduct in the pursuit of some other objective, it is highly likely that they were incomplete.

The second possible source of migration records was the control on building imposed during the war and finally dropped only in 1954. The control provided that neither new factories nor factory extensions could be built without government approval in the form of a licence. With the passage of the 1945 Distribution of Industry Act, the control

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[1] E.A.G. Robinson, "The Overall Allocation of Resources", in Lessons of the British War Economy, ed. by D.N. Chester, National Institute of Economic and Social Research, Economic and Social Study No. X (Cambridge: Cambridge University Press, 1951), p.43.

[2] Alix Meynell, "Location of Industry", Public Administration, XXXVII (Spring, 1959), 13. An excrescence is an unnatural outgrowth.

began to be used in a way not contemplated when it was initiated - indeed in a rather irregular way[1] - to force the attractions of the development areas upon manufacturers intent on remedying wartime shortages of consumer and other goods in the shortest possible time. Dame Meynell has claimed credit for this delicate piece of administrative subterfuge:

> I had the idea that the Government might make building licences available much more easily in the Development Areas than elsewhere. Industrialists were told that, if they went to one or other of the Development Areas, they would get a building licence quickly - even automatically - whereas if they insisted on building anywhere else, they might have to wait a long time for permission.[2]

The ploy worked. The DAs, with 20% of the insured population, received 53% of all new factory building space approved during the 1945-47 period. London and the SE, with 27% of the insured population, received less than 7% of the new factory building space. An important loophole in the control must inevitably have reduced the completeness of any migration records arising out of its operation; it did not apply to the take-over or conversion of existing premises.

The third and undoubtedly most useful set of government migration statistics dates from the beginning of July 1948 with the coming into effect of the I.D.C. control procedure under the 1947 Town and Country Planning Act. Between 1 July 1948 and 1960, any manufacturer wishing to expand his capacity by more than 5,000 sq. ft., either by building new premises or through an extension to existing plant, had first to obtain an I.D.C. from the BOT. This requirement was tightened in 1960 to include the conversion of existing non-industrial buildings into factories. In August 1965 the control was made applicable to all industrial developments within the SE and Midlands over 1,000 sq. ft. A year later (August 1966), the exemption limit was raised to 3,000 sq. ft. in these areas while remaining unaltered elsewhere at 5,000 sq. ft.[3] These minima remain in force today

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[1] See J.W. Grove, Government and Industry in Britain (London: Longmans, 1962), p.459.

[2] Meynell, op.cit., p.15.

[3] McCrone (1969) did not get the details of this sequence quite right. Cf. his book, p.129, with the Board of Trade Journal, 19 August 1966, pp. 460 ff.

(October 1970).[1] Responsibility for i.d.c. policy was transferred to Mintech in October 1969 and to the DTI in October 1970.

The object of the i.d.c. requirement is to ensure that new industrial development is located in accordance with what the government considers to be a proper distribution of industry. Together with a series of other government measures,[2] this control has provided a means for promoting the dispersal to the DAs of a significant proportion of the annual increments to the stock of manufacturing capital in GB. Its operation has given rise to an automatic record of most relevant manufacturing developments since mid-1948 in the form of would-be investors' i.d.c. applications and their disposition. Nevertheless, certain loopholes have served to reduce the completeness of the record set by an indeterminate amount. For example, it does not include moves to existing premises. Conversions were often missed until 1960. Small firms particularly have been able to take advantage of the exemption limit. A.E. Holmans has pointed out how some firms may have avoided the control by putting up several exempt but contiguous buildings and later altering the number of partitions in order to accommodate preplanned or revised layout requirements.[3] The main question, of course, is to what extent were industrial moves under-recorded as a result of these stratagems. We have already mentioned Keeble's findings. Howard noted that the compilation of the record set which he used was not a simple matter. Indeed, it involved a great deal of research on the

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[1] The Hunt Committee with the exception of the Scottish member, Mr. James Jack, recommended that the i.d.c. minimum be raised to 10,000 sq. ft. Jack opposed this proposal on the ground that its adoption would reduce the benefits of i.d.c. policy to the DAs generally, but more particularly to sub-regions such as the Highlands, the Borders and SW Scotland, the embryo development strategies for which include an unusual dependence on the small industrial firm. The Labour Government rejected the Committee's recommendation. See Hunt Committee Report, (1969), para. 487 and p.169; Harold Bolter, "Hunt Report Demolished on Publication Day", Financial Times, 25 April 1969, p.40; "Regions: Shored Up", Economist, 3 May 1969, p.25; Manners (1970), p.18.

[2] For a complete list and estimated annual costs, see the Hunt Committee Report, Appendix I, pp. 252-56.

[3] A.E. Holmans, "Industrial Development Certification and Control of the Growth of Employment in SE England, Urban Studies, I (November 1964), 144. See also Edwin Hammond, "Improving the Machinery", Town and Country Planning, XXXII (March 1964), 138-41; Cameron and Clark, op.cit., pp. 28-32.

part of the Research and Planning Branch in the BOT's Distribution of Industry and Regional Division:

> The material was collected over a number of years in a number of different places and was not assembled by a physical count or from returns specifically related to the subject reviewed.[1]

The register was terminated by the Board at the end of 1965 in favour of a new and more comprehensive recording system.

Cameron and Clark explained the lack of official data on the scale and significance of industrial migration largely in political terms although they also acknowledged the existence of certain statistical and conceptual difficulties. According to their main argument, the obvious reticence of successive governments to disclose facts and figures was inevitable given industrialists' dislike of controls and the sometimes vociferous claims of the peripheral and/or high unemployment areas.[2] They might also have mentioned the reluctance of most local authorities in the regions of emigration to see a reduction in their employment and rate bases.[3]

The publication of Howard's study by the BOT does not completely invalidate the Cameron-Clark hypothesis. They appear to have had in mind a finer degree of detail than has so far been made public. Nevertheless, it could be argued that the movement of industry has recently become somewhat less of a political issue. However, this incipient trend is far from being irreversible. Consider, for example, the following quote from the evidence to the currently-sitting Commission on the Constitution by the Welsh Regional Council of the CBI:

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[1] Howard, (1968), para. 22.

[2] Cameron and Clark (1966), pp. 17, 39, 40.

[3] Considerable insight into this phenomenon is provided by Ray Thomas, "Aycliffe to Cumbernauld: A Study of Seven New Towns in Their Regions", with an Introduction by Peter Hall, Planning, XXXV, Broadsheet No. 516 (December 1969), 803, 909-13, 943.

> There is still a suspicion that until recent years Wales did not achieve a sufficient proportion of industrial development. In future, any elected Welsh Council or legislature must be in a position to assess the job requirements of the various areas, to press the claims for Wales with the central Government, and to ensure that the Principality is being 'sold' effectively to industrialists, both in England and abroad.[1]

This spectacle of industrialists lobbying for government intervention in the location of industry is the most convincing proof possible that the question of industrial mobility is still very much in the political arena.

Although various proxy measures such as: a) the periodic estimates of employment by region and industry in the Ministry of Labour/Employment & Productivity Gazette, b) the employment data from the censuses of population and production, c) the information on industrial building and government factories in the annual reports by the BOT under the Local Employment Acts, and d) statistics of changes in rateable floor space (changes in rateable value in Scotland)[2] have been widely used as indicators of the amount and direction of postwar industrial movement, they have not been completely satisfactory in this regard for two reasons. First, distribution of industry policy, one of the prime causes of internal movement, has had as its continuing focus manufacturers' decisions to expand production facilities. In general, and with varying degrees of emphasis over time, it has tried to steer industrial expansion projects away from the South and Midlands to the designated DAs in the North and West by means of a combination of inducements and controls. The proxy measures have proved to be very imperfect guides to some of the effects of this policy, eg., its relationship to the number and origin of moves.[3] Second, it is not possible, using the proxy measures, to distinguish endogenous from exogenous growth in a given area's manufacturing base. An increase in employment, for example, could be the result of: 1) expansion by firms already in the area, 2) an influx of new establishments, or 3) a combination of both.

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[1] CBI, "Evidence to the Commission on the Constitution", London 1970, Appendix III, p.4. (Roneoed).

[2] For recent data on rateable floor space and value, see the Hunt Committee Report, Appendix F, pp.221-26.

[3] Cf. "Relationship Between Movement and Development Receiving Industrial Development Certificates", Appendix L in Howard (1968), pp. 53-54.

In the absence of information on the volume of industrial movement, it is difficult to determine the relative strengths of these various factors.

Number, Origin & Periodicity of Moves to Scotland & NI

Howard's study covered a period of 21 years, 1945-65. His data base consisted of 3014 cases of movement each of which had to meet several criteria in order to qualify for inclusion, viz:

1) it had to be a new manufacturing establishment but not an entirely new firm (using the terms, 'establishment' and 'firm', in the same way as the Census of Production),

2) it had to be located in an area different from its place of origin, ie., it had to have moved across the boundary of one of the 50 areas into which Howard had arbitrarily divided the UK; this criterion meant that most short-distance moves and even a few of up to 30 miles were excluded,

3) the firm or enterprise must not have been operating a plant in the same industry in the new area at the time the new establishment was opened (the 'same industry' was defined as the same Minimum List Heading of the SIC),

4) the establishment must at some time have employed more than 10 persons,

5) it must still have been operating at the end of 1966.

The organisational status of the mover was of no consequence; both transfers in the sense of complete relocations, and branches or subsidiaries were included. It was also immaterial whether the moves were housed in newly-built or existing premises. On the other hand, take-overs of existing establishments through acquisition or merger were excluded unless there was a concomitant change of HLH. Howard aimed at comprehensiveness within the limits set by his selection criteria but was unable to claim complete success by the very nature of the research task; independent checks were unavailable. Nevertheless, he felt that any eligible cases which had been missed were probably small in size, and in employment terms, insignificant. J.E. Martin, in discussing this point,[1] argued that Keeble[2] had achieved a greater degree of completeness in his micro-study of

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[1] See J.E. Martin, review of Movement of Manufacturing Industry, by Howard, in Regional Studies, III (September 1969), 225-26.

[2] Keeble, "Industrial Decentralization", Transactions (1968).

industrial migration from North-West London, but Howard's work is the most complete national movement survey to date.

Howard's 3014 cases of movement represented 5% of all establishments employing more than 10 persons in the UK in 1966. At the end of that year, they were employing 670,000 persons or 9.7% of all UK manufacturing employees.

Scotland originated 76 movers (2.5% of the total number) but the majority of them (48 or 63.2%) did not go beyond the boundaries of the seven areas into which Howard divided the Scottish Economic Planning Region. NI originated no movers.

Most interesting for our purposes are the 259 interregional moves which terminated in Scotland and the 120 which terminated in NI. As Tables 7.1 and 7.2 show, the most important sources of movement to Scotland were the South-East Economic Planning Region and overseas countries. Together they accounted for two-thirds of all manufacturing establishments moving to the region during the 1945-65 period. Although this finding is not contrary to what one would expect given the probable generating capacity of these two origins relative to the others,[1] it is worth noting that of all the specified origins, the SE and 'abroad' are the most distant from Scotland. Other important sources of new industry were the West and East Midlands and the North-West.

Figure 7.1 illustrates the postwar pattern of industrial movement to Scotland from origins in England and Wales. It can be seen that the number of moves from the SE (97) was greater than the number from all the other specified origins combined (81). No simple relationship was found between the number of moves and the distance of the origins

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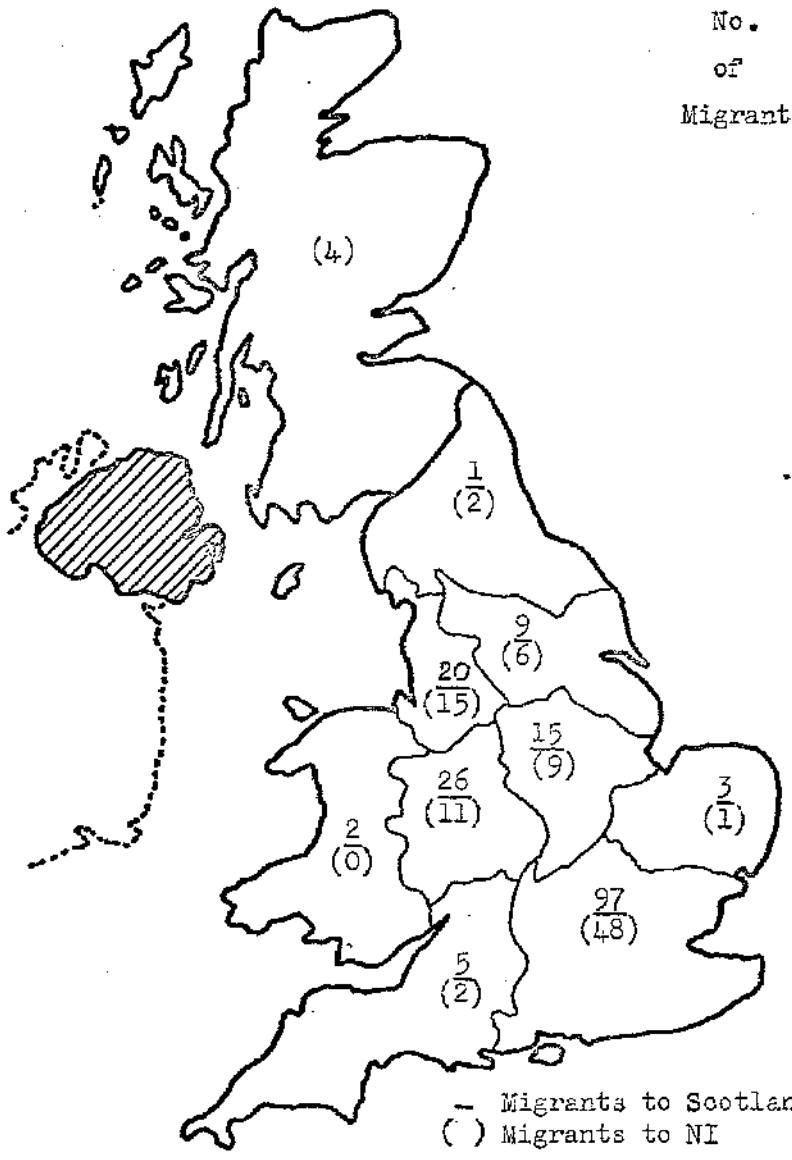
[1] Population data can be used as proxies for generating capacity to demonstrate the relative potential of the English and Welsh economic planning regions. The 1965 population of these regions was as follows:-

South-East	16,953,800	Yorkshire & Humberside	4,711,600
North-West	6,703,400	South-West	3,585,300
West Midlands	4,975,400	North	3,309,300
		East Midlands	3,271,800
		Wales	2,692,000
		East Anglia	1,559,400

Source: GB, Central Statistical Office, Abstract of Regional Statistics, No. 2 (1966), Table 1, p.6.



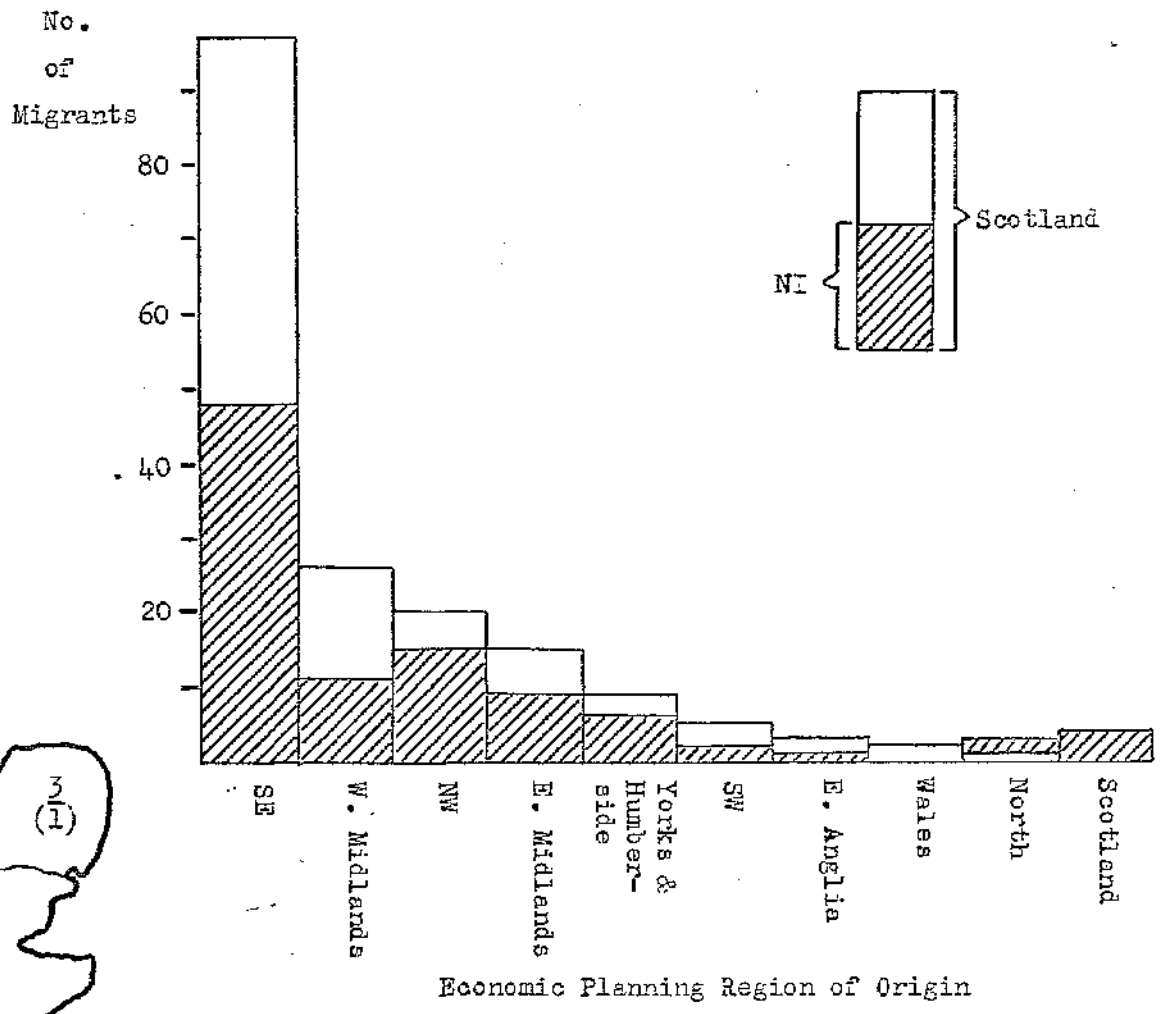


Fig. 7.1 No. of British Industrial Migrants to Scotland & NI, 1945-65, by Region of Origin

Sources: Tables 7.1 & 7.4

from Scotland,[1] but then none was expected inasmuch as the main determinants of the volume of movement and its destination profile have been: 1) the number of firms, the industrial structure, the unemployment rate, the availability of housing and the amount of vacant factory space in each of the potential sources of movement, 2) the incidence of unemployment and the number of surplus workers in the assisted areas, 3) I.D.C. policy, new towns policy and the general economic outlook. These variables can be summarised as pushes and pulls with the former grouping invariably predominating.[2] Simple distance has been an important consideration in some cases, eg., transfers and moves by small firms. Generally, however, it does not take one very far *per se* in explaining why some origins have generated much more industrial movement to Scotland than others. We speculate further on this point in our concluding section.

Table 7.1: Number of Manufacturing Establishments Moving to Scotland During the Years, 1945-65, by Origin, and Their Percentage Distribution by Date of Movement

Origin: Economic Planning Region Or Abroad	1945-65	Date of Movement: 1945-51	% of 1945-65 Total	1952-59	% of 1945-65 Total	1960-65	% of 1945-65 Total
	No.	No.		No.		No.	
South-East	97	29	29.9	14	14.4	54	55.7
Abroad	76	20	26.3	19	25.0	37	48.7
West Midlands	26	5	19.2	4	15.4	17	65.4
North-West	20	9	45.0	4	20.0	7	35.0
East Midlands	15	4	26.7	2	13.3	9	60.0
Yorkshire & Humberside	9	6	66.7	2	22.2	1	11.1
South-West	5	-	-	2	40.0	3	60.0
Great Britain n.e.s.	5	4	80.0	1	20.0	-	-
East Anglia	3	-	-	1	33.3	2	66.7
Wales	2	-	-	1	50.0	1	50.0
Northern	1	-	-	-	-	1	100.0
Northern Ireland	-	-	-	-	-	-	-
Totals	259	77	29.7	50	19.3	132	51.0

Source: Percentages computed from data in Howard (1968), Appendices B-E, pp. 40-45.

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[1] As measured by the number of road miles from the principal city in each origin to the Glasgow-Edinburgh axis. For example, Bristol, the largest city in the South-West, is 365 miles from both Glasgow and Edinburgh. Greater London, the home of almost half the inhabitants of the South-Eastern region, is 392 miles from Glasgow and 373 miles from Edinburgh; the average London - 'Scotland' distance can be taken as 382.5 miles.

[2] Cf. Leasby (1967), p.35.

Table 7.2: Percentage Distribution of Manufacturing Establishments Moving to Scotland, 1945-65, by Origin & Date of Movement

Origin: Economic Planning Region or Abroad	Date of Movement			
	1945-65 %	1945-51 %	1952-59 %	1960-65 %
South-East	37.5	37.7	28.0	40.9
Abroad	29.3	26.0	38.0	28.0
West Midlands	10.0	6.5	8.0	12.9
North-West	7.7	11.7	8.0	5.3
East Midlands	5.8	5.2	4.0	6.8
Yorkshire & Humberside	3.5	7.8	4.0	0.8
South-West	1.9	-	4.0	2.3
Great Britain n.e.s.	1.9	5.2	2.0	-
East Anglia	1.2	-	2.0	1.5
Wales	0.8	-	2.0	0.8
Northern	0.4	-	-	0.8
Totals	100.0	100.0	100.0	100.0

Source: Computed from Table 7.1.

Howard divided his 21-year period into three distinct parts - 1945/51, 1952/59 and 1960/65 - on the basis of major changes in regional policy and economic circumstances. These divisions have been retained in the above tables. It can be seen that the volume of movement was not steady over the 21 years. Bearing in mind that the tables refer to survivors only and that the probability of closure rises with the age of an establishment, it is still evident that the number of moves was highest during the last six years of the total period and lowest during the middle eight years. It can also be seen that the relative strengths of the flows from the various origins have altered over time. For example, the SE was the most important single source of new industry during the periods, 1945-51 and 1960-65, but not during the bulk of the 1950s when the first generation of London New Towns was being developed. On the other hand, the combined flow from the SE and abroad increased steadily relative to the total flow, from 63.7% in 1945-51 to 66.0% in 1952-59 to 68.9% in 1960-65. The West Midlands showed a steady but much more pronounced increase in relative importance; its share of the total Scottish inflow rose from 6.5% in 1945-51 to 12.9% in 1960-65. Conversely, the NW's contribution fell from 11.7% of the total in 1945-51 to 5.3% in 1960-65. Although the absolute number of moves involved is small, the sharp decline in the relative role of

Yorkshire and Humberside region as a source of new industry for Scotland is also worthy of note; the percentages for 1945-51 and 1960-65 are 7.8 and 0.8 respectively.

Table 7.3 illustrates the changing temporal importance of the significant origins of moves[1] to Scotland in a different way. It expresses in index form the percentage columns in Table 7.1 excluding the entries for Wales, the North, the South-West, East Anglia, Great Britain n.e.s. and, of course NI.

Table 7.3: Indices Showing Changes in the Relative Importance of the Significant Origins of Postwar Industrial Movement to Scotland During Successive Time Periods

Origin: Economic Planning Region or Abroad	Period of Movement 1945-51 Index with 29.7%=100	1952-59 Index with 19.3%=100	1960-65 Index with 51.0%=100
Yorkshire & Humberside	225	115	22
North-West	152	104	69
South-East	101	75	109
East Midlands	90	69	118
Abroad	89	130	95
West Midlands	65	80	128
All Origins	100	100	100

Source: Computed from Table 7.1.

This approach summarises the highlights of Tables 7.1 and 7.2 while making clearer the relative contribution of the most important origins during each time period to the total volume of moves. Take Yorkshire and Humberside for instance. Whereas the 7-year period, 1945-51, accounted for 29.7% of postwar moves to Scotland from all origins up to the end of 1965, in the case of Yorkshire and Humberside the years 1945-51 accounted for 66.7% of postwar moves to Scotland from the region. Dividing the latter percentage by the former, we get 225. The fact that this figure exceeds 100 indicates that Yorkshire and Humberside contributed a disproportionately large amount to the migrant flow to Scotland during the early postwar period relative to later periods. Conversely, by 1960-65 the region was contributing a disproportionately small amount. Similarly, the

[1] Defined arbitrarily as origins giving rise to more than 5 moves during the 1945-65 period.

reversal in the positions of the SE and abroad in 1952-59 relative to earlier and later periods, the prominent part played by both halves of the Midlands in 1960-65, and the relative insignificance of the jump between 1952-59 and 1960-65 in the absolute number of moves originating in the North-West all emerge in sharper perspective from Table 7.3 than from its predecessors.

Tables 7.4-7.6 present data for NI comparable to the figures in Tables 7.1-7.3. Many of the comments made concerning the latter are broadly applicable to the former. Some interesting disparities exist, however, apart from the obvious difference in the total number of migrants. For example, overseas firms were proportionately much less important to NI than to Scotland over the 1945-65 period as a whole, and particularly during the early postwar years, but by the 1960s this discrepancy had disappeared. In contrast, the SE was consistently more important to NI than to Scotland in relative terms as a source of migrants. It is also worth mentioning that NI benefitted less than Scotland from the pronounced upsurge in interregional migration between 1960 and 1965 despite an enviable success record in attracting overseas companies. Scotland's superior pulling power with regard to British firms was almost certainly due in large part to the backward linkage effects of the Rootes and Leyland motor vehicle ventures (see below and the migrant flows from the West Midlands).

Table 7.4: No. of Manufacturing Establishments Moving to NI, 1945-65, by Origin & Their Percentage Distribution by Date of Movement

Origin: Economic Planning Region or Abroad	1945-65 No.	Date of Movement 1945-51 No.	1945-51 % of 1945-65 Total	1952-59 No.	1952-59 % of 1945-65 Total	1960-65 No.	1960-65 % of 1945-65 Total
SE	48	17	35.4	9	18.8	22	45.8
Abroad	22	1	4.5	6	27.3	15	68.2
NW	15	7	46.7	4	26.7	4	26.7
W. Midlands	11	5	45.4	4	36.4	2	18.2
E. Midlands	9	5	55.6	-	-	4	44.4
Yorkshire & Humberside	6	2	33.3	1	16.7	3	50.0
SCOTLAND	4	1	25.0	2	50.0	1	25.0
Northern	2	-	-	1	50.0	1	50.0
SW	2	1	50.0	1	50.0	-	-
E. Anglia	1	1	100.0	-	-	-	-
Wales	-	-	-	-	-	-	-
Totals	120	40	33.3	28	23.3	52	43.3

Source: Same as Table 7.1.

Table 7.5: Percentage Distribution of Manufacturing Establishments Moving to NI, 1945-65, by Origin & Date of Movement

Origin: Economic Planning Region or Abroad	1945-65 %	Date of Movement 1945-51 %	1952-59 %	1960-65 %
SE	40.0	42.5	32.1	42.3
Abroad	18.3	2.5	21.4	28.8
NW	12.5	17.5	14.3	7.7
W. Midlands	9.2	12.5	14.3	3.8
E. Midlands	7.5	12.5	-	7.7
Yorkshire & Humberside	5.0	5.0	3.6	5.8
SCOTLAND	3.3	2.5	7.1	1.9
Northern	1.7	-	3.6	1.9
SW	1.7	2.5	3.6	-
E. Anglia	0.8	2.5	-	-
Wales	-	-	-	-
Totals	100.0	100.0	100.0	100.0

Source: Computed from Table 7.4.

Table 7.6: Indices Showing Changes in the Relative Importance of the Significant Origins* of Postwar Industrial Movement to NI During Successive Time Periods

Origin: Economic Planning Region or Abroad	Period of Movement 1945-51 Index with 33.3%=100	1952-59 Index with 23.3%=100	1960-65 Index with 43.3%=100
East Midlands	167	0	103
NW	140	115	62
West Midlands	136	156	42
SE	106	81	106
Yorkshire & Humberside	100	72	115
Abroad	14	117	150
All Origins	100	100	100

*Defined arbitrarily as origins giving rise to more than 5 moves during the 1945-65 period.

Source: Computed from Table 7.4.

Table 7.7 shows for each time period and origin the number of moves to Scotland and NI as separate proportions of the total number of interregional moves. Four points emerge from this way of looking at the pattern of movement. First, in absolute terms Scotland was more attractive to migrants than NI. The exceptions to this generalisation were few in number and usually trifling in import. Overall, then, it could be argued that Scotland had more than twice Ulster's appeal as an industrial location. But on a per capita basis, Scotland was less attractive to migrants than Ulster. Whereas its total population was over three times as large as NI's, it attracted only 2.2 times as many industrial movers. Secondly, foreign firms had a much greater preference for a Scottish location than did British interregional migrants. Almost 30% of the factories emanating from abroad during the years, 1945-65, located in Scotland. No other economic planning region in the UK proved nearly so attractive to foreign manufacturers (see Table 7.8). The comparable percentage for the SE, the most important source of migrants to Scotland during the same period in absolute terms, was only 15.3.

Table 7.8: Distribution of Manufacturing Plants from Abroad by Economic Planning Region, 1945-65

Economic Planning Region	%
SCOTLAND	29.5
South-East	18.6
North-West	12.4
Wales	9.3
NORTHERN IRELAND	8.5
North	7.4
South-West	4.6
East Midlands	3.5
East Anglia	2.7
Yorkshire & Humberside	2.3
West Midlands	1.2
United Kingdom	100.0

Source: Computed from Howard (1968), Appendix B, p.40.

Thirdly, some origins were much more important sources of interregional moves than others, taking such moves as a proportion of total moves, intraregional and interregional. Table 7.9 is designed to highlight this point. It exhibits the interregional move/total move ratio for each UK economic planning region for one period only, 1945-65. The average ratio for all regions was 54.

Table 7.7: Industrial Moves to Scotland and NI by Origin as Proportions of the Total Number of Interregional Moves, of Various Time Periods Between 1945 and 1965

Origin: Economic Planning Region or Abroad	Period of Movement							
	1945-65		1945-51		1952-59		1960-65	
	Scot. %	NI %	Scot. %	NI %	Scot. %	NI %	Scot. %	NI %
Abroad	29.5	8.5	36.4	1.8	24.7	7.8	29.4	11.9
Wales	12.5	-	-	-	14.3	-	20.0	-
East Anglia	14.3	4.8	-	-	25.0	-	20.0	-
East Midlands	11.7	7.0	8.3	10.4	6.7	-	18.0	8.0
South-West	13.2	5.3	-	-	14.3	7.1	17.6	-
North-West	13.2	9.9	14.1	10.9	9.3	9.3	15.9	9.1
West Midlands	12.1	5.1	6.6	6.6	9.8	9.8	17.3	2.0
South-East	13.3	6.6	11.6	6.8	10.9	7.0	15.3	6.3
Northern	5.9	11.8	-	-	-	20.0	12.5	12.5
Yorkshire & Humberside	6.5	4.3	9.1	3.0	5.6	2.8	8.8	8.3
SCOTLAND	n/a	14.3	n/a	11.1	n/a	20.6	n/a	8.3
All Origins(including GB n.e.s.)	14.6	6.8	12.7	6.6	12.5	7.0	17.3	6.8

Source: Computed from Howard (1968), Appendices B-E, pp. 40-43

Table 7.9: Interregional Move/Total Move Ratios by Economic Planning Region, 1945-65

Economic Planning Region	Ratio
NI	100
Wales	100
East Anglia	84
East Midlands	81
North	77
Yorkshire & Humberside	65
South-West	62
West Midlands	61
North-West	61
South-East	47
SCOTLAND	37
UK	54

Source: Ibid.

ie., 54 out of every 100 moves went to a destination outside the region of origin. Intraregional locations attracted the remaining 46 moves. Almost by definition,[1] intraregional and interregional are synonyms for short-distance and long-distance respectively. Short distance moves stem primarily from new town and urban overspill policies. Long-distance moves on the other hand are closely associated with regional development and distribution of industry policies. Interestingly, despite the seemingly disparate nature of these two sets of policy influence, the volumes of industrial movement to which they gave rise were roughly in balance (46/54) for the UK as a whole. However, this phenomenon is seen to be a misleading coincidence when one examines the facts on a disaggregated basis as is done in Table 7.9. Out of the 11 regions making up the UK, only two, Scotland and the SE, were below-average generators of long-distance moves during the period, 1945-65. These were precisely the regions in which new town and urban overspill policies were most active. The other nine regions were above-average initiators of interregional moves. Patently, the table does not support the hypothesis suggested *prima facie* by the aggregate data that a conscious attempt was made during the postwar period to balance the number of short and long-distance moves originating within each region. That is to say, the 46/54 ratio was entirely a chance phenomenon.

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[1] But not quite - see Howard, *op.cit.*, para. 17.

The fourth point to be noted about Table 7.7 is that it reveals some unexpected temporal patterns. To give just one example, it was observed previously that 'abroad' took over from the SE the distinction of being the most important single source of new industry for Scotland during most of the 1950s. Yet Table 7.7 shows that the proportion of moves from the SE to Scotland declined very little (0.7 points) between 1945-51 and 1952-59 compared to the drop of 11.7 points in the proportion from 'abroad'. This finding could be interpreted as suggesting that distribution of industry policy is applied with greater rigour to firms from abroad than to domestic manufacturers. When the policy is relaxed, as it was during much of the 1952-59 period, foreigners, according to this hypothesis, should benefit more than nationals. In other words, the figures expressing moves from abroad to the self-evidently less desirable UK locations, the development areas, as a proportion of total moves from abroad for 1945-51 and 1952-59 should display a greater disparity than the corresponding figures on interregional moves by SE firms. Contrarily, when the stringency with which policy is applied is increased, as it was between 1952-59 and 1960-65, foreigners should be affected more than nationals. Howard's data were used as a crude test of this hypothesis. Table 7.10 presents the test results. Under assumption A, the DAs are defined as including in their entirety the following economic planning regions: Scotland, Wales, NI and the North. This definition is broadened under assumption B to include the NW and the SW. Both assumptions, but especially B, overstate the size of the DAs. However, this problem was unavoidable given Howard's method of data presentation. Notwithstanding, it is unlikely that the overstatement has greatly affected the main conclusions arising out of the table. The data give some support to our general hypothesis. As predicted, increased stringency in the application of distribution of industry policy between 1952-59 and 1960-65 had a greater impact on firms from abroad than on domestic companies under both assumptions. On the other hand, the data did not behave as predicted when policy was relaxed between 1945-51 and 1952-59. Hence, the hypothesis must be judged not proven.

Table 7.10: A Test of the Hypothesis that Distribution of Industry Policy Is Applied with Greater Rigour to Firms from Abroad than to British Manufacturers

		Date of Movement		
		1945-51	1952-59	1960-65
Moves from Abroad to the DAs as a % of Total Moves from Abroad	A	63.6	49.4	54.0
	B	80.0	66.2	71.4
Indices: % for 1952-59 = 100	A	129	100	109
	B	121	100	108
Moves to the DAs by SE Firms as a % of Total Interregional Moves by SE Firms	A	67.3	38.0	59.2
	B	85.7	66.2	69.0
Indices: % for 1952-59 = 100	A	177	100	103
	B	126	100	101

Source: Computed from Howard (1968), Appendices C-E, pp. 41-43.

Statistics on the number and origins of industrial migrants to Scotland and NI during the years, 1945-69, extant at the end of the period have recently become available.[1] They appear to be reasonably comparable with Howard's data although some discrepancies exist, especially in the case of NI as explained in Appendix B. However, ignoring these difficulties for the moment it is interesting to compare Howard's material with the more up-to-date information as we have done in Tables 7.11 and 7.12.

Table 7.11: No. of Postwar Industrial Migrants to Scotland Extant in 1965 and 1969 by Origin & Period of Movement

	Period of Movement							
	1945-51 Extant in		1952-59 Extant in		1960-65 Extant in		1945-65 Extant in	
Origin	1965	1969	1965	1969	1965	1969	1965	1969
England & Wales	57	53	31	29	95	80	183	162
Abroad	20	19	19	18	37	36	76	73
Totals	77	72	50	47	132	116	259	235

Sources: Howard (1968), pp.40-43; App. A.

[1] See Appendices A & B.

Table 7.12: No. of Postwar Industrial Migrants to NI Extant in 1965 and 1969 by Origin & Period of Movement

	Period of Movement							
	1945-51		1952-59		1960-65		1945-65	
	Extant in		Extant in		Extant in		Extant in	
Origin	1965	1969	1965	1969	1965	1969	1965	1969
Great Britain	39	37	22	29	37	40	98	106
Abroad	1	1*	6	6	15	18	22	25
Totals	40	38	28	35	52	58	120	131

*Excluding 8 firms established by W.W.II refugees between 1945 and 1949, which Howard obviously excluded from his record. This revelation came too late for mention in App. B. Sources: Howard (1968); App. B.

Table 7.12 establishes conclusively that Howard's data and Appendix B are too dissimilar to be analysed on a comparable basis; a substantial number of firms listed in the latter obviously cannot be genuine migrants in terms of Howard's criteria since the total number of movers during the 1945-65 period extant in 1969 was considerably higher than in 1965! This finding not only contravenes expectations, it is an impossibility assuming that like is being compared with like. Unfortunately, it came too late for changes to be made in the Appendix. Indeed, short of access to the confidential Mintech register, any programme of revision could prove to be extremely lengthy. These points should be borne in mind when interpreting subsequent analyses based either in whole or in part on Appendix B's contents. We are not condemning the Appendix out of hand - far from it. What is being asserted is simply that more research is required before reasonable comparability can be claimed between our record set and that utilised by Howard.

In contrast, Appendix A and Howard's material are eminently comparable as illustrated by Table 7.11 and Fig. 7.2. Clearly revealed is the effect of time on the stock of migrants. Twenty-four firms, i.e., over 9% of the number extant in 1965, disappeared during the ensuing four years (for a partial list, see Appendix A). Particularly affected were the British migrants which suggests that foreign firms might look more carefully before leaping as it were, or alternatively that they might not be expecting such a quick return on their investment as British companies. It will also be noted from the British data in the table that migrants, like infants, suffer from an unusually high mortality rate during the early part of their lives.

after which their prospects of longevity improve considerably.

As indicated by Figs. 7.2 and 7.3, the volume of migration to Scotland during the four years following 1965 was little short of astounding when contrasted with the pre-1966 experience, even allowing for the fact that the older moves were subject to a longer period of attrition. Over 35% of all movers extant at the end of 1969 had begun operations since the termination of Howard's migrant register four years earlier; Howard's register, of course, covered a 21-year period. Corresponding figures for British and foreign movers were 36.3% and 31.8% respectively suggesting that the regional policy innovations by the Labour Government, beginning in 1964, were considerably more persuasive with British manufacturers than with overseas firms. The total volume of migration tapered off in 1969. There is little cause to doubt that it continued to do so in 1970 and 1971 in light of the recession which overtook Britain during these years.

Fig. 7.3 also related to NI. The two sections are analogous but not strictly comparable for reasons already mentioned. Furthermore, the 1969 date for NI are national since the official record set available to us terminated at mid-year. Despite these caveats, it can easily be shown that the NI experience following 1965 was the reverse of the Scottish one. First, only 29.6% of the migrants to NI in operation at the end of the decade had commenced production during the previous four years; the relevant Scottish figure, as suggested above, was 35.1%. The spread between these two percentages, of course, would have been larger had they been more similar in makeup. Secondly, foreign migrants were much more prominent during the 1966-69 period in NI than in Scotland; the opposite was true of British migrants. Whereas 37.7% of Ulster's foreign migrants extant in 1969 were post-1965, only 25.9% of the domestic movers fell into this category.

As a final point, it is worth testing briefly the conventional wisdom concerning the origins of foreign migrants to Scotland and NI. In the former case, foreign migration, at least until very recently with the advent of Michelin and Mullard, has been virtually synonymous

Fig. 7.2 Postwar Industrial Migrants to Scotland Extant in 1965 and 1969 Respectively by Period of Movement.

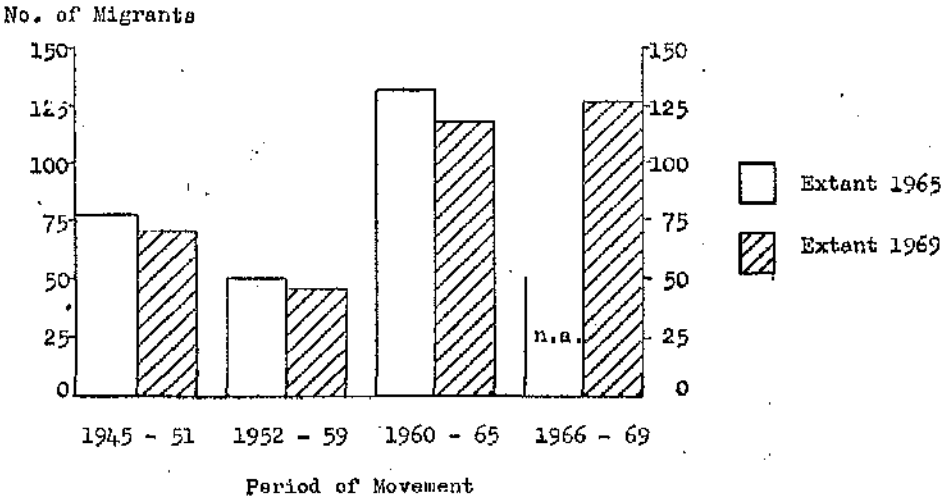
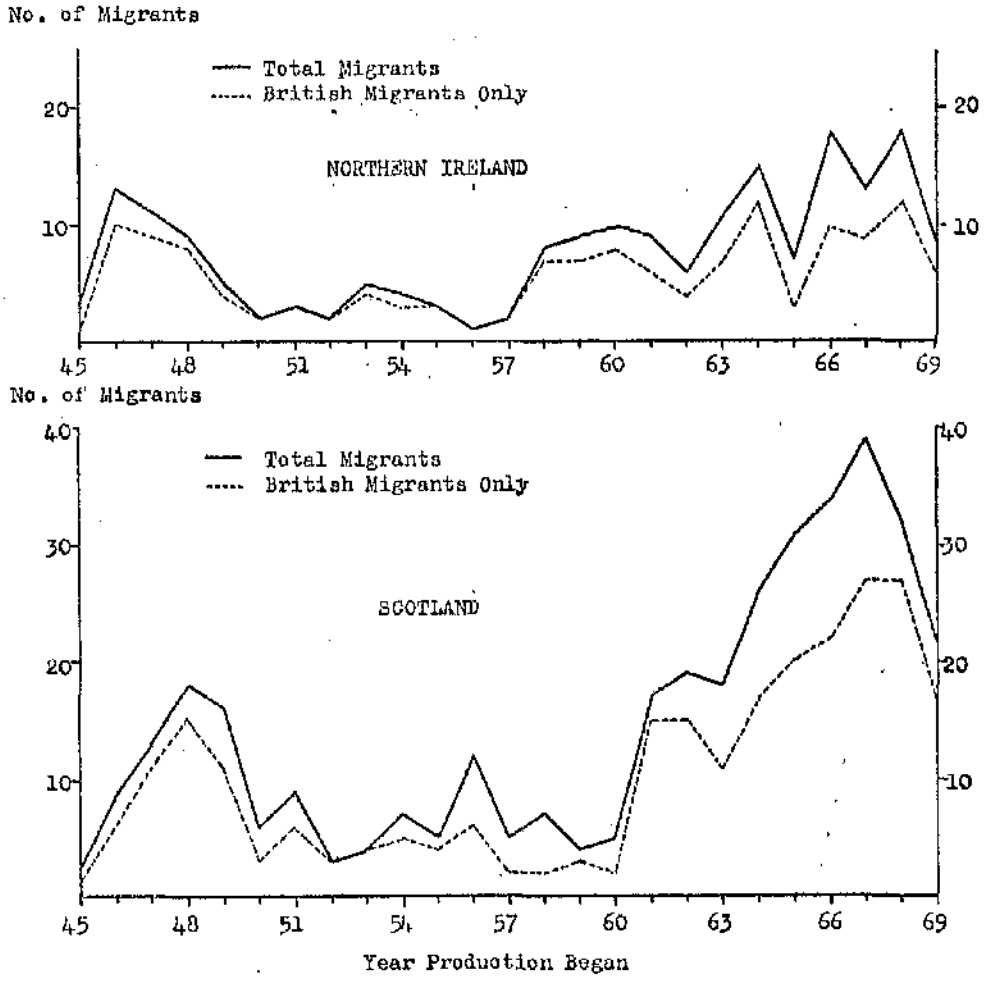


Fig. 7.3 Postwar Industrial Migrants to Scotland & NI Extant in 1969 by Origin & Year Production Began.



Sources: Fig. 7.2 - Howard (1968), pp.41-43; Appendix A
Fig. 7.3 - Apps. A & B (1969 NI data are estimates)

in the public mind with the inflow of American firms. In Ulster, foreign migration has been associated traditionally with both the US and the Continent. Table 7.13 portrays the facts. It suggests that the conventional view, while broadly in accordance with reality, requires some reshaping in the direction first of de-emphasising slightly the American role in Scotland, and second, playing up somewhat the US contribution to Ulster's economy relative to that made by Continental firms, especially since eight out of the 10 European companies depicted in the table were established by W.W.II refugees, and do not conform to the current image of the typical foreign migrant.

Table 7.13: Foreign Movement Existing, Scotland & NI, 1945-69

Origin	Scotland No.	Scotland %	NI No.	NI %
US	85	79.4	32	61.5
Europe	15	14.0	18	34.6
Canada	6	5.6	1	1.9
India	1	0.9	-	-
South Africa	-	-	1	1.9
Totals	107	100.0	52	100.0

Scotland's Relative Attractiveness to Industrial Migrants

So far we have been concerned largely with the origins of industrial migration to Scotland and NI, ignoring, with the exception of Table 7.8, the regions' attractiveness to long-distance movers relative to other regions in the UK. Relative attractiveness is not an easy concept to express in a single measure given the extensive range of variables which might properly be considered as apropos. The best solution to this problem was devised by Professor P. Sargant Florence in 1929 when he first advanced his location factor or quotient concept and a concomitant measure, the coefficient of localisation.[1]

A location quotient indicates the extent to which an industry is concentrated or localised in a specific region. It is calculated by dividing the percentage of workers in industry A in region X, taking the total number of workers in industry A as 100%, by the percentage

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[1] P. Sargant Florence, "Economic Research and Industrial Policy", Economic Journal, XLVII (December 1937), 622. These techniques have since been widely used. Extensive early applications: Political and Economic Planning, Report on the Location of Industry: A Survey of Present Trends in Great Britain Affecting Industrial Location and Regional Economic Development, with Proposals for Future Policy (London: PEP, 1939), Ch. II and Appendices I & II; Florence, "The Selection of Industries Suitable for Dispersion into Rural Areas," Journal of the Royal Statistical Society, CVII (Part IV, 1944), 93-107.

of workers in industries (A.....n) in region X taking the total number of workers in industries (A.....n) as 100%. A result of <1.0 suggests a lack of concentration, ie., there are fewer employees in the industry in a given region than one would expect on the basis of the region's share of total national employment. The reverse holds for a location quotient >1.0.

A coefficient of localisation measures the extent to which an entire industry is localised.[1] Polar coefficients would be 0 and 1.0 with the former indicating a pattern of dispersion in exact conformity with the geographical distribution of the working population and the latter a total lack of dispersion. Of course, the vast majority of industries would fall somewhere in between. Florence has suggested the following guidelines for the interpretation of particular coefficients:[2]

<0.21	'residentiary' or tied to distribution of population
0.21-0.46	footloose
>0.46	'clustered' or dependent on external economies.

Notwithstanding, considerable care must be exercised in interpreting actual results because the size of a coefficient is a function not only of the extent to which the industry concerned is localised but of the degree of geographical disaggregation in the underlying data.[3]

Table 7.14 shows how Florence's techniques can be adapted for the purpose of measuring Scotland's relative appeal to long-distance industrial migrants.[4] The direct employment benefit to Scotland by

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[1] The method of calculation is rather complicated. It is illustrated in Florence, assisted by W. Baldamus, Investment, Location and Size of Plant: A Realistic Inquiry into the Structure of British and American Industries, NIESR, Economic and Social Study No. VII (Cambridge: Cambridge University Press, 1948), Table IVA, p.36.

[2] Florence (1944).

[3] See the discussion by M.G. Kendall on Florence's 1944 article, op.cit., 110-11; Florence (1948), p.35. Florence's guidelines are based on the published data available for British regions in 1944.

[4] The idea for the table was suggested by a similar sort of exercise in John H. Dunning, American Investment in British Manufacturing Industry (London: George Allen & Unwin Ltd., 1958), pp. 84-85. Unfortunately, a datum for NI comparable to col. 4 is not readily available since monthly employment and unemployment data relating to Ulster are not published in the Employment and Productivity Gazette. The reasons for this frustrating and needless situation have not been uncovered.

the end of 1966 from long-distance migration during the period, 1945-65, was 94,700 jobs or 16.5% of all direct employment in the UK resulting from interregional movement. Comparable figures for NI were 39,300 and 6.9%. The direct benefit to Scotland was equal to 17.7% of the employment created directly in GB by interregional migration. The region's share of total employment in GB however was only 9.2%. Thus, its 'concentration quotient' was 1.92. It can be seen from column 5 that Scotland did less well than Wales and the Northern region in the competitive struggle for new industry. Nonetheless, it did considerably better than could have been expected on the basis of its total employment share thus indicating the efficacy of post-war regional policy measures. The 'coefficient of concentration' for all long-distance moves was 0.41, a relatively high figure but not unusually so given the pressures on industry during the period to locate in specified areas.

Table 7.14: Concentration Quotients by Economic Planning Region, and the Coefficient of Concentration for All Inter-regional Industrial Migrants During the Period 1945-65.

	(1)	(2)	(3)	(4)	(5)	(6)
Economic Planning Region	No. of Moves To Region	Direct Employment Benefit '000	Direct Employment Benefit %	Total Employment in Region %	Concentration Quotient (3)÷(4)	Deviations (3)-(4)
Wales	285	93.7	17.5	4.2	4.17	+ 13.3
North	220	89.6	16.8	5.6	3.00	+ 11.2
SCOTLAND	259	94.7	17.7	9.2	1.92	+ 8.5
North-West	215	104.8	19.6	12.9	1.52	+ 6.7
South-West	164	36.9	6.9	5.6	1.23	+ 1.3
East Anglia	127	16.7	3.1	2.7	1.15	+ 0.4
East Midlands	106	26.9	5.0	6.2	0.81	- 1.2
Yorkshire & Humberside	112	31.3	5.9	9.0	0.66	- 3.1
South-East	104	31.6	5.9	34.6	0.17	- 28.7
West Midlands	58	8.7	1.6	10.0	0.16	- 8.4
Great Britain	1650	534.9	100.0	100.0		± 41.4

Note: Howard's employment data refer generally to November 1966. The percentages in col. 4 relate to December 1966.

Sources: Basic data taken from Howard, op.cit., Appendix B, p.40 and Employment and Productivity Gazette, LXXVII (January 1969), Table 102, p.67.

It is interesting to compare Scotland's attractiveness to migrants from abroad with its appeal to interregional movers originating within Great Britain using the concentration quotient technique. This exercise is attempted in Tables 7.15 and 7.16. The results for Scotland are in sharp contrast with those indicated by Table 7.14. Several points are particularly noteworthy. First, the region received almost one-half of all jobs originating abroad. The relevant concentration quotient (Table 7.15) was a striking 5.05. Only one other region - Wales - had a concentration quotient >1.0 for foreign industry and it was a great deal smaller than the Scottish figure. Second, domestic interregional migrants were much less attracted to Scotland than firms from outside the UK. The relevant concentration quotient (Table 7.16 was still >1.0 (1.21) but this time it ranked 6th rather than 1st in the regional league table. Third, foreign firms created almost as many new jobs in Scotland as domestic companies although their number was far smaller.

Table 7.15: Concentration Quotients by Economic Planning Region, and the Coefficient of Concentration for Industrial Migrants from Abroad During the Period, 1945-65

	(1)	(2)	(3)	(4)	(5)	(6)
Economic Planning Region	No. of Moves from Abroad Going to	Direct Employment Benefit '000	Direct Employment Benefit %	Total Employment in Region %	Concentration Quotient (3)-(4)	Deviations (3)-(4)
SCOTLAND	76	46.2	46.5	9.2	5.05	+ 37.3
Wales	24	9.0	9.1	4.2	2.17	+ 4.9
North	19	5.2	5.2	5.6	0.93	- 0.4
East Midlands	9	4.7	4.7	6.2	0.76	- 1.5
North-West	32	9.5	9.6	12.9	0.74	- 3.3
South-West	12	3.3	3.3	5.6	0.59	- 2.3
South-East	48	16.9	17.0	34.6	0.49	- 17.6
East Anglia	7	1.3	1.3	2.7	0.48	- 1.4
Yorkshire & Humberside	6	2.9	2.9	9.0	0.32	- 6.1
West Midlands	3	.4	0.4	10.0	0.04	- 9.6
Great Britain	236	99.4	100.0	100.0		± 42.2

Sources: See Table 7.14.

The domestic/foreign job creation and migrant ratios were 1.05/1 and 2.41/1 respectively. That is to say, foreign firms in Scotland had more than twice as many employees on average as their domestic counterparts.

Fourth, despite the enormous variations in the concentration quotients for several of the regions in Tables 7.14-7.16, the three coefficients of concentration are almost exactly the same indicating that foreign firms on the whole were concentrated neither more nor less than domestic interregional migrants. Finally, the coefficient of rank correlation between the concentration quotients in Tables 7.15 and 7.16 was rather low at 0.612; r^2 was only 0.3748. In other words, less than 2/5ths of the variance in the concentration quotients for industrial migrants from abroad was accounted for by the corresponding variance in the concentration quotients for British interregional migrants. This finding suggests a certain dissimilarity in the location factors taken into account by the two groups of firms. More will be said on this point in a subsequent section.

Impact of Interregional Migrants on Employment in Scotland[1]

Employment impact refers to the job-creating effects of industrial mobility. These effects can be divided into two components: direct and indirect. The direct effects relate to actual employment in migrant plants. Indirect effects arise out of the operation of the regional employment multiplier. In practice these two types of effect overlap although they are conceptually distinct. Thus, while it is likely that some of the jobs in migrant plants at any point in time owe their existence solely to the local multiplier, they are usually considered to be part of the direct rather than the indirect employment impact for two reasons. First, the number of jobs involved is probably small. Second, it is extremely difficult to actually calculate the value of the multiplier in specific circumstances.

The direct employment benefit to Scotland at the end of 1966 from interregional migration during the period, 1945-65, was 94,700 jobs, a sum equal to 4.5% of total Scottish employment (2,124,000) in December 1966. To this figure should be added the effects of the regional employment multiplier which, following Needleman, Scott,

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[1] For an analogous discussion on NI, see the province's Development Programme, 1970-75 (1970). Interregional industrial migration has prevented total manufacturing employment in Ulster from diminishing.

Table 7.16: Concentration Quotients by Economic Planning Region, and the Coefficient of Concentration for British Interregional Migrants During the Period, 1945-65

Economic Planning Region	(1) No. of Moves from GB Origins Going to	(2) Direct Employment Benefit '000	(3) %	(4) Total Employment in Region %	(5) Concentration Quotient (3)÷(4)	(6) Deviations (3)-(4)
Wales	261	84.7	19.5	4.2	4.64	+ 15.3
North	201	84.4	19.4	5.6	3.46	+ 13.8
North-West	183	95.3	21.9	12.9	1.70	+ 9.0
South-West	152	33.6	7.7	5.6	1.38	+ 2.1
East Anglia	120	15.4	3.5	2.7	1.30	+ 0.8
SCOTLAND	183	48.5	11.1	9.2	1.21	+ 1.9
East Midlands	97	22.2	5.1	6.2	0.82	- 1.1
Yorkshire & Humberside	106	28.4	6.5	9.0	0.72	- 2.5
West Midlands	55	8.3	1.9	10.0	0.19	- 8.1
South-East	56	14.7	3.4	34.6	0.10	- 31.2
Great Britain	1414	435.5	100.0	100.0		±42.9

Sources: See Table 7.14.

Cameron and Clark, we assume to be 1⅓.[1] The resulting estimate of total direct and indirect job creation by interregional migrants - 94,700 x 1⅓ or 126,300 - is equivalent to 5.9% of aggregate employment in Scotland at the end of 1966. Even this new total, however, does not tell the whole story. The Board of Trade suggests that it takes at least three years for most new plants to become fully manned.[2] That is to say, typically the labour force in a new establishment is built up gradually; recruitment and other difficulties make it very unusual for a complete staff to be on hand the day a plant opens. It follows that most migrant factories locating in Scotland during 1964 and 1965 would not have been fully staffed at the date chosen by Howard for his employment survey, and that the measures of employment impact given above are in fact under-estimates.

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[1] See L. Needleman & B. Scott, "Regional Problems and Location of Industry Policy in Britain," Urban Studies, I (November 1964), 165; Cameron and Clark, op.cit. pp. 48, 58-60. Steele calculated that the regional income multiplier for Scotland in 1964 was either 1.89 or 1.70 depending on the import assumption used. Multiplying 94,700 by 1.89 gives a result of 178,983 which is equal to 8.4% of total Scottish employment in December 1966. However neither of Steele's Scottish multiplier alternatives inspires a great deal of confidence and thus we have not used them in the text. Cf. D.B. Steele, "Regional Multipliers in Great Britain", Oxford Economic Papers, N.S., XXI (July 1969), 268-92.

[2] See, e.g., GB, BOT, Local Employment Acts: Eighth Annual Report H.C. 370 (1967-68), para. 31.

Indeed, Howard goes much further than the BOT and suggests that the maturation period for moves can be as much as 11 years.[1] He advances the following set of relationships between degree of immaturity and employment growth:

Age of Move	Increase in Employment
Between 6 months & 18 months	60%
" 1.5 yrs. & 2.5 yrs.	20%
" 2.5 " & 3.5 "	10%
" 3.5 " & 4.5 "	10%
" 4.5 " & 11 "	1/0th

These relationships are used to derive what he calls "rough" estimates for the UK of: a) total employment when all moves during the 1945-65 period have matured; b) average employment at maturity per year. The exercise is hedged round with a number of qualifications including the explicit caveat that it would be "unsafe" to apply the technique to individual regions. Nonetheless, because of the importance of the question of impact, we have gone ahead as shown by Table 7.17 to produce for Scotland estimates of the type produced by Howard for the entire kingdom. The two groups of figures are not comparable given the relative but inevitable crudity of our methodology which is based on published aggregates rather than individual cases and which relates to interregional moves only, not to total moves. Still, the magnitudes in the table give some indication of the extent to which the amount of direct employment creation from interregional migration as of 1966 falls short of ultimate employment potential. They also reveal some interesting temporal disparities in the employment impact of moves Particularly striking in this connection is the low employment pay-off of moves during much of the 1950s relative to those before and after.

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[1] Howard, op.cit., para. 61; see also paras. 59, 60 and 62-65 and Table 6, p.22.

Table 7.17: Estimates of Direct Employment Potential of Interregional Moves to Scotland During the Years, 1945-65

Moves During	Actual Employment November 1966	Estimated Employment at Maturity	Estimated Average Annual Employment at Maturity
1945-51	44,300	44,300	6,300
1952-59	18,400	18,800	2,350
1960-65	31,900	39,300	6,550
1945-65	94,700*	102,400	4,900

*Column adds only to 94,600 because of rounding.

What is the significance of the finding in Table 7.17 that the direct employment benefit to Scotland from interregional migration between 1945 and 1965 was roughly 4,900 new manufacturing jobs a year? Cameron and Clark have suggested that an annual net increase of 5-10,000 in manufacturing employment is necessary to reduce the rate of unemployment and increase activity rates in Scotland (presumably to national levels although this assumption is not stated explicitly) and to reduce net out-migration "to some more politically acceptable figure."[1] The figure of 4,900 however is gross and thus not directly comparable. To reduce it to net terms, one would require a consistent series of data on manufacturing employment in Scotland over the entire 1945-65 period. Unfortunately, such a series is not available.[2] Howard presents Ministry of Labour estimates of manufacturing employment in 1953 and June 1966 for each British region.[3] The figures for Scotland show that manufacturing employment actually declined by 1,000 over this period; in the absence of interregional migration the decline would have been 51,000. It thus appears that the net change in the size of the Scottish manufacturing sector since World War II may have been either zero or negative. At best, it is unlikely to have been more than marginally positive. About 1/8th of total manufacturing employment in Scotland at the end of 1966 was directly attributable to postwar interregional mobility. It could be argued on the basis of this proportion that industrial movement has been of considerable importance

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[1] Cameron and Clark (1966), p.66.

[2] Cf. Ely Devons, An Introduction to British Economic Statistics (Cambridge: Cambridge University Press, 1958), pp. 11, 64-65.

[3] Howard (1968), Table 2, p.11.

to the Scottish economy. On the other hand, it is clear that the volume of movement up to December 1965 had not generated anything like the number of jobs necessary to meet the modest objectives put forward by Cameron and Clark. One must conclude with them that "mobility policy has acted as a holding operation".[1]

Unemployment in Scotland & Interregional Industrial Mobility[2]

Perhaps the most important aim of location of industry policy in postwar Britain has been to remove regional disparities in the incidence of unemployment. One measure of the effectiveness of this policy is the extent to which the new job opportunities resulting from interregional movement have been concentrated in the areas of greatest relative need, ie., in those areas with above-average unemployment. Table 7.18 divides the economic regions of GB[3] into two groups: 1) the main problem regions, viz., Scotland, Wales, the North and the NW; 2) other. As one would perhaps expect, the concentration quotients for the regions in the first group all exceed 1.00 indicating that policy has been effective.[4] Yet such a straightforward conclusion would be misleading. The Scottish figure was barely in excess of 1.00. Moreover, it was less than the values for two of the "non-problem" regions - the East Midlands and the SW. In other words, government measures to reduce unemployment were not as concentrated as they might have been. More specifically, in terms of relative need as measured by the incidence of unemployment, Scotland benefitted less from location of industry policy between

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[1] Cameron and Clark, op.cit., p.68.

[2] For an analogous discussion on NI, see the province's Development Programme, 1970-75 (1970). There is little doubt that Ulster's unemployment problem would have been far worse in the absence of interregional industrial mobility.

[3] NI has not been included due to the lack of readily available data on the wholly unemployed comparable to those in the Employment and Productivity Gazette for GB.

[4] Cf. Cameron and Clark, op.cit., Table 4.8, p.61. Their implicit concentration quotients, using 1956-63 data, were >1.0 for the NW and Wales but <1.0 for Scotland and the North.

1945 and 1965, than the other important problem regions in GB. At the same time, government policy would appear to have helped staunch any deterioration in its relative position.[1]

Table 7.18: Direct Job Creation by Postwar (1945-65) Interregional Industrial Migrants Relative to Unemployment by Economic Planning Region, 1966

Economic Planning Region	(1) Average Annual Unemployment 1965-67* '000	(1) %	(2) Direct Job Creation by Interregional Migrants %	(3) Concentration Quotient (2) ÷ (1)	(4) Deviations (2) - (1)
I Main Problem Regions					
Wales	31.2	8.0	17.5	2.19	+ 9.5
North	39.6	10.2	16.8	1.65	+ 6.6
North-West	53.4	13.7	19.6	1.43	+ 5.9
SCOTLAND	68.0	17.5	17.7	1.01	+ 0.2
II Other					
East Midlands	16.8	4.3	5.0	1.16	+ 0.7
South-West	25.8	6.6	6.9	1.05	+ 0.3
Yorkshire & Humberside	20.5	7.3	5.9	0.81	- 1.4
SE & E. Anglia	100.1	25.7	9.0	0.35	-16.7
West Midlands	26.2	6.7	1.6	0.24	- 5.1
Great Britain	389.6	100.0	100.0		±23.2**

*Data relate to the wholly unemployed. A 3-year average centred on 1966 was chosen to avoid the possible distortion involved in using a single year's figures. Separate unemployment figures were unavailable for East Anglia and the South-East.

**Coefficient of concentration = 0.23.

Sources: Table 7.14; Employment and Productivity Gazette (January 1969), Tables 104 and 107-16, pp. 70 and 73-82.

Average Employment Per Interregional Move

Each postwar interregional move to Scotland had created an average of 366 direct jobs by the end of 1966. The comparable

[1] For a much more extensive discussion of changes in regional disparities during the postwar period, see McCrone (1969), Ch. VI. On the unemployment issue, McCrone was unable to discern any trend for Scotland; the disparity in unemployment rates between the region and the UK average remained much the same throughout the period.

NI figure was some 10% less at 332. As shown by Table 7.19, the Scottish and NI figures were 113% and 102% respectively of the British average and higher than the corresponding figure for Wales but considerably less than the averages for the Northern and NW regions. Interestingly, the figures for all five of these problem regions were above-average in size while the equivalent numbers for the six 'non-problem' regions were uniformly below-average.[1] This suggests that the BOT was generally successful in its attempts, motivated by distribution of industry policy, to steer major new employment generators such as the motor vehicle assembly plants opened during the early 1960s to labour surplus areas.

Table 7.19: Average Employment at the End of 1966 per Interregional Industrial Move During the Period, 1945-65, by Economic Planning Region

Economic Planning Region	Average Employment per Move to	Index UK Average = 100
North-West	487	150
North	407	125
SCOTLAND	366	113
NORTHERN IRELAND	332	102
Wales	329	101
South-East	304	94
Yorkshire & Humberside	279	86
East Midlands	254	78
South-West	225	69
West Midlands	150	46
East Anglia	131	40
UK	325	100

Source: Computed from data in Howard (1968), p.40. Howard's interregional move total should read 1,770, not 1,779.

Moves from abroad to Scotland and NI were much more important sources of new jobs than equivalent moves from British origins during the postwar period analyzed by Howard although the reverse was true in Scotland between 1960 and 1965 as indicated in Table 7.20. But in general origin would appear to have been a key determinant of employment potential. The period of movement, on the

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[1] Cf. Cameron and Clark (1966), Table 4.9, p.62. Their average employment per move data in rank order were as follows: NW (1113), Wales (385), Scotland (344), Great Britain (337), etc.

other hand, was a significant determinant of average employment per move only in the case of moves from abroad to Scotland. Otherwise, the relationship between these two variables was ambiguous. Two possibilities suggest themselves in explanation of the first finding. It could be that the foreign and British migrants were concentrated in different industries with contrasting potentials for growth. We shed some light on this subject below. Alternatively, or perhaps in addition, the foreign and British migrants may have pursued divergent corporate strategies with the former granting their offspring more extensive responsibilities than the latter in terms of product range and/or markets thereby enhancing their growth prospects.

Table 7.20: Average Employment at the End of 1966 For Industrial Move to Scotland & NI Between 1945 & 1965 by Origin and Period of Movement

	Average Employment Per Move							
	1945-51		1952-59		1960-65		1945-65	
Origin	Scot.	NI	Scot.	NI	Scot.	NI	Scot.	NI
Abroad	1470	1100	553	267	170	420	608	409
Great Britain*	261	336	255	250	269	332	265	314
All Origins	575	555	368	254	242	358	366	332

*It will be recalled that NI generated no moves.

Source: Computed from data in Howard, op.cit., pp.40-43.

Table 7.21 reveals interesting differences in the average amount of employment per move to Scotland and NI from the various British origins. Surprisingly, the largest generators of employment in the Scottish case came not from the SE or the West Midlands but from the SW. Contrarily, but more in line with expectations, NI's most rewarding moves in employment terms originated in the West Midlands. Also noteworthy is the wide range in the averages relating to Scotland from a low of 78 (Yorkshire & Humberside) to a high of 460; the latter figure is six times the former one!

Table 7.21: Average Employment at the End of 1966 For Industrial Move to Scotland & NI from Other British Regions During the Period, 1945-65, by Origin

Origin	Average Employment per Move	
	Scotland	NI
South-West	460	n/a
West Midlands	335	518
East Anglia	267	n/a
Great Britain	265	314
South-East	253	352
North-West	230	167
East Midlands	187	144
Yorkshire & Humberside	70	367
SCOTLAND	n/a	175

Source: Computed from data in Howard, op.cit., p.40.

Notes: Scottish data not available for the Welsh or Northern regions while NI not applicable. NI data not available for E. Anglia or the SW while Wales not applicable.

Migrants to Scotland & NI by SIC Order & MLH

In the following three chapters, we develop detailed information on the importance of transport and communication costs for each industry in the UK, Scotland and NI. As a prelude to these exercises, it is interesting to note the extent to which postwar migrants to Scotland and NI are concentrated in specific industries and industry groupings. The relevant estimates are presented in Tables 7.24 and 7.25 based upon Appendices A and B. Before examining those tables we comment briefly on some cognate unpublished material from the Howard study made available by Mintech.

A request was submitted to Mintech for information on the interregional migrants to Scotland and NI comparable to that in Appendix I of Howard (1968). This appendix shows the volume of postwar industrial movement to Britain's peripheral regions by SIC Order and period of move but in aggregate terms, ie., the peripheral regions are lumped together. In addition to the details published in the appendix, we sought a breakdown of the migrants to Scotland and NI by MLH. We received the data underlying Tables 7.22 and 7.23. MLH statistics were not made available because of Mintech reservations concerning their reliability. In the case of Scotland, intraregional and interregional cases were aggregated as in Howard's Appendix I. Thus, Table 7.22 is not strictly comparable to Table 7.1, for example, inasmuch as it relates to 307 rather than 259 moves. While this discrepancy should not seriously distort the

percentage distributions in the table, it should nonetheless be borne in mind when contemplating them. In the case of NI, of course, there were no intraregional migrants and Table 7.23 is fully comparable with Table 7.4 and its offshoots.

Table 7.22: Postwar Industrial Moves to Scottish Destinations by SIC Order & Period of Movement

1958 SIC Order		Period of Movement			
		1945-65 %	1945-51 %	1952-59 %	1960-65 %
III	Food, drink & tobacco	9.4	9.7	12.5	8.0
IV	Chemical & allied industries	5.5	5.4	7.8	4.7
V	Metal manufacture	3.6	4.3	1.6	4.0
VI	Engineering & electrical goods	31.9	36.6	35.9	27.3
VII	Shipbuilding & marine engineering	-	-	-	-
VIII	Vehicles	4.2	1.1	-	8.0
IX	Metal goods n.e.s.	6.8	9.7	3.1	6.7
X	Textiles	8.1	15.1	3.1	6.0
XI	Leather, leather goods & fur	0.3	1.1	-	-
XII	Clothing & footwear	13.4	6.4	9.4	19.3
XIII	Bricks, pottery, glass, cement, etc.	5.5	2.2	9.4	6.0
XIV	Timber, furniture, etc.	2.6	1.1	4.7	2.7
XV	Paper, printing & publishing	3.9	4.3	7.8	2.0
XVI	Other manufacturing industries	4.6	3.2	4.7	5.3
	Totals	100.0	100.0	100.0	100.0
	(No. of moves)	(307)	(93)	(64)	(150)

Source: Unpublished Mintech data.

Table 7.23: Postwar Industrial Moves to NI by SIC Order & Period of Movement

1958 SIC Order		Period of Movement			
		1945-65 %	1945-51 %	1952-59 %	1960-65 %
III	Food, drink & tobacco	10.8	17.5	7.1	7.7
IV	Chemical & allied industries	3.3	-	3.6	5.8
V	Metal manufacture	-	-	-	-
VI	Engineering & electrical goods	31.7	20.0	46.4	32.7
VII	Shipbuilding & marine engineering	-	-	-	-
VIII	Vehicles	2.5	-	3.6	3.8
IX	Metal goods n.e.s.	6.7	7.5	3.6	7.7
X	Textiles	23.3	22.5	25.0	23.1
XI	Leather, leather goods & fur	1.7	2.5	-	1.9
XII	Clothing & footwear	6.7	10.0	3.6	5.8
XIII	Bricks, pottery, glass, cement, etc.	2.5	2.5	3.6	1.9
XIV	Timber, furniture, etc.	1.7	5.0	-	-
XV	Paper, printing & publishing	2.5	5.0	-	1.9
XVI	Other manufacturing industries	6.7	7.5	3.6	7.7
	Totals	100.0	100.0	100.0	100.0
	(No. of moves)	(120)	(40)	(28)	(52)

Source: Unpublished Mintech data.

Six points stand out from the tables. 1) the way in which the migrant flows to both regions were dominated by engineering and electrical goods industries, 2) the attraction of Scotland for firms in the clothing and footwear group, especially during 1960-65, 3) the attraction of NI for textile firms, 4) the influx of companies in the vehicles group to Scotland between 1960 and 1965, 5) the importance of the food group to NI during the early postwar years, and 6) the pronounced temporal shifts in the relative significance of many of the Orders, frequently because of the small numbers involved, but not always. We turn now to Tables 7.24 and 7.25 which, for reasons developed earlier, suffer from varying degrees of incomparability with their immediate predecessors.

Table 7.24 shows the numerical and percentage distributions of postwar migrants to Scotland and NI by Order. The MLH breakdowns are presented separately in Table 7.25 to enhance both their impact and the impact of the Order information. Reasonable comparability can be safely assumed between the percentage figures for the two regions but, as explained previously, the numerical figures are not entirely comparable. They are included in the tables mainly for reference purposes so as to lend perspective to the percentages.

From Table 7.24, it can be seen that by far the most important sources of migrants to Scotland were Orders VI and XII, particularly the former. These two Orders together accounted for fully half of all postwar migrants. None of the remaining 14 Orders generated as much as 1/12th of the migrant total. Orders VI and X dominated the migrant flow to NI in roughly equal proportions. Their joint share of the provincial total was 46.4%. The only other significant Orders were XII and III. Their collective weight was 21.9%. In other words, four Orders generated over 2/3rds of Ulster's migrant stock.

Table 7.24: Interregional Industrial Migrants to Scotland (1945-January, 1970) & NI (1945-July, 1969) by Order

1958 SIC Order		Scotland		Northern Ireland	
		No.	%	No.	%
III	Food, drink and tobacco	17	4.5	18	9.4
IV	Chemicals & allied industries	26	6.9	6	3.1
V	Metal manufacture	14	3.7	-	-
VI	Engineering & electrical goods	131	34.8	46	24.0
VII	Shipbuilding & marine engineering	-	-	-	-
VIII	Vehicles	13	3.5	5	2.6
IX	Metal goods n.e.s.	22	5.9	12	6.3
X	Textiles	17	4.5	43	22.4
XI	Leather, leather goods & fur	2	0.5	3	1.6
XII	Clothing and footwear	58	15.4	24	12.5
XIII	Bricks, pottery, glass, cement, etc.	23	6.1	10	5.2
XIV	Timber, furniture, etc.	11	2.9	4	2.1
XV	Paper, printing & publishing	13	3.5	8	4.2
XVI	Other manufacturing industries	29	7.7	13	6.8
	Totals	376	100.0	192	100.0

Sources: Appendices A & B.

Table 7.25 warrants detailed scrutiny but is largely self-explanatory. It provides more elaborate proof that postwar migration has been highly selective. Many of the 'boxes' in the table are completely empty. Another large number contain only one or two establishments. In ch. 11 we relate these phenomena to transport and communication costs. However, a full explanation would require a much more massive research endeavour than we have been able to undertake.

Appendix G is a companion to the Scottish components of Tables 7.24 and 7.25. It shows the pattern of postwar migration to Scotland by Order and MLH according to the 1968 SIC and will thus be useful in analyses involving the 1960 Census of Production. Insufficient time precluded the preparation of a similar appendix for NI.

Table 7.25: Intermegional Industrial Migrants to Scotland (1945-January, 1970) & NI (1945-July, 1969) by Minimum List Heading (1958 SIC)

Order & MLH		Industry	Scotland		Northern Ireland	
			No.	%	No.	%
XXI	211	Grain milling	-	-	-	-
	212	Bread & flour confectionery	-	-	-	-
	213	Biscuits	1	0.3	-	-
	214	Bacon curing, etc.	5	1.3	7	3.6
	215	Milk products	-	-	1	0.5
	216	Sugar	-	-	-	-
	217	Cocoa & confectionery	-	-	-	-
	218	Fruit & vegetable products	2	0.5	3	1.6
	219	Animal and poultry foods	2	0.5	3	1.6
	229.1	Margarine	-	-	-	-
	229.2	Starch & miscellaneous foods	1	0.3	2	1.0
	231	Brewing & malting	-	-	-	-
	239.1	Spirit distilling, etc.	4	1.1	-	-
	239.2/3	Soft drinks, wines & cider	-	-	1	0.5
	240	Tobacco	2	0.5	1	0.5
IV	261	Coke ovens & manufactured fuel	1	0.3	-	-
	262	Mineral oil refining	-	-	1	0.5
	263	Lubricating oils & greases	-	-	-	-
	271.1	Dyestuffs	-	-	1	0.5
	271.2	Fertilisers & related chemicals	-	-	-	-
	271.3	General chemicals	9	2.4	2	1.0
	272.1	Pharmaceutical preparations	4	1.1	1	0.5
	272.2	Toilet preparations	3	0.8	-	-
	273	Explosives & fireworks	1	0.3	-	-
	274	Paint & printing ink	4	1.1	-	-
	275.1	Vegetable & animal oils & fats	-	-	-	-
	275.2	Soap, detergents, candles, etc.	1	0.3	-	-
	276	Synthetic resins, etc.	3	0.8	-	-
	277.1	Polishes	-	-	-	-
	277.2	Gelatine, adhesives, etc.	-	-	1	0.5
V	311	Iron & steel (general)	6	1.6	-	-
	312	Steel tubes	1	0.3	-	-
	313	Iron castings, etc.	1	0.3	-	-
	321/22	Non-ferrous metals	6	1.6	-	-

Order & MLH		Industry	Mainland		Northern Ireland	
			No.	%	No.	%
VI	331	Agricultural machinery	2	0.5	1	0.5
	332	Metal-working machine tools	5	1.3	-	-
	333	Engineers' small tools, etc.	5	1.3	5	2.6
	334	Industrial engines	1	0.3	1	0.5
	335	Textile machinery	3	0.8	-	-
	336	Contractors' plant	2	0.5	-	-
	337	Mechanical handling equipment	7	1.9	3	1.6
	338	Office machinery	3	0.8	1	0.5
	339	Misc. non-electrical machinery	19	5.1	8	4.2
	341	Industrial plant & stockwork	7	1.9	4	2.1
	342	Ordnance and small arms	1	0.3	-	-
	349	General mechanical engineering	4	1.1	6	3.1
	351	Scientific, etc. instruments	16	4.3	4	2.1
	352	Watches & clocks	3	0.8	-	-
	361	Electrical machinery	6	1.6	1	0.5
	362	Insulated wires & cables	2	0.5	3	1.6
	363	Telegraph & telephone apparatus	3	0.8	1	0.5
	364	Radio & electronic apparatus	31	8.2	5	2.6
	365	Domestic electrical appliances	2	0.5	2	1.0
	369	Misc. electrical goods	9	2.4	1	0.5
VII	370	Shipbuilding, marine engineering	-	-	-	-
VIII	381	Motor vehicle manufacturing	11	2.9	2	1.0
	382	Motor cycle manufacturing	-	-	-	-
	383	Aircraft manufacturing & repair	1	0.3	3	1.6
	384	Locomotives, track equipment	-	-	-	-
	385	Railway carriages, wagons	-	-	-	-
	389	Perambulators, hand-trucks, etc.	1	0.3	-	-
IX	391	Tools & implements	-	-	1	0.5
	392	Cutlery	1	0.3	1	0.5
	393	Bolts, nuts, screws, etc.	4	1.1	-	-
	394	Wire & wire manufactures	1	0.3	1	0.5
	395	Cans & metal boxes	1	0.3	1	0.5
	396	Jewellery, plate, etc.	2	0.5	-	-
	399	Misc. metal manufactures	13	3.5	8	4.2
X	411	Production of man-made fibres	3	0.8	5	2.6
	412	Spinning, doubling of cotton, etc.	-	-	9	4.7
	413	Weaving of cotton, etc.	1	0.3	3	1.6
	414	Woollen & worsted	5	1.3	2	1.0
	415	Jute	-	-	-	-
	416	Rope, twine & net	-	-	-	-
	417	Hosiery & other knitted goods	7	1.9	13	6.8
	418	Lace	-	-	1	0.5
	419	Carpets	-	-	1	0.5
	421	Narrow fabrics	-	-	3	1.6
	422.1	Household textiles	-	-	4	2.1
	422.2	Canvas goods & sacks	-	-	1	0.5
	423	Textile finishing	1	0.3	1	0.5
	429.1	Asbestos	-	-	-	-
	429.2	Misc. textile industries	-	-	-	-

Order & MLH		Industry	Scotland		Northern Ireland	
			No.	%	No.	%
XI	431	Leather tanning & dressing	1	0.3	-	-
	432	Leather goods	1	0.3	2	1.0
	433	Fur	-	-	1	0.5
XII	441	Weatherproof outerwear	3	0.8	3	1.6
	442	Men's & boys' outerwear	10	2.7	2	1.0
	443	Women's & girls' outerwear	3	0.8	1	0.5
	444	Overalls, men's shirts, etc.	17	4.5	6	3.1
	445	Dresses, lingerie, infants' wear	15	4.0	5	2.6
	446	Hats, caps & millinery	-	-	1	0.5
	449.1/3/4	Corsets, misc. dress inds.	6	1.6	2	1.0
	449.2	Gloves	-	-	-	-
	450	Footwear	4	1.1	4	2.1
XIII	461	Bricks, fireclay, etc.	2	0.5	2	1.0
	462	Pottery	-	-	3	1.6
	463	Glass	3	0.8	-	-
	464	Cement	1	0.3	1	0.5
	469.1	Abrasives	-	-	1	0.5
	469.2	Misc. building materials	17	4.5	3	1.6
XIV	471	Timber	3	0.8	1	0.5
	472	Furniture & upholstery	2	0.5	2	1.0
	473	Bedding & soft furnishings	2	0.5	-	-
	474	Shop & office fittings	-	-	1	0.5
	475	Wooden containers & baskets	3	0.8	-	-
	479	Misc. wood & cork manufactures	1	0.3	-	-
XV	481	Paper & board	2	0.5	1	0.5
	482	Cardboard boxes, etc.	4	1.1	2	1.0
	483	Misc. paper manufactures	1	0.3	2	1.0
	486	Print., publish. newspapers, serials	1	0.3	1	0.5
	489	General printing, publishing, etc.	5	1.3	2	1.0
XVI	491	Rubber	7	1.9	4	2.1
	492	Linoleum, leathercloth, etc.	-	-	-	-
	493	Brushes & brooms	-	-	1	0.5
	494	Toys, games & sports equipment	5	1.3	2	1.0
	495	Misc. stationers' goods	1	0.3	-	-
	496	Plastics moulding & fabricating	11	2.9	5	2.6
	499	Misc. manufacturing industries	5	1.3	1	0.5
		Totals	376	100.0	192	100.0

Sources: Appendices A & B.

Table 7.26, the final one in this section, is a comparison of the industrial distributions of migrants from Britain, the U.S., and other foreign countries to both Scotland and NI. Some interesting discrepancies emerge. For instance, U.S. migrants were concentrated in Order VI to a much greater extent than British movers. Conversely, the latter were distributed rather more evenly over the Order spectrum, especially in NI. Least widely distributed were the 'other foreign' migrants although they had a unique affinity for Order XI. Perhaps the most striking similarity between the various distributions is the relatively narrow range of percentages for the important textile group (Order X) in NI.

Table 7.26: Interregional Industrial Migrants to Scotland (1945-January, 1970) & NI (1945-July, 1969) by Order & Origin

	Scotland			NI		
1958	Migrants from			Migrants from		
SIC Order	Eng. & Wales	U.S.	Other Foreign	GB	U.S.	Other Foreign
	%	%	%	%	%	%
III	4.9	3.4	4.3	12.1	3.1	-
IV	7.2	5.7	8.7	2.9	3.1	5.0
V	4.2	3.4	-	-	-	-
VI	23.4	64.8	52.2	19.3	46.9	20.0
VII	-	-	-	-	-	-
VIII	4.9	-	-	2.1	6.3	-
IX	6.0	6.8	-	7.1	3.1	5.0
X	5.7	2.3	-	21.4	21.9	30.0
XI	-	-	8.7	-	-	15.0
XII	19.6	4.5	8.7	15.0	3.1	10.0
XIII	7.5	1.1	8.7	6.4	3.1	-
XIV	4.2	-	-	2.9	-	-
XV	3.8	3.4	-	5.7	-	-
XVI	8.7	4.5	8.7	3.0	9.4	15.0
Totals	100.0	100.0	100.0	100.0	100.0	100.0
(No. of migrants)	(265)	(88)	(23)	(140)	(32)	(20)

Sources: Appendices A & B.

Locational Pattern of Migrants to Scotland

Using establishment addresses provided in large part by Mintech (see Appendix A), it has been possible to determine the approximate geographical location of each of the postwar migrants to Scotland in our universe with one exception, viz., a foreign firm which has signified its intention to begin operations in the near future but has not yet (January 1970) selected a site. Ex ante, at least to the

non-geographer, plotting migrants on a map would appear to be a relatively straightforward operation, indeed, so much so that we had hoped initially to undertake a more ambitious task and show the relationship of migrant locations to the existing transport network. In fact, the task of plotting is not that straightforward and the results invariably require considerable qualification. Of major importance are the decisions on: 1) what to plot; 2) what scale to use. Some examples will illustrate the complexities involved.

National Cash Register currently occupies eight SIEC factories in Dundee. According to Howard's criteria, these plants constitute only one move because they can all be classified under a single MLH. Yet if one were attempting to show the juxaposition of migrant establishments and the transport network it would be necessary to plot individual plants rather than moves, a very time-consuming process involving the use of large-scale (6 inch to the mile) maps[1] and much more site detail than is available from Mintech.

Burroughs Machines illustrates another type of problem. The company has three manufacturing operations in Scotland: Vale of Leven Industrial Estate, Cumbernauld and Glenrothes. Their opening dates were 1950, 1958 and 1969 respectively. Two of these operations fall within a single MLH and thus appear as one 'move' in our list. The location and date of this move are those of the initial establishment although in terms of employment it is only half the size of the second plant. This example clearly demonstrates the limitations of a map confined to 'moves'.

Faced with these complications, we decided to confine our locational analysis to those manufacturing establishments qualifying as migrants under Howard's criteria. By plotting moves rather than plants, it was possible to use very small-scale maps with a view to highlighting locational patterns rather than individual sites.

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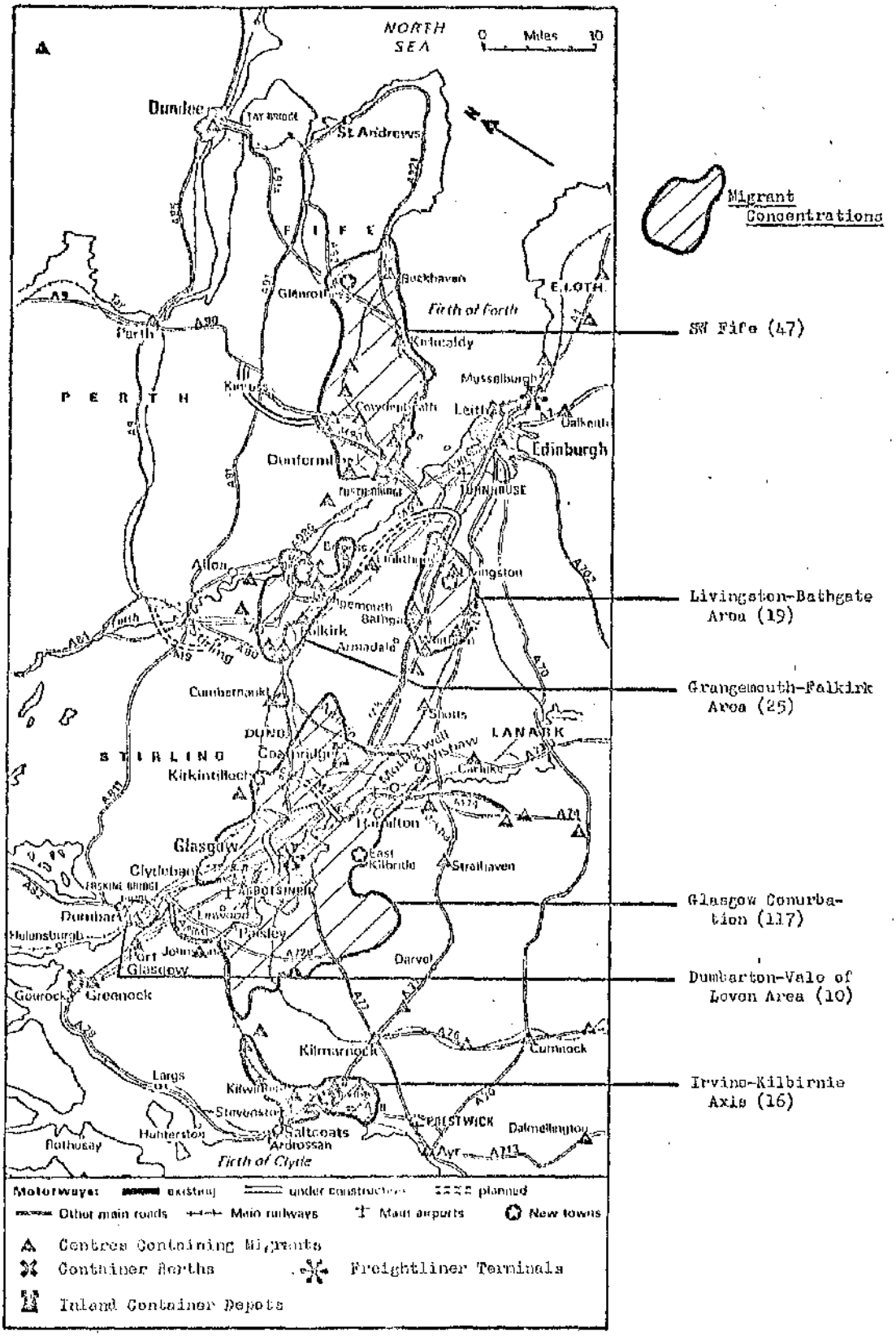
[1] This assertion is amply corroborated by the recent experience of a University of Glasgow research team attempting *inter alia* to plot the location of all manufacturing plants within the Glasgow conurbation as part of a project financed by the Centre for Environmental Studies.

Fig. 7.4 is a map of Scotland's Central Belt, the destination of the vast majority (85.9%) of all postwar migrants either operating in January 1970 or about to begin operations. The figure shows the relationship of the major elements of the transport network to the urban centres in which migrants have located. Related groups of centres having 10 or more migrants are specified down the right side of the map together with the number of migrants in each. By far the largest single concentration of migrant companies is in the Glasgow conurbation as defined by the 1966 sample census; 117 establishments or 51.1% of the Scottish total are located within its boundaries. Next in importance is SW Fife (including South Queensferry) with 47 migrants or 12.5% of the total. This area has proven particularly attractive to engineering and electronics firms; over half the migrants fall within SIC Order VI. The main migrant reception centres within SW Fife have been Glenrothes (15 establishments), Cowdenbeath-Kelty-Lochgelly (8), Inverkeithing (7), Dunfermline (6) and Kirkcaldy (6). Third in importance as a destination for migrants is the Grangemouth-Falkirk area with 25 establishments or 6.6% of the Scottish figure. Fourth is the Livingston-Bathgate area straddling the M8 motorway between Glasgow and Edinburgh with 5.1% of all migrants to Scotland. Three other areas in the Central Belt - the Irvine-Kilbirnie axis, Cumbernauld New Town and Dumbarton-Vale of Leven - each attracted 10 or more migrant establishments but less than 5% of the Scottish total as shown by Table 7.27.

It should be borne in mind when examining Fig. 7.4 and Table 7.27 that the boundaries of all of the areas shown with the exception of the Glasgow conurbation are rather arbitrary. An attempt has been made to group related centres and/or to highlight what appear to be significant patterns but the results are suggestive rather than definitive.

Fig. 7.4 Central Scotland: The Transport Network and the Geographical Distribution of Postwar (1945–69) Industrial Migrants



Source: App. A. Map adapted from "Scotland – A Sense of Change: A Survey," Economist, 21 Feb 70, p.xviii.

Table 7.27: Geographical Distribution of Migrants to Scotland

Location	Total Migrants		Migrants from England & Wales	Migrants from Overseas
	No.	%	%	%
Glasgow conurbation	117	31.1	32.5	27.9
South-West Fife*	47	12.5	9.4	19.8
Grangemouth-Falkirk	25	6.6	7.5	4.5
Livingston-Bathgate	19	5.1	6.0	2.7
Irvine-Kilbirnie axis	16	4.3	4.2	4.5
Cumbernauld New Town	16	4.3	4.9	2.7
Dumbarton-Vale of Leven	10	2.7	1.5	5.4
Other Central Belt	73	19.4	18.1	22.5
Central Belt Subtotal	323	85.9	84.2	90.1
Scotland N of the Central Belt	25	6.6	7.5	4.5
Scotland S " " " "	28	7.4	8.3	5.4
Non-Central Belt Subtotal	53	14.1	15.8	9.9
All Scotland	376	100.0	100.0 (265)	100.0 (111)

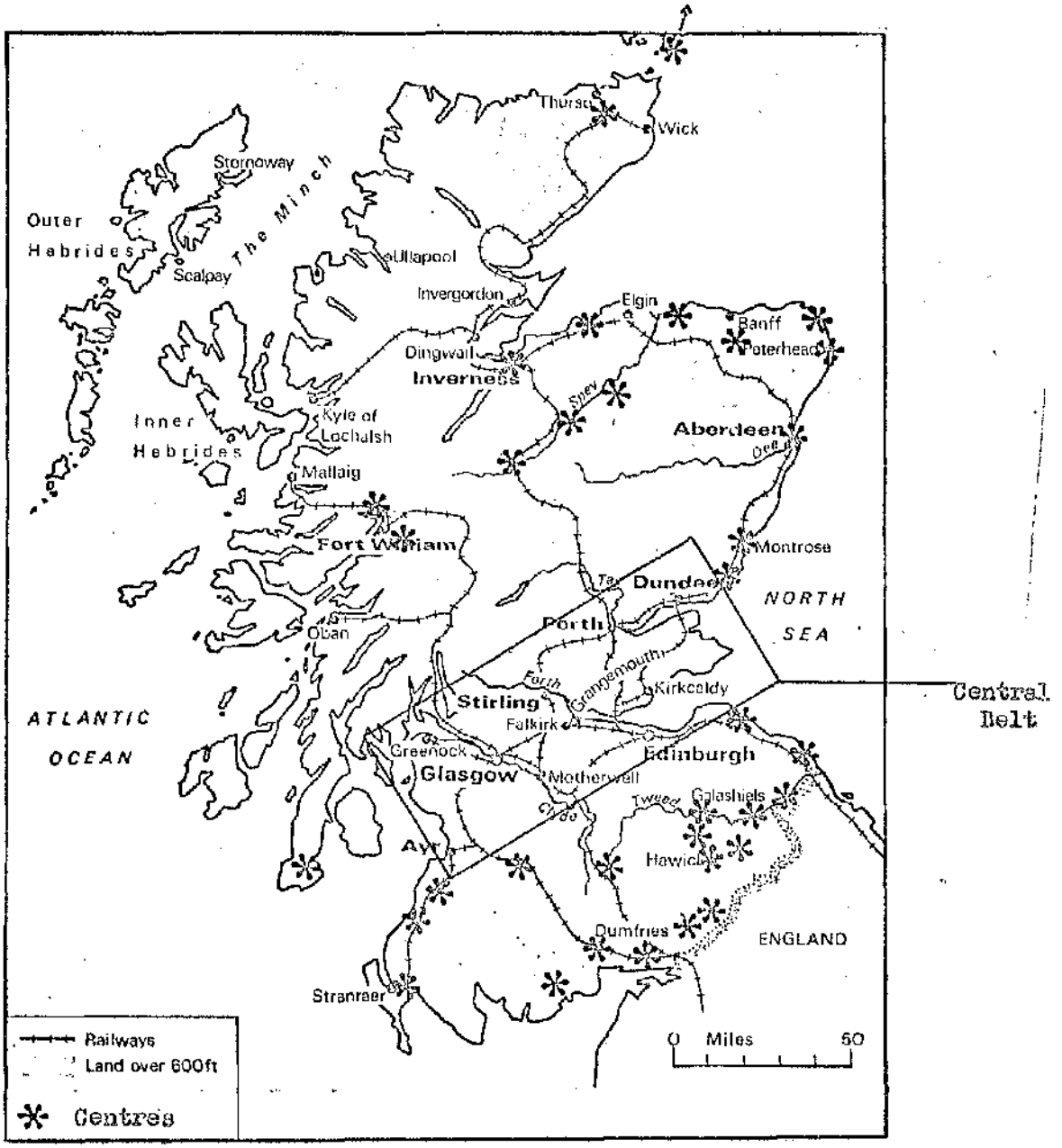
*Including South Queensferry

Source: Appendix A.

Outside the Central Belt, a large number of centres (5 - see Fig. 7.5) attracted one or more migrant companies but, as the total number of establishments involved was rather modest (53 - see Table 7.27), the majority of these places in fact acquired just one. The most popular centres in terms of number of establishments were Inverness (5), Girvan (4), and Annan and Peterhead with 3 each. The area south of the Central Belt proved only slightly more attractive to migrants than the north of Scotland.

It has already been observed that British and non-British migrants to Scotland display certain dissimilarities, eg., in average size and industry mix. Table 7.27 indicates that they also differ to some extent in their pattern of location. Overseas firms for instance would appear to have a greater preference for the Central Belt than their domestic counterparts with this preference being particularly marked in the cases of SW Fife and the Dumbarton-Vale of Leven area. In contrast, British firms found the Glasgow conurbation, the Grangemouth-Falkirk and Livingston-Bathgate areas, Cumbernauld New Town and the extremities of Scotland more congenial than did the foreign migrants.

Fig. 7.5 Centres in Northern and Southern Scotland Containing One or More Postwar (1945-69) Industrial Migrants



Source: App. A. Map adapted from "Scotland," Economist, 21 Feb 70, p.ix.

Locational Pattern of Migrants to NI

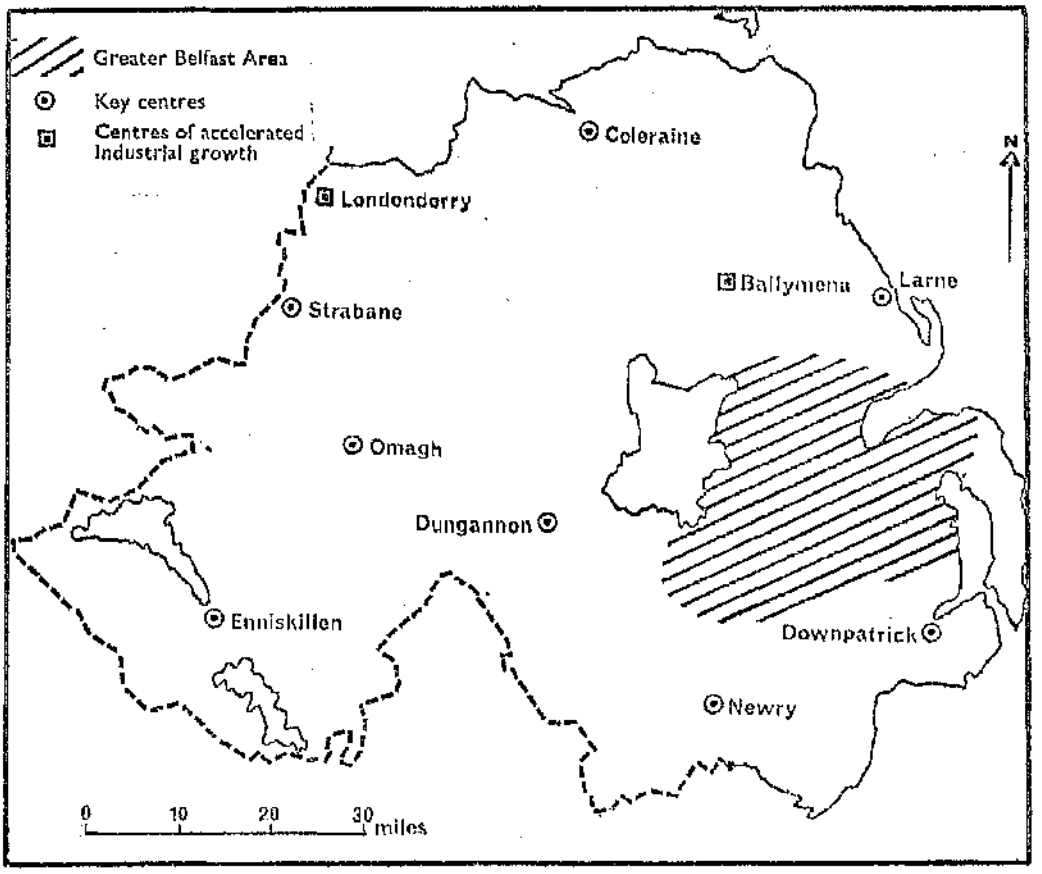
From a comparison of Tables 7.27 and 7.28, it will be readily apparent that migrants to NI have clustered even more tightly than in Scotland. Over half the British firms and 2/3rds of the foreign ones have located in one 'centre', the Greater Belfast Area. The GBA of course, as noted in the previous chapter, covers a very large area including Ulster's experiment in new town-building, Craigavon (see Fig. 7.6). Nonetheless, it is obvious from the evidence that the vast majority of Ulster's new industrial operations have been sited close to the east coast, inter alia to minimize the difficulty of communicating with suppliers and customers in the key British market, and to take advantage of the agglomeration economies available in the Belfast area, especially the pool of labour. For instance, without distorting reality unduly, we can consider the following centres or areas in the table to be east coast: the GBA, Ballymena, Newry, Downpatrick, Larne, Co. Down and Co. Antrim. Together they attracted 146 out of NI's 192 postwar migrants or 76%.

Table 7.28: Geographical Distribution of Migrants to NI

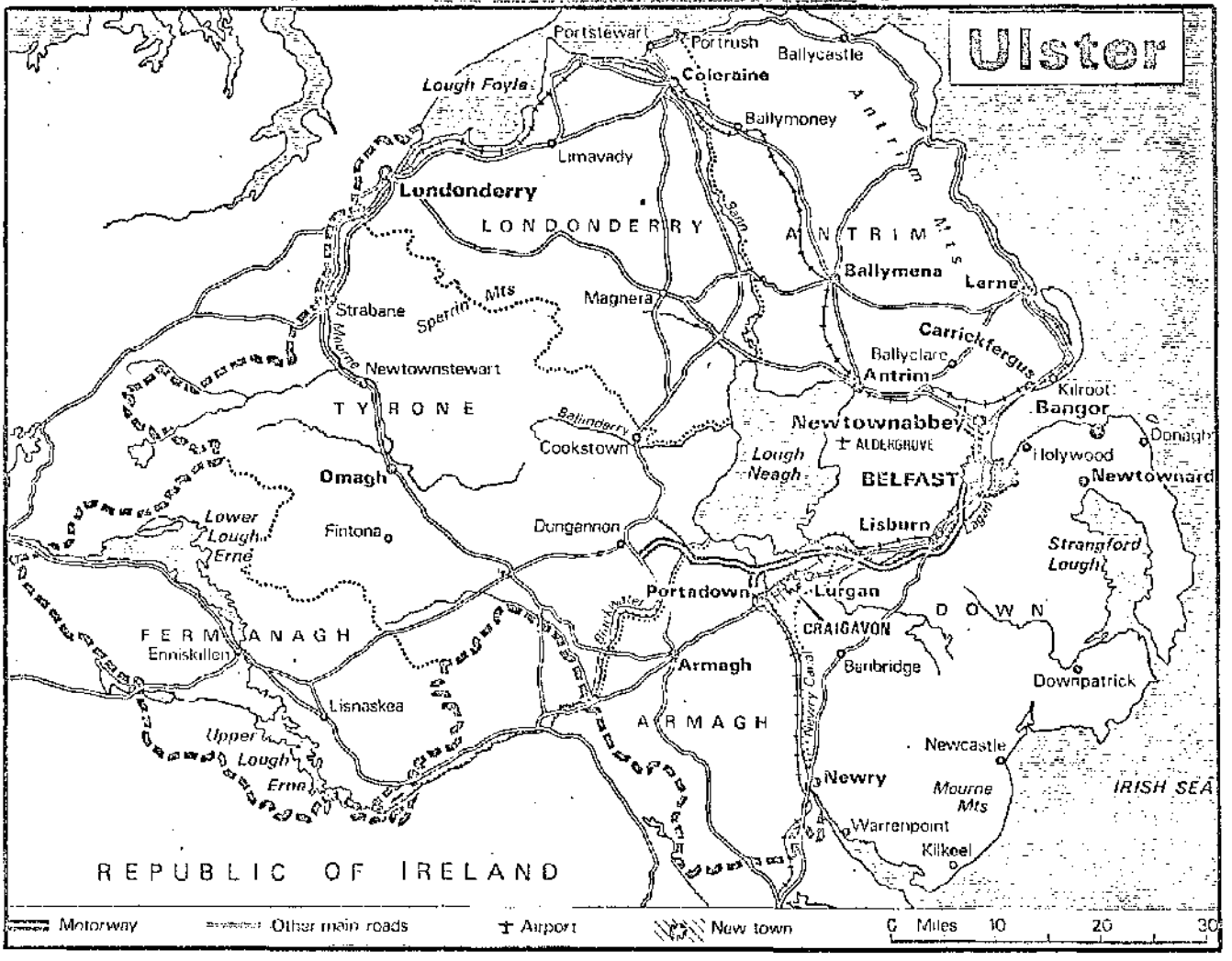
Location	Total Migrants No.	Total Migrants %	Migrants from GB %	Migrants from Overseas %
Accelerated industrial growth centres	126	65.6	62.9	73.1
Greater Belfast Area	106	55.2	51.4	65.4
Londonderry	15	7.8	7.9	7.7
Ballymena	5	2.6	3.6	-
Key centres	27	14.1	15.0	11.5
Coleraine Triangle	8	4.2	4.3	3.8
Newry	6	3.1	3.6	1.9
Dungannon	3	1.6	2.1	-
Enniskillen	3	1.6	0.7	3.8
Downpatrick	2	1.0	1.4	-
Larne	2	1.0	0.7	1.9
Omagh	2	1.0	1.4	-
Strabane	1	0.5	0.7	-
Other centres, grouped by county	39	20.3	22.1	15.4
Co. Down	16	8.3	10.0	3.8
Co. Antrim	9	4.7	5.0	3.8
Co. Armagh	7	3.6	4.3	1.9
Co. Tyrone	3	1.6	0.7	3.8
Co. Fermanagh	2	1.0	0.7	1.9
Co. Londonderry	2	1.0	1.4	-
All NI	192	100.0	100.0 (140)	100.0 (52)

Source: Appendix B.

Fig. 7.6



Source: Adapted from 1970-75 Development Programme, p.121.



Source: Adapted from "Ulster: A Survey," Economist, 29 May 71, p.iv.

Another interesting feature in Table 7.28 is the enormous disparity in the 'pulling power' both of the accelerated industrial growth centres and the key centres. The range in the former case is 106 to five; in the latter, it is eight to one. Two key centres, the Coleraine Triangle and Newry, have proven more attractive historically than one of the accelerated centres, Ballymena. These classifications of course and the concomitant policy commitments have only appeared recently and thus the past is not necessarily a guide to the future. Having said that however, it seems clear that some of the new 'centres' are effectively doomed to languish for a long time yet.

Summary and Conclusions

Our aim in this chapter has been twofold: 1) to show the nature and magnitude of postwar industrial migrant flows to Scotland and NI, 2) to give some indication of their relative importance. Most of the assembled material is of interest per se and is discussed here as such. But in the larger context of the thesis as a whole, its main purpose is to provide part of the background information necessary for the testing of our working hypothesis concerning distance costs and interregional mobility. The results of this test are presented in ch. 11.

The Data

Migrant data for the UK have only recently become available on a systematic, internally consistent and comprehensive basis after years first of official ignorance, and then of secrecy tempered by occasional but limited disclosures such as those made to Cameron & Clark (1966). Howard (1968), relating to the years, 1945-65, represented the major breakthrough. Unfortunately, the rules governing the compilation of the record store underlying the Howard study were altered at the end of 1965 and the subsequent migrant register, when and if it is published, will not be strictly comparable. But some figures are better than none and hopefully the discrepancies awaiting future researchers will be minimal.

We have been able to supplement the Howard data for Scotland and NI with more up-to-date information from official sources. But the degree of comparability varies. In the Scottish case, it would appear to be very high, probably because the material comes from Mintech and thus is identical with the Howard statistics subject to the discrepancies mentioned in the previous paragraph. In the NI case, the more up-to-date figures are inflated relative to the Howard set. According to the latter, for example, there were 120 postwar migrants to NI extant in 1965. In contrast, the more up-to-date figures show that 139 migrants to Ulster between 1945 and 1965 were extant in 1969, a 16% increase ignoring completely the mortalities which undoubtedly occurred during the last four years of the 1960s. The difference is understandable given the fact that the higher of the two numbers comes from Stormont rather than Whitehall and does not purport to conform to the Howard selection criteria. Ironically, the higher figure may also be more accurate since Howard's register understates the volume of postwar interregional industrial movement, probably by a considerable amount. On the other hand, any evidence of incomparability obviously renders the task of analysis more difficult.

Two further points are worth mentioning. First, both the Howard and the more up-to-date data pertain solely to extant movers. Remarkably little information is available anywhere (one exception - Keeble, 1968) on migrant mortality rates or dead migrant characteristics. Hence, in ch. 11, we will be able to say nothing substantive about the relationship, if any, between transport cost sensitivity and migrant survival expectations, although speculation will still be possible. Secondly, while we know that actual postwar migrant flows exceeded those recorded here, by definition we know very little (again with the exception of Keeble) about the precise characteristics of the unrecorded movers and the question arises, are they apt to vary significantly from the characteristics of the firms for which we do have information? In fact, they probably do. For example, the unrecorded movers were likely of considerably smaller size on average and thus less likely to have moved long distances. But these likelihoods have little obvious relevance to transport costs. It can therefore be concluded on *a priori* grounds that the unrecorded movers were probably neither more nor less sensitive to transport costs than their recorded counterparts. Communication costs,

however, are a different story. Small firms with limited management resources will generally refuse to set up distant branches in order to minimize intra-firm communication costs defined broadly to include the time and expense of executive travel. Similarly, because of their often heavy dependence on a narrowly circumscribed environment of suppliers and other contacts, small firms will be reluctant to transfer long distances. It would appear then, in contradistinction to our conclusion on transport costs, that the unrecorded postwar movers were much more sensitive to communication costs than the recorded ones. This judgment, it will be noted contradicts our working hypothesis and suggests that it must be modified.

Number of Migrants

According to Howard's data, 259 postwar interregional migrants were extant in Scotland at the end of 1965 or 12.3 for each year of the 1945-65 period. Cognate NI data were 120 and 5.7 respectively. These figures suggest that NI was rather more attractive to migrants than Scotland in terms of number of migrants per 1000 population, a finding contrary to expectations on the assumptions that NI is more peripheral than Scotland and distance costs constrain interregional migration. If, on the other hand, one were to postulate, as we have done, that distance costs are not an important constraint on long-distance migration, then our finding becomes much less surprising although the task remains of explaining the disparate attractiveness of the two areas. However, we cannot attempt to do so here in any exhaustive way.

Periodicity of Movement

We can divide the postwar period into three segments on the basis of Howard's data and get some idea of the variation in the average annual number of migrants (extant in 1965) over time. The results of this exercise for Scotland and NI appear below.

	Period of Movement		
	1945-51	1952-59	1960-65
Scotland	11.0	6.3	22.0
NI	5.7	3.5	8.7

Clearly, NI flagged relative to Scotland during the last six years of the total period in contrast to an excellent earlier record.

From our appendices (A and B) we can determine that the situation was for each of the two areas during the remainder of the decade. The facts are as follows:

	Period of Movement			
	1945-51	1952-59	1960-65	1966-69
Scotland	10.3	5.9	19.3	31.8
NI	6.6	4.4	9.7	14.3

It should be remembered when interpreting these figures that they are comparable intra- but not interregionally. Furthermore, they relate to migrants extent in 1969. While the Scottish data can be compared with the preceding table, the NI data stand alone. It will be apparent that Scotland did exceedingly well from interregional migration during the latter half of the 1960s relative to preceding time periods. NI also did better than in preceding years but less so than Scotland. The same relative performance occurred between 1952-59 and 1960-65. It would seem then that Scotland's attractiveness to migrants grew faster than NI's during the 1960s. We have not gone into the reasons for this situation in any detail though it was almost certainly due in part to the backward linkage effects of the Rootes (Chrysler) and Leyland motor vehicle plants opened early in the decade at Linwood and Bathgate respectively following exceptional government pressure and financial inducements.[1] But there are no grounds for thinking that it was otherwise related to distance costs or to relative endowments of communications infrastructure.

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[1] This argument can reasonably be inferred from App. A. While it may appear to contravene the conventional wisdom which holds that the linkage effects of the Rootes' and Leyland plants have been small, in fact the contradiction is only partial for two reasons. First, we are not claiming that the backward linkage effects of these plants have been spectacular but only that a number can be discerned. Secondly, the conventional wisdom relates in part to indigenous suppliers - cf. Bertram G.S. James, "The Incompatibility of Industrial and Trading Cultures: A Critical Appraisal of the Growth-Point Concept", Journal of Industrial Economics, XIII (November 1964), 90-94 - whereas we refer solely to induced migration.

Migrant Origins

The most important origins of movement to both Scotland and NI were the South-East and 'abroad' in that order. These findings suggest, prima facie, that distance was not an important constraint on the volume of migration since the other relevant origins were all nearer, a conclusion strengthened by the fact that NI has always benefitted from a disproportionate number of SE migrants relative to Scotland. Clearly, if distance was invariably the most important factor governing migrant flows, the reverse should have occurred. But more detailed examination reveals that the foregoing requires severe qualification. Neither Scotland nor NI has benefitted unduly from SE migration. Indeed, Scotland has received a disproportionately small number of SE migrants; it did distinctly less well between 1945 and 1965 for instance than competing areas much closer to the SE such as the South-West and East Anglia. It can be argued then, and this line of reasoning is borne out by the literature, that during much of the postwar period, distance was a major constraint on interregional industrial mobility up to a point equal say to a comfortable day return journey between origin and destination by road or rail, ie., 4-5 hours' total travel time. Beyond that point, distance while still very important, diminished in significance relative to other factors, especially labour supply and labour relations. This argument explains both why SE migrants generally favoured contiguous or comparatively close areas of destination, and why, when long-distance moves were undertaken, NI proved rather more attractive relatively than Scotland. It follows that transport and communication cost considerations played a key though not universally paramount role in shaping the industrial mobility patterns revealed by Howard's data.

But this role is no longer what it used to be as businessmen switch increasingly from ground to air transport for long domestic journeys, with the improvement in the motorway network, and with better rail and telecommunications services. The comfortable day return journey radius centred on London now covers most of the UK. As advertised recently by the Highlands and Islands Development Board, the flight time from London to Inverness is only 130 minutes, or less

time than it takes to travel from London to Swansea, Carlisle, Grimsby, Lincoln, Sheffield or York. In other words, one of the most distant parts of the Scottish Development Area is no more remote from London that much of South Wales or many sizable English centres. It might be argued that the Board's case is slightly suspect since the 130-minute figure is not entirely comparable with the other travel times mentioned. Also, some businessmen prefer single-mode to multi-mode travel arrangements and flying invariably involves the use of more than one mode of transport. Yet these cavils do not seriously detract from the general point being made that space is shrinking in time terms. It may take a while for this fact to impress itself upon the mind of the typical southern executive contemplating expansion or relocation but when it does distance will cease to be a major consideration for most inter-regional industrial migrants though there will always be exceptions.

This conclusion, which relates primarily to intra-UK moves, is corroborated by Scotland's success in attracting migrants to the UK from abroad, a success shared increasingly in recent years by NI. No less than 29.5% of the foreign migrants between 1945 and 1965, most of whom were North American in origin, ended up in Scotland. In contrast, the Scottish share of all interregional moves (including those from abroad) was only 14.6%. Equivalent figures for NI were 8.5% and 6.6%. During 1960-65, Scotland's share of foreign immigration (29.4%) was almost identical with that recorded for the much longer period, 1945-65, but NI's share was higher at 11.9%. These findings clearly conform to our suggestion above that beyond a certain point equal to perhaps 4-5 hours' day return travel time, migrants become rather indifferent as to their location from a distance point of view. Thus to a firm from the U.S., the most important single origin of postwar migration to Britain, it will be just as easy to control and service a branch in Scotland as one in London. But why has Scotland done so well out of migration from abroad relative to the rest of the UK, especially NI? To answer this question, one must first ask what generally has attracted foreign firms to Britain? While a detailed exploration of this topic is not possible here, the following considerations would appear to be relevant (though not always simultaneously and with considerable overlap):

1) the size of the domestic market - for a long time, the UK was the largest national market in terms of purchasing power outside the U.S. - together with the growing British demand for goods featuring American design or embodying the U.S. way of life.

2) Britain's status as a trading nation and international trade centre

3) the expectation of UK entry into the European Common Market

4) British membership in the European Free Trade Association

5) a desire to surmount certain specific UK tariffs and to take advantage of the imperial trading preferences arising out of first the Empire and more recently the Commonwealth

6) the size and quality of London's financial institutions

7) the kingdom's generally liberal attitude towards foreign investment

8) the common language, Anglo-Saxon traditions and close political associations comprising the 'special relationship' between Britain and the U.S.

9) the regional development incentives available in Britain were generally more attractive than their Continental equivalents

10) sterling area dollar shortages during the early postwar years deprived many U.S. firms, e.g., clock, watch and office machinery manufacturers, of important pre-war sales outlets and gave them a powerful incentive to set up manufacturing units in the UK in order to retain and develop their market positions

11) labour cost differences between Britain and the U.S., particularly in the engineering sector

12) postwar American pre-eminence in certain key industries requiring heavy outlays on R and D, e.g., pharmaceuticals and industrial precision instruments - immigration was essential if these industries were to develop in the UK on any scale

13) postwar government policy decisions to develop certain industries in the UK previously dominated by the Americans, e.g., oil refining - reasonably rapid development meant that an inflow of U.S. companies was almost inevitable.

Perhaps the most important aspect of the above list from our viewpoint is the absence of transport costs as an obviously significant factor in foreign immigration to Britain.

A number of points in the preceding paragraph are obviously relevant to Scotland, especially suitability as a centre for exports.

In addition, there has been the direct air link between the region and North America via Prestwick, a very considerable if still under-explored competitive weapon in the struggle for new industry, and one unavailable to any other peripheral area in the UK with the recent exception of NI (cf. ch. 6). But one must also turn to more intangible factors to explain Scotland's superior pulling power vis-à-vis competitive GB regions. One might mention for instance the activities of the Scottish Council, the romantic undertones peculiar to Scotland, the region's long history of emigration with the result that many expatriates or their descendents now occupy key decision-making posts in foreign companies, and generally, Scotland's unusually strong image overseas. There can be very few adults in North America and on the Continent who have not heard of whisky, bagpipes, kilts, clans and even Bonnie Prince Charlie. No other region can match this sort of imagery. Finally, there is the self-reinforcing success record of U.S. firms in Scotland. Many have prospered to the point where collectively U.S. companies today are the source of one in every 10 Scottish manufacturing jobs.

Intangible considerations can also be cited in partial explanation of Scotland's superior pulling power with foreign firms vis-à-vis NI during the early postwar period. But of equal or perhaps even greater importance was its accessibility advantage with regard to domestic and export markets, suppliers and head offices. Available evidence suggests that foreign migrants turned to NI in any quantity only when labour shortages began to appear in GB during the early 1950s. But these firms' generally favourable experiences in NI, the province's better inducement package, the exceptional ability of Stormont civil servants to cut red tape when necessary in connection with aid to migrants, and improvements to the NI communications network combined to reduce the region's initial lack of appeal to foreign migrants to the point where it is now probably on a par with Scotland.

Employment Impact of Interregional Migration

Postwar interregional migration had directly produced 94,700 jobs in Scotland by the end of 1966, a sum equal to 16.5% of the comparable UK total. Average employment per move was 366; taking the UK average as 100, this figure equalled 113. Equivalent NI data

were 39,800, 6.9%, 332 and 102. Since the above percentages (16.5% and 6.9%) were considerably in excess of the two regions' population shares, it would appear that regional policy worked between 1945 and 1965, i.e., it successfully achieved its objectives of diverting employment growth from the South and Midlands and steering overseas firms to the peripheral areas. But Scotland (comparable NI data are not readily available) did not do as well from interregional migration as Wales or the Northern Economic Planning Region. Indeed, it did relatively poorly from domestic interregional migration, achieving a concentration quotient greater than 1.0 (1.23) but ranking 6th in the regional league table after Wales, the North, the NW, the SW and East Anglia in that order. On the other hand, it did exceedingly well from overseas migration, attracting almost half of all UK jobs originating abroad (the region's concentration quotient was 5.05). The average size of the foreign migrants to Scotland (608 employees) was well over twice as large as its domestic counterpart (265 employees). (Equivalent NI data were 409 and 314) In summary, Scotland did poorly in the competition for domestic interregional migrants but led the UK in its appeal to overseas firms. Overall, it did less well from interregional migration than Wales and the North but better than the NW and the SW, the other peripheral GB regions. These findings can be explained largely by the distance considerations advanced earlier.

Both in Scotland and NI, one of the main effects of postwar interregional migration has been to prevent a drastic decline in total manufacturing employment. The significance of this achievement is indicated by the fact that 1/8th of total employment in the Scottish manufacturing sector at the end of 1966 was due directly to the inflow of new establishments. Indeed, in the absence of interregional mobility, there can be little doubt that unemployment among the Scots and the Northern Irish would have been far worse. The picture which emerges - the regional policy finger in the sagging dyke holding back unemployment - is not one to inspire enormous confidence in the future. On the other hand, to the extent that distance has been a factor historically in holding back development in Scotland and NI, the future looks brighter than the past since distance is no longer the constraint that it used to be. Regional policy had some success between 1945 and 1965 in reducing unemployment in Wales, the North, the NW and the SW. With the

progressive removal of the distance incubus, it could have the same effect henceforth on Scotland and NI.

Industrial Distribution of Migrants

Engineering firms including electrical goods producers dominated the migrant flow to Scotland between 1945 and 1969, accounting for over one-third of the total number of movers. Clothing and footwear firms, with 15.4% of the total, were a poor second. None of the remaining 14 manufacturing Orders was particularly noteworthy. In NI the situation was somewhat different. Again, engineering firms predominated but textile companies were almost as important. Together these two Orders accounted for 46.4% of all postwar movers. Also significant were the clothing and footwear and the food and tobacco groups. Collectively, they generated 21.9% of Ulster's migrant stock. To sum up, half of the postwar migrants to Scotland were concentrated in two Orders, VI and XXI. None of the remaining Orders was significant in terms of migrant numbers although not necessarily from a job viewpoint. For example, while comprehensive employment data are unavailable, it would appear from the evidence which is extant that the vehicles group of migrants to Scotland are much more important sources of jobs than their number suggests. Over 2/3rds of the postwar migrants to NI were concentrated in four individually significant Orders - III, VI, X and XII.

The largest migrant groups at the MLH level in Scotland were producers of radio and electronic apparatus, miscellaneous non-electrical machinery, light manswear, miscellaneous building materials, scientific instruments, light ladieswear and miscellaneous metal manufactures in that sequence. A majority of those groups belonged to UK growth industries[1] as one would expect since most interregional migrants were expanding at the time of their move. But clothing was a declining industry which suggests that financial inducements and the hope of reduced labour costs may have been behind the moves of many of the firms in that sector. Migrants in the miscellaneous building materials industry were probably local market-oriented.

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[1] Cf. Howard (1968), Table 9, p.27.

In NI, the largest migrant groups at the MLH level in rank order were manufacturers of hosiery and other knitted goods, spinners and doublers of man-made and other non-wool fibres, miscellaneous non-electrical machinery makers, producers of miscellaneous metal manufactures and meat packers. With the exception of the spinners and doublers, all of these groups were in growth industries as defined by Howard (1968). Spinning and doubling, of course, is a traditional NI industry, some of it in decline but not the man-made fibre end. It is probably this segment which accounts for much of the movement which we have uncovered.

Table 7.25 shows clearly that postwar migration to Scotland and NI has been highly selective in terms of industrial composition. Some industries are not represented at all, especially in the NI case. Many others generated only one or two moves. This situation is explained in part by the lack of growth in certain industries anywhere in the UK; shipbuilding and marine engineering is an obvious case in point. Other industries, e.g., iron and steel and non-ferrous metals, did expand somewhat[1] but generated relatively few moves and they were usually short ones due probably inter alia to a pronounced sensitivity to transport costs. But we have not been able to probe this fascinating subject of the reasons for the migrant generation differential between MLHs in any depth. Neither have we been able to compare the industrial distributions of migrants to Scotland and NI with those for other individual British regions. From a comparison of Tables 7.22 and 7.23 above with Apps. F and I in Howard (1968), however, Scotland would appear to conform to the general UK pattern while NI was somewhat atypical, particularly with regard to Orders III, X and XII. Whereas the first two industrial groups were unusually prominent in Ulster, the reverse applied to the latter one.

It is worth noting finally that U.S. migrants to Scotland and NI were concentrated in Order VI to a much greater extent than their British counterparts. Conversely, the latter were distributed

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[1] Ibid.

somewhat more evenly over the total number of Orders, particularly in NI. These findings should occasion little surprise given the pre-eminence of the Americans in many fields of engineering and the reasons proffered earlier in explanation of foreign investment in Britain generally (cf. ch. 11).

Locational Distribution of Migrants

The postwar migrants to Scotland and NI have established definite location patterns. In the former case, it is the Central Belt that predominates; in the latter case, it is the east coast. Within these relatively broad areas, the Glasgow conurbation and the Greater Belfast Area stand out.

Scotland's Central Belt attracted 85.9% of all postwar migrants to the region, a figure roughly in keeping with the Central Belt's share of the total Scottish population. One can conclude that labour supply and proximity to key communications nodes were probably the predominant location factors for most of the firms followed in a limited but indeterminate number of cases by local market accessibility. Almost a third of the new establishments located inside the Glasgow conurbation including the New Town of East Kilbride. Other popular areas were SW Fife (especially the New Town, at one time official growth centre, of Glenrothes and the towns close to the Fife end of the Forth Bridge), the Grangemouth-Falkirk (growth) area with its ample supply of female labour, the New Towns/growth areas of Livingston, Cumbernauld and Irvine, and the short-lived Vale of Leven growth area together with the adjacent town of Dumbarton. Almost one in five postwar migrants located in other Central Belt locations, many of which were small towns. Prima facie, this widespread preference for essentially non-urban sites may seem surprising but, as explained by Cameron and Reid (1966, p.63), migrant companies frequently seek to monopolize limited local labour markets to avoid competition from other employers. Thirty-five non-Central Belt locations attracted one or more firms but none acquired more than five and the mode was in fact just one. The number of migrants locating north and south of the Central Belt was roughly equal. Foreign migrants had a greater preference for the Central Belt than did British ones. It would be interesting to relate the locational

distributions of the migrants to their time of arrival in Scotland and to their industry mix but such analyses are not essential to our purposes.

NI's east coast, ie., the main population concentration and the area closest to GB, attracted roughly 3/4ths of all postwar migrants to the province. The Greater Belfast Area alone accounted for 55% of the provincial total. This proportion rose to 65% in the case of foreign firms. For British migrants, it was slightly less than the aggregate average at 51%. As in Scotland, labour supply and proximity to interregional communications facilities were likely the main location factors operative in Ulster. Local market accessibility was probably of roughly equal consequence in the two regions.

NI's 'key centres' and the accelerated industrial growth centre of Ballymena had attracted relatively few migrants up to 1969. Indeed, apart from the Greater Belfast Area and, to a much lesser extent, Londonderry, migrants were widely dispersed. Probably the province's industrial dispersal policy was partially responsible for this phenomenon inasmuch as it predated the idea of growth centres. Also relevant perhaps was the small-town propensity noted in connection with Scotland. But the record to date does not augur well for the future of the smaller designated centres although it is perhaps too soon to judge their potential 'pulling power' given the current civil unrest in Ulster, the economic recessions in the UK and the U.S., and the still recent advent of comprehensive development planning in the province. While further analyses could be made of the NI material along the lines suggested previously for Scotland, again, the foregoing is adequate for our purposes.

CHAPTER 8

TRANSPORT AND COMMUNICATION COSTS IN BRITISH MANUFACTURING, 1963

Introduction

Outlays on transport and communications form part of the cost structure of every manufacturer. However, few producers will be aware of the true magnitudes involved for two reasons. First, raw materials, intermediate goods, fuel and other purchased inputs may be bought in whole or in part at standard prices. Transport costs will be included in these prices but will not be listed separately. Second, manufacturers will seldom pay directly for inbound communications such as telephone calls but the relevant costs will almost invariably be included in the prices charged by suppliers for their goods or services. Not infrequently, a third reason may apply, i.e., company accounts may be kept in such a way that direct expenditures on transport and communications are neither readily apparent nor easy to disinter except after sustained inquiry. This situation will be particularly apt to occur when transport and communication costs are either insignificant in fact or felt to be so. One can envisage, for example, to take an extreme case, a company buying all of its inputs at standard prices and selling its entire output ex-works. Under these circumstances, direct outlays on transport and communications, that is, private transport and communication costs, would be negligible. This example is not likely to be encountered in practice. Nevertheless, as will be seen below, it does not deviate very far from the situation prevailing in a number of industries. It can apply *a fortiori* to individual establishments within such industries, especially when transport and communication costs are treated as company overheads and are not allocated to specific plants. Since the I.D.C. control affects many more branches than HQs, the foregoing augurs well for the success of the control insofar as transport and communication costs are a critical factor in private location decisions.

Manufacturers then will normally tend to under-estimate their real expenditures on transport and communications. Yet this likelihood is

immaterial to an evaluation of the part played by these expenditures in firms' location choices such as we attempt in a later chapter in connection with postwar industrial movement to Scotland and NI. Only direct costs are of relevance in most industrial location decisions unless government intervenes in its role as guardian of the public interest.[1] Our purpose in this chapter is to establish the size of the direct outlay on goods transport and communications[2] by each manufacturing industry in Britain during 1963, the latest year for which detailed information was available in March 1970, and to relate the results to output and profits as a preliminary test of their significance. By so doing, we get an idea of each industry's sensitivity to such costs.

Census of Production

The only official source of data on transport and communication costs in British industry is the census of production. This census dates back to 1906 when Lloyd George as President of the Board of Trade introduced the first Census of Production Act. It was not until 1946, however, 40 years later, that an attempt was made to elicit from industry information concerning the amount of money being spent on transport. Communication costs were ignored until 1948. These delays are rather puzzling when one considers the important role attributed to distance costs by many of the early location theorists. On the other hand, the main motive behind the prewar censuses lay in tariff considerations[3] rather than location of industry policy. Indeed, as we have seen in chapter 4, it was not until 1934 that a location of industry policy began to take explicit shape; only in the postwar period was this policy really made effective. The last prewar census related to the year 1935. The 1939 Census of Production Act was never used owing initially to the outbreak of war and later to the change in attitude

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[1] Notable exceptions to this generalisation are certain public-spirited companies and the nationalised industries. Fortunately in economic terms the secular trend would appear to be an increase in the number of exceptions.

[2] It would be desirable to include the direct costs of travel by executive and technical personnel but such information is not available in published form.

[3] See the discussion on the development of the census of production in GB, Interdepartmental Committee on Social and Economic Research, Census of Production Reports, Guides to Official Sources: No. 6 (London: HMSO, 1961) pp.2-12.

towards the role of government represented by the 1944 White Paper on Employment Policy.

Postwar censuses have been generally broader in scope than their predecessors. Respondents have been frequently asked to provide information on transport costs, largely for technical reasons (see below), but sometimes as a result of specific requests to the BOT from the MOT. Communication cost data have been collected only twice, in 1948 and 1963. Academic regional analysts appear to have made very little use of this new statistical material. One suspects, looking from the outside, that this allegation is equally applicable to distribution of industry personnel within the civil service. Of course, only insiders will be able to confirm or deny the veracity of such a speculation.

Transport Costs

Transport cost information has been published for the years, 1946, 1948 to 1958 inclusive and 1963. The data for 1946 and 1948-50 refer solely to outwards transport on sales of final product; the figures for the more recent years refer to a combination of outwards transport and inwards transport on purchased materials and fuel.

During the period, 1946-58, firms were asked to include two types of cost in their statement of transport payments: 1) amounts paid to other firms, 2) amounts paid or credited to their own separate transport organisations.[1] They were not asked to identify the value of transport services provided by the businesses covered by their census of production returns. As can be seen from Tables 8.1 and 8.2 and

[1] Separate figures for these two categories are available in published form only for 1951. Separate figures were collected in 1954 but not published. As explained by an MOT statistician, transport data were collected at all "to enable the Board of Trade to calculate the net output of the organisations covered in the Census. This is not to say the Ministry of Transport and indeed other departments are not interested in the amounts paid out for transport services per se but the primary object of obtaining this information is to calculate net output. This is why the question is in a Board of Trade Census and not for example in a Ministry of Transport Survey. I do not know why the earlier censuses asked the cost of transport services in two parts since for net output these would be used as a summed quantity. It is quite probable that it was felt by the Census office to be easier to answer the question in this form. With the recommendations of the /1954/ Verdon Smith Committee to reduce the burden of completing the forms it was to be expected that redundancies of this nature would be removed in order to reduce the number of questions to be completed." Private communication from Mr T.F.J. Hobson, MOT Directorate of Statistics, 29 May 70. Cf. GB, BOT, Report of the Committee on the Censuses of Production and Distribution, Sir W. Reginald Verdon Smith, chairman, Cmd. 9276(London: HMSO, 1954).

Table 8.1 Expenditures on Goods Transport by SIC Order, Larger* UK Manufacturers, 1963

1958 SIC Order	Industry	(1) Transport Payments to Other Organisations £'000	(2) Own - A/C Outlays on Road Transport £'000	(3) Total Transport Costs £'000	(3) Total Transport Costs %	(4) Net Output %
III	Food, drink & tobacco	69,871	97,567	167,438	28.4	11.9
IV	Chemicals & allied industries	50,323	21,066	71,389	12.1	10.0
V	Metal manufacture	45,304	8,342	53,646	9.1	7.9
VI	Engineering & electrical goods	33,355	30,252	63,607	10.8	23.2
VII	Shipbldg. & marine engineering	1,091	1,429	2,520	0.4	2.0
VIII	Vehicles	11,930	12,615	24,545	4.2	11.2
IX	Metal goods n.e.s.	15,788	11,217	27,005	4.6	5.2
X	Textiles	15,142	10,468	25,610	4.3	7.6
XI	Leather, leather goods & fur	1,138	980	2,118	0.4	0.4
XII	Clothing & footwear	4,491	3,673	8,164	1.4	3.3
XIII	Bricks, pottery, glass, etc.	42,497	17,062	59,559	10.1	3.8
XIV	Timber, furniture, etc.	7,992	13,367	21,359	3.6	2.3
XV	Paper, printing & publishing	31,497	14,295	45,792	7.8	7.6
XVI	Other manufacturing industries	10,483	5,767	16,250	2.8	3.6
	Total manufacturing	340,902	248,100	589,002	100.0	100.0

*Firms employing ≥ 25 persons.

Source: 1963 Census of Production. Col. 2 = Census data x 10%.

from Appendix C, this omission was more important for some industries than for others. Transport payments as a percentage of total transport costs varied widely in 1963 from a high of 97.5% in the case of coke ovens and manufactured fuel producers to a low of 5.7% in the case of the bread and flour confectionery industry.[1] The average ($\bar{x}$) for all industries was 57.9%, a considerable drop from 1958 when an estimated

Table 8.2 Grouped Frequency Table Showing Transport Payments to Other Organisations as a Percentage of Total Transport Costs by MLH, Larger UK Manufacturers, 1963.

Class Limits %	Frequency no. of MLHs	Relative Frequency %
<9.99	1	0.8
10.00 - 19.99	1	0.8
20.00 - 29.99	6	5.0
30.00 - 39.99	9	7.6
40.00 - 49.99	18	15.1
50.00 - 59.99	26	21.9
60.00 - 69.99	29	24.4
70.00 - 79.99	15	12.6
80.00 - 89.99	10	8.4
≥90.00	4	3.4
	119	100.00

Source: Computed from 1963 Census of Production.

75% of manufacturers' total outlays on transport were in the form of transport payments.[2] The modal class in 1963 (see Table 8.2) was 60.00-69.99% indicating a certain amount of negative skew in the distribution of the transport payment/total transport cost ratios by MLH.

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[1] All transport and other data in this chapter refer exclusively to firms employing ≥ 25 persons. Smaller firms have been excluded from the analysis for two reasons: a) they are of limited interest to government policymakers concerned with the location of industry, b) only larger firms were requested by the census to provide information on transport costs.

[2] Derived from an estimate of own-account transport expenditures in 1958 by S.B. Edwards in his forthcoming paper, "Transport Costs in British Industry". Edwards attributed much of the drop to a relative decline in expenditures on rail transport. Baylins and Edwards found that own-account road haulage was absorbing 45% of manufacturers' total outlays on transport in 1966. They defined own-account in terms of firm rather than establishment, i.e., their definition was considerably broader than that used in the 1963 Census. Yet, the 'own-account'/total transport cost ratios for the two years are strikingly similar. The explanation for

It is difficult to know what to make of the ratios for specific industries. On the one hand, as is explained more fully below, the transport payment side of the ratios is in many instances understated with the precise amount of understatement being a function largely of the extent to which industries export and the associated pricing procedures. On the other hand, an indeterminate amount of the transport payment total simply involves payments to separate transport organisations within the same firms[1] and thus is really a veiled version of own-account transport. Respondents to the census were asked to base their returns on the establishment, a unit comprising in most cases the entire premises under the same ownership or management at a particular address. Unless a respondent kept separate accounts for his transport department, its activities would be considered as own-account. Where separate accounts were maintained, the activities of the transport department would appear in the return under the heading, "amount payable to other organisations for transport".[2] Clearly, this distinction, while

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this phenomenon would appear at first glance to be mainly coincidence as there is no reason why the ratios should be the same or even approximately so given the differences in the method of data collection, the time difference and the semantic dissimilarities. On the other hand, it could be that, because of the "fairly" representative nature of the Bayliss-Edwards sample and the trend in the true own-account/total transport cost ratio, the percentages are comparable. See GB, MOT, Transport for Industry (Summary Report): A Study of the Determinants of Demand for Transport in Manufacturing Industry, by B.T. Bayliss and S.L. Edwards (London: HMSO, 1968), pp.7, 51-52.

[1] No information could be found on the extent to which the 1951 breakdown mentioned previously was valid for subsequent years. However, in the opinion of an MOT statistician, it is unlikely that the 1951 situation has any relevance today. Private communication from Mr T.F.J. Hobson, MOT Directorate of Statistics, 26 June 70.

[2] The likelihood of a firm setting up separate transport accounts would appear to increase with: a) the importance attached by management to accurate cost information, b) the absolute size of the annual outlay on transport, c) the relative significance of transport costs in the total cost structure, d) the size of the firm, and e) the age and experience of the transport manager or the person responsible for transport. Cf. A.A. Walters, Integration in Freight Transport, IEA Research Monograph, No. 15 (London: Institute of Economic Affairs, 1968), p.58. The introduction of quality licensing in 1970 should give quite a fillip to the separation of transport from other accounts. On quality licensing, see GB, MOT, The Transport of Freight, Cmnd. 3470 (London: HMSO, 1967), paras. 44-50.

useful in a census of production, is not significant for our purposes. It would be desirable ideally, in evaluating the role of transport considerations in private location decisions, to know the extent to which various industries contract out the transport function (distinguishing between transport inwards and outwards) rather than provide it themselves, and the reasons for their choice. The census sheds some light on the former issue although the figures require careful interpretation. A great deal of information is available on the latter question.[1]

Table 6.3 Industries (MLHs) for Which Own-Account Transport Forms More Than 50% of Total Transport Costs

SIC Order	Number of Industries	Own-Account/Total Transport Cost Ratios by MLH		
		≥70.000	60.00 - 69.99	50.00 - 59.99
III	5	212,231, 239.2/3	214	213
IV	2			263,274
V	0			
VI	9	342,363	333,351	335,338,349, 364,369
VII	1			370
VIII	2	383		389
IX	2		392,396	
X	1		423	
XI	1		433	
XII	5			441,442,443, 445,449.2
XIII	0			
XIV	6	473,474	472,475	471,479
XV	1			489
XVI	0			
Totals	35	8	9	18

Source: Appendix C.

[1] See K.M. Gwilliam, Transport and Public Policy, Minerva Series of Students' Handbooks, No. 11 (London: George Allen & Unwin Ltd., 1964), pp.134-38; Bayliss and Edwards, op. cit.; W.R. Cook, "Transport Decisions of Certain Firms in the Black Country," Journal of Transport Economics & Policy, I (September 1967), 325-44; Walters, op. cit., pp.54-67. The data underlying the Bayliss-Edwards study were gathered for the most part during the fall of 1966. Cook's findings relate to 1964-66. Walters's survey material was collected largely in 1954-55. The advantages to manufacturers of own-account road transport are discussed briefly but perceptively by a Mrs. Cox in K.F. Glover and D.N. Miller, "The Outlines of the Road Goods Transport Industry (and Discussion)," Journal of the Royal

Table 8.3 specifies the industries for which purchased transport appears to be relatively unimportant, i.e., for which own-account road transport represents more than 50% of total transport costs. Certain patterns emerge from a comparison of Tables 8.1 and 8.3 and Appendix C as argued in detail below. At the same time, the many exceptions reduce the value of any generalisations. For instance, own-account transport predominates in four SIC Orders - food, drink and tobacco; shipbuilding and marine engineering; vehicles; and timber, furniture, etc. However, some industries within these groupings, e.g., sugar and margarine, spend very little on own-account vehicle fleets while a number of others purchase more than half of their transport requirements.

The propensity to use own-account transport would appear to be highest in the cases of: 1) bulky and/or perishable, low-value consumer goods, 2) high-value, low-weight products, 3) fragile and/or easily damaged items. Plausible explanations are readily available. Commercial hauliers frequently shy away from high-cube, low-weight goods - potato crisps are a classic case - because their rate structures tend to be oriented towards the value or weight of commodities rather than their cubic measurement. Perishable and low-value goods are usually manufactured close to the ultimate consumer and short-haul transport is predominantly own-account.[1] Carrier liability is normally limited on high-value, low-weight commodities.[2] Goods of this type are also more susceptable to pilferage. Manufacturers thus have a double incentive to use their own vehicles. Fragile and/or damage-prone items will usually require special handling and may involve the use of specialised vehicles. Again, manufacturers will have good reason to undertake the transport task themselves although contract hauliers (the old Contract A type) may be equally suitable in some circumstances. Examples of each of the three categories are: 1) bread, biscuits, beer, soft drinks, timber and wooden containers, 2) jewellery, furs, gloves, engineers'

Statistical Society, CXVII, Series A (Part III, 1954), p.325. A good practical treatment of the subject of own-account vs. purchased transport is provided by G.A. Hughes, Company Freight Management: Introduction to Cost-Effective Freight Transport with Guide to the Transport Act (London: Gower Press, 1969).

[1] Cf. Baylies and Edwards, op.cit., pp.10-11, 29-30.

[2] Under the Road Haulage Association's Conditions of Carriage, carrier liability is limited to £200 a ton on the gross weight of consignments. Hughes (1969), p.152.

small tools and gauges, cutlery, ordnance and small arms, 3) scientific, surgical and photographic instruments, radios, electronic goods, furniture and aircraft. The most dramatic exceptions are milk products[1] and margarine in the first class, watches and clocks in the second and glass and pottery in the third. Other examples of a less striking nature could also be cited. However, at least some of these exceptions could be more apparent than real with the seeming preference for purchased transport being explained by the existence of separate transport organisations within respondents' firms. A surprising exclusion from Table 8.3 is MLH 273 (explosives and fireworks) where, because of the dangerous nature of the products, one would have expected own-account transport to predominate. In fact, own-account transport was responsible for 49.9% of total transport costs. Some of the 21 firms in the industry may have had their own separate transport organisation or they may have employed contract hauliers. Another curious exclusion is building materials (MLH 469.2), an industry characterised by short hauls and heavy consignments,[2] and generally considered to be predominantly road-using.[3]

A high proportion of purchased transport tends to be associated with processed fuel (MLH 261) or relatively unsophisticated intermediate goods such as sugar, dyestuffs, fertilisers, iron and steel products, rope, cement and paper. Again, there are important exceptions. On the one hand, certain consumer goods, e.g., spirits, tobacco, men's shirts and carpets, appear at the upper end of the transport payment/total transport cost ratio scale. On the other hand, basic industries like vegetable and animal oils and fats, non-ferrous metals and general chemicals display relatively low ratios, i.e., they all fall within the modal range, 60.00-69.99.

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[1] Establishments engaged mainly in the processing and bottling of milk are excluded from the manufacturing sector by the 1958 SIC but included by the 1968 edition. 'Milk products' according to the 1958 definition means butter; cheese; ice cream; and condensed, evaporated and dried milk, etc. including infant and invalid foods with a milk base. It could be argued that none of these items, with the exception of ice cream, is really bulky and/or perishable. On the other hand, they are all low-value and several require special storage facilities.

[2] Cf. below.

[3] GB, MOT, Committee on Carriers' Licensing, Report, Lord Geddes, chairman (London: HMSO, 1965), p.106.

The first group of exceptions is not readily comprehensible. One would have expected consumer goods producers, on the basis of the arguments developed earlier, to prefer own-account to purchased transport. Perhaps they did but the failure of the census to distinguish 'own separate transport organisations' from non-linked firms has disguised the fact. Explanations for the second set of exceptions are more easily adduced. Edwards[1] suggests that the propensity to use own-account transport displayed by the vegetable and animal oils and fats and the general chemicals industries reflects their need for specialised road vehicles. However, he finds the non-ferrous metals case "inexplicable". Cook,[2] on the other hand, found that the non-ferrous metal firm in his sample operated its own vehicles because of the susceptibility to pilferage of some of its materials, and the need of some of its products for careful handling to avoid damage.

Choice of transport method, as noted above has been the subject of considerable investigation in the UK. One of the most authoritative studies is that by Bayliss and Edwards(1968) conducted for the MOT. They found, employing probability analysis on data from 722 manufacturing establishments, that length of haul was "overpoweringly" the most important determinant of whether a manufacturer used own-account or purchased transport in distributing his output. The greater the length of haul, the greater the probability of a manufacturer making use of professional hauliers.[3] Consignment weight was a second but much less significant factor. The larger the consignment, the greater the chance of it being carried by the firm's own vehicles.[4] Twenty-three other variables including relative price or cost, speed, type of commodity, freedom from loss, freedom from damage, size of firm and ownership of C-licence

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[1] Op.cit.

[2] Op.cit., p.340.

[3] This was not a new insight. It was noted in the Toothill Report (1961, p.75), for example; that "The longer the distances involved, the less likelihood of a firm's providing its own transport by means of C-licensed vehicles, because of the additional capital and effort required."

[4] There is evidence to indicate that this relationship may not hold in future as common carriers, including the Post Office, become more cost-conscious and opportunities for cross-subsidisation are reduced. Bayliss and Edwards found that, for consignments of not more than 22 lbs, the PO parcels service was the transport mode most favoured by shippers. Yet this service lost £4.9m in 1965-66 on an income of £39.4m despite tariff increases in 1961, 1963 and 1965. See GB, Select Committee on Nationalised Industries, First Report: The Post Office, Vol. I: Report and Proceedings of the Committee, H.C. 340, 1966-67 (London: HMSO, 1967),

vehicles were examined but found to be individually unimportant in explaining the distribution of traffic.

Cook(1967), using a traditional type of analysis and interview results from 29 enterprises (33 firms), also found that relative price/cost was less important in choice of method than its assigned role in economic theory. However, he attached more significance to price/cost than did Bayliss and Edwards. Other important general variables emerging from his study were reliability, service, the historical development of the enterprise, the personal qualities and experience of the transport manager and simple inertia. He found a widespread preference for road haulage as opposed to rail where output was being sent to a variety of destinations. Freedom from damage was important in 23 cases leading to an emphasis on own-account road transport or, failing that, to the use of a small road haulier "to whom the firm is an important customer". Particularly interesting is Cook's discovery that in 18 out of 29 cases the customer specified the mode of transport to be used. Two explanations were advanced: a) the nature of the customer's receiving facilities; b) his need for inputs according to a very precise delivery schedule. The result was a strong bias on the part of customers in favour of road haulage. It should be cautioned that Cook's findings may largely reflect the non-random nature of his interviewee selection process, the common location of the interviewees in the Black Country and their concentration in the metal-using and engineering industries. In other words, they may be of limited relevance generally.

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pp.57-58. Money was still being lost in 1968-69. See PO, Report and Accounts for the Year Ended 31 March 1969, H.C. 444, 1968-69 (HMSO, 1969), p.25. For consignments within the weight class, 23-560 lbs inclusive, shippers still maintained a preference for commercial transport according to Bayliss and Edwards, with road hauliers attracting somewhat more freight than British Rail. However, neither mode made much money on this traffic. Indeed, ample evidence is available, both in Britain and elsewhere, to show that 'smalls' business is usually non-profitable. Smith Transport Ltd., for example, one of the largest Canadian road haulage enterprises, recently established that the average expense per revenue dollar associated with consignments of under 500 lbs was $1.36. This relationship had probably existed for years, it said, but had only come to light with the application of modern accounting and costing techniques. The implication, however, was immediately clear. Hauliers could no longer afford to accept 'smalls' because of pressure on profit margins and reduced scope for cross-subsidisation by other traffic. See "Six Ways of Shipping 'Smalls' Discussed by Traffic Experts," Truck Transportation Canada XVIII (March 1970), pp.12-13. It follows from the foregoing that Bayliss and Edwards' finding concerning consignment weight and likelihood of own-account carriage may soon prove to be dated.

Walters's general approach to the question of modal choice was similar to that used by Cook. Interviewees were confined to the West Midlands and were questioned at some length. However, Walters's sample (512 plants) was much larger than Cook's and it was both random and stratified by size. Thus, his results are probably more reliable. Unfortunately, they are now somewhat dated although the general conclusion, that the modal decision is usually based on a "very large number" of considerations, remains valid.

We can sum up the main argument to date very succinctly; prior to the publication of the 1963 Census of Production results, it was impossible to compute meaningful transport cost/output ratios for any manufacturing industry because the official data on transport payments available during the 1940s and 1950s gave an incomplete, and in the case of the unwary user, a misleading, picture of the real incidence of transport costs. Why this general situation prevailed has not been determined in any definitive way but it would appear that the BOT's Distribution of Industry and Regional Division made little sustained effort to have the census used as a vehicle for obtaining accurate transport cost information, either because the transport payments data were felt to be good enough or because transport costs were considered to be of little consequence for most industries as a location determinant. Clearly, this subject requires further research.[1] What we have done is to point out the inadequacies for our purposes of transport payments data in isolation, the incidence of own-account transport and some of the factors governing its use.

Deficiencies in the 1963 Census

The section on transport payments was dropped from the 'simple'[2]

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[1] Unfortunately, the extensive minutes of the Advisory Committees on the Censuses of Production are confidential. These Committees are statutory bodies set up on an *ad hoc* basis to advise the BOT.
While they do not have powers of final decision, they can and do exercise considerable influence on both the scope and detail of each specific census.

[2] In 1959, returns were required from all firms employing ≥ 25 persons. A sample of these firms was taken in subsequent years. In all cases only a limited number of questions was asked.

censuses conducted annually between 1959 and 1962. According to a report by the government's Interdepartmental Committee on Social and Economic Research:

> It was decided, after a careful review of the information available from other sources, that particulars of . . . payments for transport need not be obtained.[1]

These other sources were not specified but an inquiry to the MOT revealed that they did not involve manufacturers' transport costs.[2]

An expanded section on transport costs was reintroduced as part of the detailed census of 1963. Edwards advanced two reasons for this action: 1) the serious weakness noted above in previous census information on transport costs, 2) the rapid growth in the use of own-account (A-licence and C-licence) road transport by industry during the 1950s and early 1960s.[3] The 1963 census took cognizance of this situation by asking respondents for the first time to provide information not only on payments to other organisations for transport but also on the costs of running their own road vehicles.[4]

Specifically, all firms employing ≥ 25 persons were asked to provide transport expenditure data under the following headings:

a) payments to other organisations
b) wages and salaries
c) motor fuel
d) road goods vehicle operating costs, i.e.:
   (i) insurance
   (ii) vehicle licences
   (iii) depreciation
   (iv) payments to other organisations for repairs and maintenance.

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[1] Op.cit., p.9.

[2] Private communications from Mr Hobson, 29 May 70 and 26 June 70.

[3] Op. cit.

[4] The questions on road vehicle operating costs were included at the request of the MOT. Private interview with Paul D. Dworkin, Chief Statistician, Census of Production, BOT at Eastcote, 23 April 70.

Item (a) yielded results similar in concept to those obtained from the 1951-8 censuses. Despite this similarity it is not possible to make realistic estimates of total transport expenditure for those earlier years on the basis of the 1963 transport payment/total transport cost (TPTTC) ratios for two reasons.[1] First, as we have already seen, there have been important changes in the own-account/total transport cost ratio over time. Second, temporal changes in management or accounting practices by census respondents could alter the TPTTC ratio for a given industry independently of changes in economic conditions by raising or lowering the amounts paid or credited to respondents' own separate transport organisations. An additional obstacle to the development of meaningful trend data appeared in 1958 with the adoption of a new SIC. However, the BOT overcame this problem, at least in part, by reprocessing the 1954 census data on the new basis thereby establishing a 'bridge' to the earlier census results. In conclusion it appears that the 1963 census data on transport costs in British manufacturing stand on their own in the sense that they are not comparable with other, nominally similar, census data.

The contents of item (a) are as follows:

> . . . payments for hired cartage and for inwards and outwards carriage by all forms of inland transport, i.e. railways, road haulage, canals, coast-wise shipping, air, etc. Payments made for sea freight on goods sold to customers overseas and on materials and fuel purchased from overseas suppliers are excluded.[2]

Items (b) - (d) are self-explanatory.

Unfortunately, the items specified in 1963, while much more inclusive than formerly, are still not fully comprehensive.[3] First of all, certain own-account road vehicle fleet operating costs, e.g.,

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[1] Edwards, op.cit., examines and discusses two further possibilities with regard to the 1954-63 period: 1) changes in the amount of transport required per unit of output, 2) disparate rates of change in the prices of manufactured goods and freight rates.

[2] GB, BOT, Report on the Census of Production, 1963, Pt. 1: Introductory Notes (London: HMSO, 1968), para. 111.

[3] As will become evident, we do not have in mind here the very wide definition of transport costs advanced by Isles & Cuthbert(1957); cf. ch. 6.

tyres and materials for repairs and maintenance, were included for respondents under the questionnaire heading, "capital expenditure," or opposite replacement purchases, rather than opposite vehicle operating costs. The amounts are not identifiable. Edwards compensates for this curious state of affairs by multiplying the published own-account cost data by 109%.[1] This correction factor includes an indeterminate allowance for the cost of hiring vehicles. Strictly speaking, Edwards should have deducted an equivalent sum from 'payments to other organisations for transport'. However, the amount involved was small - "about 2% of total costs of operating an own-account fleet and possibly less than 1% of total transport costs of a firm."[2]

Second, respondents were not asked to include the cost of own-account transport by the four non-road transport modes, viz., rail, pipeline, air and water.[3] For many, perhaps most, industries, this example of incompleteness will be of little consequence if only because the transport function has been given over to separate departments with their own accounts or even to separate companies. A transfer along these lines is particularly likely to have occurred in the cases of pipeline and water transport. Baylies and Edwards found in their sample survey of industrial demand for transport outwards that 82% of manufacturing firms owned C-licence fleets; the probability of ownership rose with the size of establishment. Relatively few firms had rail sidings or their own railway wagons with the exception of establishments in the iron, steel and chemical industries where investment in rail facilities was relatively common, especially amongst establishments employing $\geq$ 500 persons.[4] In these and similar instances, own-account non-road transport

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[1] Op.cit.

[2] Private communication from Mr S.L. Edwards, 15 June 70. Regrettably, this information came too late for us to recalculate the many transport cost/output ratios presented below, all of which incorporate both the adjustment factor of 109% and the unadjusted payments total.

[3] Some may inadvertantly have done so at least in part, e.g., under the heading, wages and salaries, but there is no way of establishing whether this occurred or to what extent.

[4] Baylies and Edwards(1968), pp.48-49. Luttrell, II(1962, p.629) reported that a very large chemical firm [ICI] built 17 miles of railway and 18 miles of road during the late 1940s as part of its Tees-side expansion programme.

costs could be quite significant. Moreover, such costs are likely to increase rather than decrease in importance. While systematic evidence is lacking, this contention is strongly corroborated by the growing awareness on the part of many firms, including the producers of such commodities as oil, semi-finished steel, pulped paper, liquefied ammonia, cement, soda ash, whisky, vehicles and vehicle components, of the economic advantages of company trains, special-purpose rolling stock, and containers.[1] Mention might also be made, although the example refers to passenger rather than goods transport, of the increasing use, especially by larger companies with scattered operations, of private executive aircraft in place of commercial air services. This phenomenon was examined in some depth recently by the Economist.[2] Particularly noteworthy is the enormous difference between the U.S. and Britain in the number of multi-engine business aircraft flown by professional pilots. The figures are 10,000 and 150 respectively. Not all of this gap can be explained by relative distances and populations. Indeed, the Economist suggests that too many British executives still look upon business aircraft as "expensive gimmicks, unnecessary in a small country with a developed surface transport system." Capital costs range from £30-80,000 for a light twin to £400,000 for a twin jet. Ownership, as opposed to hiring, becomes feasible at a utilization rate of about 300 hours a year. Annual operating costs for a £30,000 six-seater flying 600 hours a year are roughly as follows:

Maintenance & overhaul	£7,200
Pilot - salary + related expenses	5,500
Petrol & oil	3,750
Insurance	800
Hangerage	360
Total operating costs	£17,610

The fact that businessmen make use of private aircraft is relatively well-known. Less widely appreciated is the current improvement in the fortunes of the railways and the related change in producer attitudes towards them.[3] A specific case is helpful in illustrating

[1] Cf. Michael Baily, "BR Expects £50m Private Investment in Bulk Freight," The Times, 23 Nov 70, p.17; G.F. Allen, British Rail After Beeching (London: Ian Allan, 1965), ch. 8.

[2] "Businessmen in the Air," Economist, 22 Nov 69, p.80.

[3] Cook(1967) in his series of interviews in the West Midlands between 1964 and 1966 found that a majority of manufacturers had a rather low opinion of rail transport, frequently as a result of actual experience, but sometimes through ignorance. In contrast, Baylies and Edwards(1968)

what could be the beginning of a significant shift in traffic from road to rail. British Oxygen Company has recently entered into a 10-year contract with British Rail for the transport of industrial gases via "dedicated" trains from Widnes to widely-dispersed distribution points at Wembley, Margam (Wales), Middlesbrough, Sheffield and Motherwell. The novel feature of this arrangement is the fact that the company is putting up the capital necessary to construct and service the specially-designed tank wagons, and to provide special sidings. BR's capital commitment is negligible. The expected advantages of the contract from the company viewpoint are: a) better service to customers through greater flexibility and reliability in its distribution system; b) a 25% reduction in its capital outlay from what it would have been using a road tanker fleet of equivalent capacity; c) lower operating costs relative to road transport.[1]

Third, as already indicated, respondents were specifically asked to exclude the cost of transporting goods, materials and fuel to and from the UK, even when overseas markets or suppliers were of major concern. Many companies, of course, do not concern themselves with the price of their products in foreign markets. According to British European Airways, more than 60% of British exports are marketed ex-works or f.o.b.-port of export leaving all, or the bulk of, the transport

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detected a positive change in the attitude of manufacturers towards British Rail.

[1] For greater detail on the BOC-BR contract, see Andy McIlroy, "Liquid Gas by Rail," Financial Times, 4 Mar 70, p.10. Relative road and rail rates per ton-mile for a wide range of commodities are given in B.M. Deakin and T. Seward, Productivity in Transport: A Study of Employment, Capital, Output, Productivity and Technical Change, University of Cambridge, Department of Applied Economics, Occasional Paper No. 17 (Cambridge: Cambridge University Press, 1969), pp.60-62. While cost was a secondary consideration in BOC's decision to use BR, for some companies it might be of prime importance although Dayling and Edwards (1968) found that the effect of relative price on modal choice was small. Most of the planned shifts from road to rail which they encountered were a consequence of the new freightliner service. Deakin and Seward found that rail was generally cheaper than contract road transport with the exception of a few commodity groups, especially metal manufactures, machinery and transport equipment, and wood, timber and cork (for the content of these groupings, see Deakin & Seward, pp.74-76). C-licence road transport, they suggested, was typically almost twice as expensive per ton-mile as for-hire road haulage (ibid., fn. 1, p.64).

problem to the British middleman or foreign buyer.[1] It follows that, in a majority of cases, British exporters simply do not know the total transport costs involved in moving goods from points in Britain to their final destinations. Although the transport cost data from the census of production were meant conceptually to refer only to intra-UK freight movements, in practice, where inputs purchased overseas were invoiced "carriage paid home," respondents would have been unable to estimate and deduct sea or air freight costs. No information is available on the extent to which this occurred but it is likely that the published figures include at least some disguised sea or air freight charges.

Returning to the larger issue, how important is the exclusion from the census of the cost of transport to and from the UK? Unfortunately, available evidence is very scanty. Nonetheless, some light can be shed on this question. The most valuable source of relevant information is the attempt by Carmelliah Moneta, using 1951 German data, to estimate transport costs in international trade.[2] Her purpose was to improve the general quality of balance of payments statistics. Most countries value their exports on a f.o.b.-frontier basis. Imports, on the other hand, are usually given a c.i.f. valuation. Conceptually, the c.i.f. value is equal to the f.o.b. value at the border of the country of export plus the cost of transporting and insuring the relevant goods to the border of the importing country. A rule of thumb in converting c.i.f. to f.o.b. values is to reduce the value of imports by a uniform 10%. A refinement of this procedure is to reduce the value of petroleum imports by 50% and the value of all other imports by 10%. Yet, as Moneta points out, not only do these general correction factors ignore the role of time, they also gloss over the effects of variations in the origins and, with the exception of oil, the commodity composition of imports. She hoped, by looking in detail at a particular country's experience, to develop general guidelines for making the c.i.f./f.o.b. adjustment procedure more realistic. Germany was selected simply because the necessary data were most readily available. She found that

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[1] GB, National Economic Development Office, Economic Development Committee for the Movement of Exports, Through Transport to Europe (London: HMSO, 1966), App. XIV, para. 5, p.74.

[2] Carmelliah Moneta, "The Estimation of Transportation Costs in International Trade", Journal of Political Economy, LXVII (February 1959), 41-58.

the average freight factor[1] for German sea-borne imports in 1951 was 14.3%. There was considerable dispersion around this average in the cases of both origins and commodity groups as indicated by Tables 8.4 and 8.5 respectively. Length of voyage was an important explanation of the variability in Table 8.4. Value per ton was the predominant consideration in Table 8.5, i.e., the freight factor approached zero as the per ton value increased and vice versa. The distribution of

Table 8.4 Freight Factors for German Sea-Borne Imports by Origin, 1951

Origin	Freight Factor %
Middle East	55.0
North America	21.0
Europe (inc. U.K.)	12.0
Latin America	11.0
Africa	10.0
Far East	7.0
Oceania	6.0
United Kingdom	2.4
All origins	14.3

Source: Monota(1959), Table 3, p.46 and Table A1, p.56.

freight factors by commodity group was positively skewed with 50% of all imports in value terms having a freight factor of less than 8%. The corresponding figures for the remaining imports were as follows:

Freight Factor	Share of Total Imports
≥ 8% but < 16%	12.3%
≥ 16% but < 32%	20.7%[2]
≥ 32% but < 65%	17.0%

It is important to bear in mind when evaluating the freight factors in Table 8.5 that the underlying data relate to 1951. Ocean freight rates were abnormally high in that year as a result of the Korean war. A more permanent factor making for a reduction in ocean freight rates since the early 1950s has been the accelerating trend towards larger

[1] A freight factor can be defined generally as the freight component of delivered price or c.i.f. value, i.e., a freight factor = (freight charge/c.i.f. value) x 100. The freight charges in Monota's study relate solely to sea transport; her freight factor estimates exclude all inland transport charges and some costs incurred at the port interface.

[2] Monota(1959), Fig. 1, p.48.

ships.[1] This trend has been particularly evident in the case of vessels carrying oil, ore and other bulk commodities many of which have been associated historically with above-average freight factors. The largest

Table 8.5 Freight Factors for Selected German Sea-Borne Imports by Commodity Group, 1951

SITC* Division	Commodity Group	Freight Factor %
312	Petroleum, crude	64.3
281	Iron ore & concentrates	54.9
271	Fertilisers, crude	49.6
313	Petroleum products	30.0
283	Ores of non-ferrous base metals	25.8
242	Wood in the round	24.8
041	Wheat, unmilled	16.2
046	Flour	14.1
061	Sugar	10.5
112	Alcoholic beverages	9.7
511	Chemicals, inorganic	9.5
011	Meat, fresh, chilled or frozen	8.4
532	Dyeing & tanning extracts	7.2
053	Fruit, preserved & preparations	5.9
264	Jute	5.8
211	Hides & skins	4.1
641	Paper & paperboard	4.0
121	Tobacco, unmanufactured	3.5
263	Cotton	3.5
681	Iron & steel	2.5
651	Textile yarn & thread	1.4
652	Cotton fabrics	0.9
712	Machinery, agricultural	0.8
721	Machinery, electric	0.5
714	Machinery, office	0.3
All commodities		14.3

*Standard International Trade Classification

Source: Moneta(1959), Table A2, pp.57-58.

oil tanker afloat as recently as 1948 was 26,000 d.w.t. Gulf Oil's "Universe Ireland" currently operating between Kuwait and Bantry Bay is 326,000 d.w.t.[2] and 1,000,000 ton tankers are being contemplated.

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[1] For recent developments see Robin Sanders, "The Shipbuilders: A Special Survey," Economist, 2 Mar 68; Robin Sanders, "Icebergs Ahead for Oilbergs?" Sunday Times, 4 May 69, p.37; "World Shipbuilding: A Special Report", The Times, 1 Dec 69; Scottish Council (Development & Industry), Oceanspan: A Maritime-Based Development Strategy for a European Scotland, 1970-2000 (Edinburgh: Scottish Council (Development & Industry), 1970).

[2] A contract for the "world's biggest tanker," a 477,000 ton vessel, was announced in London on 23 Jun 70. Michael Baily, "Globtik Confirms £17m Ship Order," The Times, 24 Jun 70, p.22.

Grangesberg, a major Swedish company specialising inter alia in the shipment of iron ore, is no longer buying carriers of less than 70,000 d.w.t. whereas vessels of 15,600 d.w.t. were the latest thing in 1951.[1] Behind this surge in average ship size lie two salient points. First, large ships are cheaper per ton than small vessels both to build and to operate. Second, steady growth in international trade during the post-war period has greatly increased the demand for shipping capacity. To some extent these points are interrelated, with reduced shipping costs as a result of economies of scale in ship size leading to the exploitation of new sources of supply in Australia and elsewhere. Sanders in 1969 put the cost of transporting oil from the Persian Gulf to Rotterdam in a 325,000 d.w.t. ship at about 17 shillings per ton. The comparable figure for a 25,000 d.w.t. tanker was 50 shillings.[2] More recently, the Economist put the cost of landing Middle East crude on the east coast of the United States at U.S. $2.14 a barrel. The freight factor involved was 34.6%.[3] In sum, while this evidence is piecemeal, the implications are clear. Freight factors comparable to those in Table 8.5 are less significant today, especially at the high end of the scale, than they were in 1951.[4]

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[1] L'Institut pour L'Etude des Methodes de Direction de L'Entreprise (IMEDE), Grangesberg: A Case Study, by Bruce R. Scott and C. Roland Christensen (Lausanne, Switzerland: IMEDE, 1965-66), Parts BI and FI. Grangesberg's largest ship, a 106,400 d.w.t. ore/oil carrier, was delivered in 1969. Two 265,000 d.w.t. o/o carriers are on order for delivery in 1972/73. See the summary of the company's 1969 annual report in the Financial Times, 23 Jun 70, p.8. The combined payload of the two largest vessels will exceed that of the entire Granges fleet as it was in 1959 (35 ships). Granges, Annual Report, 1969 (English translation), p.22.

[2] Sanders(1969). Both costs are on a pre-devaluation basis.

[3] Calculated from "Business Brief: The American Oil Dilemma", Economist, 28 Feb 70, p.63.

[4] This generalization must be taken as descriptive of the trend; it may not apply to any particular point in time. For example, at the end of June 1970 the oil industry was paying 148s. a ton to transport Persian Gulf crude to the UK. In March 1970 it was paying 100s. a ton. Both figures were abnormally high. Cf. Clive Callow, "Freight Rises May Lead to Dearer Petrol," The Times, 30 Jun 70, p.21. By October 1970, the cost of transporting Middle East crude to the UK had risen to 218s. a ton. "True Offshore Wealth," Economist, 24 Oct 70, p.65. These various figures are spot tanker freight rates, of course, and not average freight values on all UK oil imports.

As noted earlier, Moneta's freight factors refer only to sea transport charges. To these should be added certain port charges, the cost of inland transport from the port of discharge to the final destination of the goods, insurance, forwarding agents' fees where applicable and any other related expenditure. A recent pilot study by the Organisation for Economic Co-operation and Development deals specifically with the question of ocean freight rates as a proportion of total transport costs.[1] While the analysis omits the insurance variable and is confined to general cargo movements between North America and Western Europe, the results are nonetheless illuminating. It was found that, on average (222 shipments), ocean freight formed roughly 70% of the cost of transporting manufactured goods from the border of the country of export in Europe to their final destination with the remainder being divided between inland freight in North America (23.4%) and port and other charges (6.6%).[2]

John M. Munro tried to make use of the freight factor concept in a recent study of the effect of transport policy on commodity flows between Canada and the United States.[3] However, he encountered three major difficulties:

1) Canada and the U.S., like most countries, do not publish or even collect the necessary statistics.
2) The two countries use different commodity classifications and comparability is not easily achieved.
3) Temporal variability in freight factors can be significant given wide fluctuations in either commodity prices or freight rates. Munro suggested that ocean transport was most vulnerable in this respect but clearly certain commodity prices are also subject to considerable variation as anyone following lumber and nickel market trends during 1968-69 will be well aware.

Despite these problems, Munro was able to calculate a number of freight factors, the ranking of which was more or less in accordance with Moneta's finding that the value of a freight factor is inversely related to the per ton value of the commodity to which it applies. Particularly

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[1] OECD, Ocean Freight Rates as Part of Total Transport Costs (Paris: OECD, 1968).

[2] Calculated on the basis of ibid., Table 7, p.29 and paras. 20 and 36.

[3] John M. Munro, Trade Liberalization and Transportation in International Trade, Canada in the Atlantic Economy Series, No. 8 (Toronto: University of Toronto Press for the Private Planning Association of Canada, 1969). See especially pp.6-16, 195-96, 200-02.

interesting for our purposes was Munro's general conclusion that:

> It is virtually impossible to provide definite guides to state how important transport costs must be before they have a significant impact on international trade flows.[1]

Other things being equal, a high transport cost/delivered price ratio suggests greater sensitivity to transport cost changes than does a low ratio. On the other hand, even slight changes in production or distribution costs can be important to the firm fighting for a share of a highly competitive market regardless of the size of the freight factors involved.

One might also mention in connection with this discussion on the cost of transport to and from the UK an attempt by three Oxford economists to estimate the effect of a reduction in short-sea ocean freight rates on the economic potential of each region in Western Europe.[2] Economic potential is a conceptual device for measuring the attractiveness of a given region to new industry. The measurement formula developed by Clark, et al. is as follows:

$$P_i = \frac{I}{M} + \sum_{\substack{j=1 \\ j \neq i}}^{n} \frac{I_j}{M + T_{ij}} + F$$

where P_i = economic potential of region i

I = regional income

M = intraregional minimum transport costs (assumed to be the same for all regions)

T_{ij} = transport costs from i to j

F = tariff

1 to n = 103 regions of Western Europe

n + 1 to n = all non-West European regions

Underlying this formula is the view that the most important variables determining the location of manufacturing plants are: 1) regional income, 2) transport costs. A computer was used to work out the economic potential of each West European region under five sets of conditions. One of these sets involved the assumption that the European Economic Community had been enlarged to encompass Denmark, Eire, Norway and the UK in addition to the existing 'six'. Another involved two assumptions: 1) a 10-nation EEC, 2) reduced short-sea shipping costs as a result of containerisation. These sets of conditions can be referred to as A and

[1] Munro, op.cit., pp.9-10.

[2] C. Clark, F. Wilson & J. Bradley, "Industrial Location and Economic Potential in Western Europe", Regional Studies, III (September 1969), 197-212.

B respectively. Table 8.6 shows their effect on the economic potential of selected British regions relative to the most attractive or core area in Western Europe.

Table 8.6 Economic Potentials under Alternate Sets of Conditions: Selected British Regions and the Core Area of Western Europe

Selected Regions	Economic Potentials under Alternate Sets of Conditions		
	A	B	B as % of A
West European core*	3900	3900	0.0
London & South-East	3100	3500	112.9
South Scotland (centred on Hawick)	2300	2700	117.4
Central " (centred on Glasgow)	2300	2500	108.7
North " (centred on Inverness)	2100	2300	109.5
Northern Ireland	1900	2100	110.5

*The most attractive area for manufacturers in Western Europe. Includes eastern Belgium, south-east Holland and the Rhine Valley in West Germany.

Source: Calculated from figures in Clark, Wilson & Bradley(1969).

Two points stand out from this table. First, a reduction in short-sea freight rates could have a considerable positive effect on the competitive position of British manufacturers. In other words, the pre-containerisation rates must have represented a sizable barrier to exports.[1] Second, reduced short-sea rates would benefit some regions in Britain more than others. For example, South Scotland would benefit more than the Central Belt.

A more speculative flaw in the coverage of direct transport costs by the 1963 census involves the possibility that some respondents may have omitted from their returns expenditure on purchased inbound transport as inconsequential or included it in the cost of commodity purchases despite the instruction in the notes accompanying each questionnaire to include intra-UK transport charges under transport payments

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[1] Cf. GB, NEDO, EDC for the Movement of Exports, Delivering the Goods: A Study of Moving British Exports to Europe (London: NEDO, 1968), p.3 where it is argued that "The English Channel and North Sea do appear as an isolating factor out of all proportion to the ease with which they can now be crossed."

whenever these charges were identifiable.[1] While data are lacking, a priori one would not expect any such inconstancies to be very important since the usual (but by no means universal) practice in the case of domestic suppliers is to quote delivered prices.[2] It can also be argued that the alleged inconstancies reflect a decline in the significance of inbound transport costs as a location factor. This decline is simply the reciprocal of the widespread use of delivered pricing and is striking proof of the old adage, 'out of sight, out of mind'. Conceptually, the transport cost/value of inputs ratio should exceed that for output reflecting the generally accepted proposition that any transport cost/total cost ratio will be an inverse function of the per ton value of the commodity being transported. Inasmuch as manufactured output has a higher value per weight unit than inputs, it follows, given a normal[3] freight rate structure and assuming (albeit rather heroically) that few suppliers have absorbed or disguised their transport costs, that the burden of these costs should be more onerous with regard to inputs than output. Relaxing the assumption concerning suppliers' treatment of transport costs, of course, may well render the

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[1]This judgment is an intuitive one based on the literature and the case studies presented below.

[2]Cook found that only 15 out of the 33 firms for which he obtained information took a close and continuing interest in transport inwards; some of these were concerned about the progress of consignments rather than transport expenditures because the cost of transport was hidden in the delivered price. Cook(1967), pp.329-30. On the other hand, his findings are not particularly persuasive per se since his interviewees were concentrated in one small area and selected non-randomly from a relatively narrow range of industries. They have been strongly corroborated, however, by our case studies and by S.B. Edwards who asserted in a private communication (15 Jun 70) that "my experience has consistently been that industry in Britain quotes delivered prices for customers in Britain. This is true not only of firms producing finished goods but also of many of those producing intermediate products . . .". See also Luttrell(1962), NIDC(1962), Toothill Report(1961) and, more recently, Michael Chisholm, Geography and Economics (London: G. Bell & Sons, Ltd., 1968), ch. 7.

[3]What has been 'normal' since early in the railway era is becoming increasingly abnormal as freight rates generally move closer to actual costs. Traditionally, low-value commodities such as many raw materials and intermediate goods have contributed very little to carriers' fixed costs or profits. Consequently, these goods should be especially affected by the changing structure of freight rates lending even more force to our theoretical argument. There is a vast literature on this general topic. See, e.g., Gwilliam(1964); Gilbert Walker, Road and Rail: An Enquiry into the Economics of Competition and State Control (London: George Allen and Unwin Limited, 1942); Walters(1968), ch. 2;

theoretical postulate invalid in many cases. It should also be noted that the identifiable cost of transporting inputs appears generally to be less in absolute terms than the cost of transporting output.[1] Yet, if all freight rates were based on real costs and suppliers brought all their transport costs into the open, this situation might be different. In summary, three propositions can be stated with reasonable certainty:

1) the alleged failure of some manufacturers to include or allocate properly all identifiable inbound transport costs in their census returns, if true, can be seen as reflecting the unimportance of these costs both absolutely and as a location determinant;
2) conceptually, $\frac{TC_1}{I} > \frac{TC_2}{O}$ where
   TC_1 = inbound transport costs
   TC_2 = outward transport costs
   I = value of inputs
   O = value of output;
3) in practice, manufacturers consider $TC_2 > TC_1$.

It should be mentioned finally that the census of production excludes direct outlays on intra-establishment transport regardless of whether the costs were incurred within a single plant area or resulted from the movement of goods between separate sites covered by a single return. Two points seem relevant here. First, intra-establishment transport costs, if tabulated at all, will be of significance for very few firms. Second, it is difficult to conceive of such costs affecting a manufacturer's location decision for presumably they would be spatially invariant. Thus, we can henceforth ignore them.

& Graham L. Reid and Kevin Allen, Nationalized Industries, Penguin Modern Economics Texts (Harmondsworth, Mddx.: Penguin Books, 1970), ch. 5.

[1] Cf. our case studies and the NIDC survey results presented in ch. 6. The survey of distribution costs in British manufacturing reported in GB, EDC for the Distributive Trades, Planning Warehouse Locations: Studies of the Location of Depots and Warehouses and Their Role in the Distribution System (London: HMSO, 1967), p.8, puts the cost of inbound transport at 1.5% of sales. The corresponding figure for outbound transport is 4.0%. Unfortunately, the make-up of these percentages is not specified in any detail. Thus, while we can accept the orders of magnitude involved, we do not know to what extent the figures are comparable to the transport cost/gross output ratios derived below from census data. Cook(1967) found that the median value of the outbound transport/ex-works cost ratio was 3%.

It is useful at this juncture to recapitulate what we have been saying about the coverage of direct transport costs in British manufacturing by the 1963 Census of Production. Total transport costs can be disaggregated into many components. The following equation indicates the set most relevant to our purposes.

$$TC = P_a + P_b + P_c + R_u + R_v + NR$$

where

TC = total transport costs

P_a = payments to other organisations for transport services within the UK

P_b = respondent inconsistencies in connection with inbound P_a

P_c = payments to other organisations for transport services outwith the UK

R_u = expenditure on own-account road transport except R_v

R_v = expenditure on tyres, vehicle hire charges and materials for repairs

NR = non-road, own-account transport.

We have shown that the census data include $P_a + R_u$ only. Respondents could have provided at least some information on P_c, R_v and NR but were not asked to do so. P_b of course refers to respondent error concerning P_a.

What is the significance of the omissions from the census coverage of direct transport costs? Of the four unknowns we can assign a value only to R_v with any degree of certainty. As noted earlier, this variable would appear to be equal to 9% of the value of R_u (see Table 8.1) which in turn is equal to 42.1% of the combined value of P_a and R_u. In other words, R_v would not appear to be very important in aggregate terms although this judgment might well be reversed in individual cases.

There is little doubt that P_c is of much greater significance than R_v in absolute terms. On the other hand, its relevance to intra-UK industrial location decisions is probably minimal. Two reasons can be put forward in support of this assertion. First, few British manufacturers are very far from a deep-sea port or an international air terminal. Consequently, the intra-UK component of the total cost of shipping goods from a British plant to a foreign buyer will be very small.[1]

[1] Cf. the discussion above concerning the OECD study of ocean freight rates relative to total transport costs.

Second, at least two of the large shipping consortia serving Britain[1] have instituted a one-price collection system whereby all manufacturers are charged a standard rate for the shipment of their containerised goods from an Inland Clearance Depot (ICD) to the docks at Tilbury irrespective of the location of the ICD, the commodities involved, or their unit weight. The freight rate is related solely to the size of the container. This arrangement has the effect of placing most manufacturers on an equal footing with respect to the intra-UK leg of an export shipment. The exceptions are those producers located some distance from an ICD. Even their handicap can be expected to diminish with time as ICDs become more plentiful.[2]

P_b and NR are both likely to be less significant than R_v in aggregate terms although specific evidence is lacking. It is difficult to visualise them as being of vital importance to a firm even in a limited number of instances.

Indirect Transport Costs

Indirect transport costs, by definition, do not involve an identifiable financial outlay by the individual firm; thus, they are ignored by establishment-oriented censuses of production. This does not mean, however, that they are without locational significance. Such costs can take three forms: 1) the social costs borne by the state, 2) the hidden transport component in the delivered price of inputs, 3) the costs incurred by the distributive trades rather than the manufacturer. They can affect private location decisions in either of two ways. On the one hand, previously indirect costs may become direct with consequences for existing establishments. Pricing arrangements, distribution procedures and government subsidy programmes are all subject to periodic change. Usually the locational implications will be negligible but not always as for example, to take an extreme case, when a loss-making railway line is closed and marginally profitable, rail-using

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[1] Overseas Containers Ltd. and Associated Container Transportation Ltd. on the UK-Australia run.

[2] Cf. Model Toys case study below and University of Glasgow, Department of Social & Economic Research and University of Strathclyde, Departments of Urban and Regional Planning and Economics, A Report on Containerisation: Implications for Distribution and Transportation in West Central Scotland, submitted to the Scottish Development Department and the Glasgow Chamber of Commerce (Glasgow: Universities of Glasgow and Strathclyde, 1969).

establishments are forced to switch to higher-cost transport modes. On the other hand, industrialists may occasionally refuse to locate new plants in certain areas despite explicit financial incentives unless an adequate transport infrastructure is in place or under construction and they are satisfied that some of the continuing costs involved will be borne by the state and/or by the other customers of their suppliers as a result of average cost pricing. Clearly then, indirect transport costs should not be entirely ignored when discussing transport costs and the location of British manufacturing although direct costs will generally be of much greater significance. In the following sections we comment very briefly on public transport subsidies and at greater length on manufacturers' pricing policies with a view to rendering the subsequent empirical analysis of direct transport cost/output ratios more meaningful and placing it in a broader perspective.

Transport Subsidies

Transport subsidies represent the difference between the real resources utilised in the provision of transport facilities/services and user costs, i.e., the prices actually paid by transport users. Subsidies can be either explicit or hidden with the trend being towards the former situation. A related phenomenon is the gradual decline in the aggregate level of subsidy in the UK which seems to have been occurring in recent years as a result of reduced opportunities for cross-subsidisation, greater intermodal competition and increased use of analytical techniques like cost-benefit analysis. However, subsidies have by no means been eliminated.[1] In general, individual firms will have little knowledge of the extent to which they are benefitting from public transport subsidies inasmuch as the British government has never used direct transport grants to industrialists as compensation for adverse locations.

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[1] See, e.g., the note by the MOT to the recent Select Committee on Scottish Affairs and the Committee's examination of MOT witnesses. GB, Select Committee on Scottish Affairs, Minutes of Evidence, 23rd April - 16th July, 1969 and Appendices, H.C. 397, 1968-69 (London: HMSO, 1969), pp.301 - 28, 405.

Manufacturers' Pricing Policies[1]

In general, manufacturers take transport costs into account when setting prices in one of two ways. Either they price ex-works or they quote on a delivered basis.[2] The argument usually advanced in support of ex-works pricing has two strands. It is claimed first that an ex-works price policy enables a manufacturer to predict his net returns from a given volume of sales with a high degree of accuracy because customers pay all outbound transport costs. Consequently, uncertainty is diminished, expansion capital can be raised more easily and on better terms, and the quality of corporate planning is enhanced. Second, it is argued that the producer need not concern himself with the intricacies of the freight market nor with loss and damage claims. The resultant savings take the form both of reduced money outlays on transport specialists and reduced worry. Against these advantages, however, can be listed several disadvantages. First, ex-works pricing almost invariably imposes a spatial market limitation on a seller in a non-monopoly position especially when the product involved is highly standardised, e.g., cement, steel ingots, or primary aluminium. (And even monopolists cannot escape the effects of commodity substitution by consumers.) Product differentiation can reduce the height of the geographic barrier imposed by factory price plus transport costs but only

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[1] We are grateful to Thomas E. Milne, Lecturer in Business Economics, U. of Glasgow, for help in the initial planning of this section. Some basic references are Hoover(1948), Chisholm(1968) and Donald V. Harper, Price Policy and Procedure, Harbrace Series in Business and Economics (New York: Harcourt, Brace & World, Inc., 1966).

[2] While a small majority of deliveries in the UK are still made to independent wholesalers, direct manufacturer-retailer links are becoming increasingly important. Universities of Glasgow & Strathclyde, Report on Containerisation, ch. 1. Detailed information on manufacturers' sales by distribution channel was collected for GB by the 1948 Census of Production and for the UK by the 1950 Census following a recommendation by the Nelson Committee on the Census of Production in 1945. However, the subject was dropped from later production censuses as a result of the inauguration of a Census of Distribution in 1950 and the exceptional difficulties experienced by many respondents in providing accurate figures. It is unlikely that the 1948-50 data are particularly relevant today. Also, the industry breakdown used at that time was based on the 1948 SIC. See GB, BOT, Report of the /Nelson/ Census of Production Committee, Cmd. 6687 (London: HMSO, 1945); Final Report on the Census of Production for 1948, 157 parts in 12 vols. (HMSO, 1951-53); The Report on the Census of Production for 1950, 13 vols. (1953); Census of Production for 1951: Summary Tables, Part II(1956), Table 6; Report of the /Smith/ Committee(1954); Interdepartmental Committee, Census of Production Reports (1961).

in the unlikely case of oligopolistic control of a unique, spatially-concentrated natural resource can non-monopolists hope to surmount this barrier with certainty and ease. Second, an ex-works price policy makes it difficult for consumer goods manufacturers to maintain or advertise resale prices. Third, manufacturers pricing ex-works may underestimate the need for keeping track of transport developments. Their salesmen or marketing personnel, for example, will be handicapped by not being able to quote delivered prices when asked to do so. Thus, such companies may find it necessary to hire transport specialists after all.

Delivered pricing can take several forms: 1) zone systems, 2) freight allowed, 3) basing-point. Zone system pricing would appear to be the most common form used in the UK with freight allowed a distant second, although it has not been possible to document this assertion. Basing-point pricing, while mandatory in the European Coal and Steel Community and historically important but now illegal in a number of American industries, e.g., steel, cement, asphalt roofing, sugar and wood pulp, is found in Britain only in the cement industry where a fine-mesh multiple basing-point arrangement gives locational results akin to those produced by an ex-works pricing system.

Delivered pricing by zone can be done on either a single or multiple-zone basis. Single-zone pricing involves the addition of an average transport cost factor to the ex-works unit sales value resulting in price uniformity throughout the market. Clearly, this policy will become increasingly risky the greater the spatial spread of the market, the greater the amount of freight absorption involved in supplying distant customers and the greater the exploitation of customers located near the production point. Multiple-zone pricing developed as a way of minimizing the risk associated with discriminatory or delivered pricing. Proponents argue that manufacturers may derive up to six specific advantages from multiple-zone pricing. First, the penetration of markets distant from the production centre(s) is made easier. This advantage is most pronounced in high fixed cost or excess capacity situations. Second, it is easier to maintain resale prices, the advantages of which include better service before and after sales, and stability in production. A third and related point is that salesmen can quote prices with greater certainty. Fourth, a multiple-zone strategy may be more realistic than single-zone pricing or indeed the only possible strategy when great distances are involved. Fifth, multiple

-zone pricing may facilitate market segmentation in spatial terms with delivered price being tailored to geographic variations in the price elasticity of demand. Finally, multiple-zone pricing can be used to help cope with varying degrees of competition in different geographic markets.

The disadvantages of zone system pricing are generally much less important than the advantages. However, they are by no means insignificant and can be crucial in specific cases. Perhaps the salient disadvantage is the fact that net returns on sales will vary with changes in the spatial distribution of customers. Hopefully, freight absorption costs will be offset by 'phantom' freight revenues but this may not necessarily occur and the prudent firm, particularly one in an industry characterised by high transport costs relative to value added, will keep its average transport cost factor(s) under constant review so as to minimize the costs arising out of any adverse shift in the market. Manufacturers pursuing a zone system price strategy may encounter ill-will on the part of customers located near the production points or zone boundaries where price discrimination will be especially evident. Finally, zone-system pricing will involve the producer in the transport business with its accompanying costs and worries.

Delivered pricing on a freight allowed basis means that the customer arranges and pays for the transport of his goods from the manufacturer's plant to their destination but then deducts the costs involved from the manufacturer's invoice. It is similar to ex-works pricing in that the responsibility for making transport arrangements is transferred from the producer to the customer. The difference between the two systems is that under freight allowed schemes the manufacturer maintains a very close interest in transport matters.

It was noted earlier that many British exporters market ex-works, f.o.b.-port of export or c.i.f.-port of import rather than on a delivered basis. These firms are likely to have a very imperfect knowledge of the total transport costs involved in the distribution of their products. This same conclusion would apply in the case of goods destined for UK consumers on a non-delivered price basis. To the extent that non-delivered prices are quoted in connection with intra-UK freight movements, the census data on transport costs could be misleading because many users will assume implicitly that the official figures relate to delivered values. Indeed, even those who take the trouble to read the fine print may not always remember that this assumption is

unwarranted. We can do little more than discuss this problem in a general way due to a complete absence of information on census respondents' pricing policies. Census personnel should ponder this point when deciding on the scope of future censuses of production. Asking respondents to indicate the pricing procedure normally followed in the case of their major product(s) would not seem to raise any special problems apart from increasing the length of the questionnaire or precipitating a fresh look at information priorities with a view to eliminating some other question in order to prevent an increase in the burden on respondents. On the other hand, such a query could yield considerable benefits in the form of new insights and increased understanding. In the meantime, because no one else appears to have tackled the subject on a comprehensive basis,[1] we shall have to make do with a miscellany of insights gleaned from a variety of sources in interpreting the transport cost/output ratio data developed in the next section.

Transport Cost/Output Ratios

The simplest way of assessing the importance of transport costs to industry is to express them as a percentage of industrial output. On *a priori* grounds we would expect a transport-sensitive industry to exhibit a relatively high transport cost/output ratio. Low ratio industries, on the other hand, presumably require access to reasonably good transport facilities but, given this minimum requirement, transport costs would not likely constrain their freedom to locate or their growth expectations.

Output can be defined in either gross or net terms. Gross output

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[1] The interdepartmental Committee on Economic Research, an official body composed of civil servants, has recently called for "a systematic investigation of all aspects of company behaviour, including . . . price decisions and the factors affecting them. In particular, studies of price formation at the firm level, including studies of distributive costs and margins, would fill a considerable gap." GB, Committee on Economic Research, "Survey of Government Needs in the Field of Economic Research - An Assessment of Gaps and Priorities," working paper prepared for the Social Science Research Council conference on social science research inside and outside government, Bristol, 1969, para. 20. According to Chisholm(1968, p.188), the extent to which delivered pricing prevails in the UK "is a much-neglected field of geographic and economic research that would amply repay cultivation".

according to the census of production is equal to sales plus an inventory adjustment. Net output is equivalent to value added and includes own-account transport expenditures[1] but not purchased transport.

Table 8.7 presents transport cost/gross output and transport cost/net output ratios for 119 UK manufacturing industries. All data refer to 1963 and to firms employing 25 or more persons. Clearly, choice of denominator makes a considerable difference in the value of a transport cost/output ratio. In the table, net output gives a result $2\frac{1}{2}$ times that obtained by using gross output; the all-industry ratios are 5.8% and 2.3% respectively. Indeed, gross output is rather unsatisfactory as a denominator because it includes an element of duplication.[2] On the other hand, it is frequently easier in specific instances to obtain turnover (or gross output) data than figures on value added. Therefore, we have included both types of ratio in Table 8.7 to illustrate their relationship. Henceforth, we shall largely ignore gross output because of the duplication problem and in order to make our analysis more manageable. However, gross output could be substituted for net output in studies of this type where necessary with only a limited loss of accuracy.[3]

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[1] Technically, of the various own-account transport expenditures, only wages, salaries, insurance, licences and depreciation should be included in net output. Motor fuel purchases and payments to other organisations for repairs and maintenance should be excluded. We have not made any adjustment in the census data along those lines as the effect would be negligible.

[2] For details, see Part 1 of the Report on the Census of Production, 1963, paras. 99-103. Duplication is substantial in the motor vehicle (MLH 381) and woollen and worsted (414) industries. Also, it rises with the level of aggregation, i.e., it is greater at the Order than the MLH level.

[3] Spearman's coefficient of rank correlation between transport cost/gross output and transport cost/net output ratios derived from unadjusted 1963 census of production data for UK manufacturing industries at the MLH level was +0.925. This result has not been corrected for the existence of 4 tied observations in each of the two series but the consequent over-valuation of r_s is considered to be insignificant. On the technical point, see K.A. Yeomans, Statistics for the Social Scientist, Vol. II: Applied Statistics, Penguin Education X6, Studies in Applied Statistics (Harmondsworth, Midx.: Penguin Books, 1968), pp.304-05.

Table 8.7 Transport Cost/Gross Output & Transport Cost/Net Output Ratios by Order & MLH, UK Manufacturing Industries (Larger* Firms Only), 1963.

1958 SIC Order	MLH	Transport Costs: Gross Output %	Transport Costs: Net Output %
III	211-240	3.4	13.9
	211	3.4	14.3
	212	10.5	25.0
	213	4.4	10.6
	214	3.5	13.2
	215	5.0	27.7
	216	3.9	24.2
	217	3.3	7.4
	218	4.7	13.4
	219	3.4	17.4
	229.1	1.9	13.7
	229.2	3.5	10.2
	231	3.6	11.8
	239.1	1.2	5.1
	239.2/3	10.5	23.4
	240	0.3	3.0
IV	261-277	2.5	7.0
	261	2.9	20.0
	262	0.3	2.2
	263	4.5	12.2
	271.1	1.5	3.1
	271.2	5.6	17.4
	271.3	3.3	7.5
	272.1	1.9	3.2
	272.2	1.8	3.1
	273	2.5	3.0
	274	3.1	6.9
	275.1	2.0	12.1
	275.2	3.3	8.4
	276	1.9	4.9
	277.1	3.1	6.7
	277.2	4.7	11.7
V	311-322	2.1	6.7
	311	2.4	7.8
	312	2.4	6.5
	313	3.1	6.7
	321,322	1.2	4.5

1968 SIC Order	MLH	Transport Costs: Gross Output %	Transport Costs: Net Output %
VI	331-369	1.4	2.7
	331	2.0	4.5
	332	1.1	2.2
	333	1.2	1.8
	334	1.2	2.6
	335	1.1	2.1
	336	1.5	3.9
	337	1.7	3.1
	338	0.9	1.6
	339	1.7	3.1
	341	1.7	3.7
	342	0.7	1.2
	349	1.4	2.5
	351	1.0	1.7
	352	0.7	1.1
	361	1.3	2.6
	362	2.1	5.9
	363	0.9	1.5
	364	0.9	1.6
	365	2.0	4.0
	369	1.7	3.3
VII	370	0.6	1.2
VIII	381-389	0.9	2.2
	381	0.9	2.6
	382	1.8	3.9
	383	0.6	1.1
	384	0.4	0.9
	385	0.8	1.5
	389	3.6	7.7
IX	391-399	1.8	5.1
	391	1.9	3.4
	392	0.8	1.2
	393	1.8	3.5
	394	2.2	7.5
	395	3.4	11.7
	396	0.1	1.8
	399	2.5	5.0

1958 SIC Order	MLH	Transport Costs Gross Output %	Net Output %
X	411-429	1.2	3.3
	411	1.2	2.1
	412	0.8	2.5
	413	0.8	2.7
	414	1.2	3.9
	415	1.6	4.4
	416	2.8	8.4
	417	0.9	2.2
	418	0.9	2.1
	419**	1.7	4.5
	421	1.3	2.9
	422.1	1.5	4.8
	422.2	2.2	9.2
	423	2.7	4.4
	429.1	1.9	3.8
	429.2	3.8	10.7
XI	431-433	1.5	4.6
	431	1.5	5.1
	432	2.0	4.5
	433	1.2	2.8
XII	441-450	1.1	2.5
	441	1.0	2.4
	442	0.9	2.0
	443	1.3	3.0
	444	1.2	3.3
	445	1.2	2.8
	446	1.6	3.2
	449.1/3/4	1.0	2.1
	449.2	1.4	3.1
	450	1.0	2.2

1958 SIC Order	MLH	Transport Costs Gross Output %	Net Output %
XIII	461-469	8.2	15.6
	461	12.9	22.3
	462	2.6	4.0
	463	5.2	9.5
	464	6.0	12.6
	469.1	1.9	3.5
	469.2	10.9	23.6
XIV	471-479	4.1	9.3
	471	4.4	12.2
	472	3.9	7.9
	473	4.2	10.8
	474	2.7	4.5
	475	4.8	11.4
	479	4.4	8.7
XV	481-489	3.0	6.0
	481	3.2	8.5
	482	3.3	8.1
	483	2.9	6.7
	486	3.7	6.3
	489	1.9	3.1
XVI	491-499	2.1	4.5
	491	2.1	4.6
	492	2.4	5.6
	493	2.4	5.3
	494	2.8	5.2
	495	1.6	2.9
	496	2.1	4.3
	499	1.5	3.0
III-XVI	211-499	2.3	5.8

* Firms employing ≥ 25 persons.
**Cf. Appendix C.

Source: Derived from 1963 Census of Production.

Transport cost/net output (TCNO) ratios derived from census of production data will vary by industry for two reasons: 1) differences in

the under-recording of transport costs,[1] 2) variations in the relative size of the identifiable transport outlays. Unfortunately, it is not possible to assign precise weights to these causes in particular cases. Consequently, great care must be taken when analyzing the ratios.

[1] Cf. previous sections.

Are the TCNO ratios for firms within an industry apt to be similar? That is to say, are the TCNO ratios at the MLH level reasonably representative? While empirical evidence is lacking, recent work on the theory of the firm[1] suggests an affirmative answer to those questions. It has been argued for example that most decision-making in industry reflects inter alia a strong desire on the part of firms to avoid or minimise uncertainty. Rather than predict external occurrences as a basis for action, they prefer to control their environment through such devices as standard operating procedures, industry-wide conventions, etc. Pricing policy is perhaps the most likely decision variable to be affected by those practices.

As indicated by Table 8.7, transport costs relative to net output at the Order level are most important in the case of building materials (XIII). Other industry groups having TCNO ratios greater than the all-industry ratio (5.8%) are food, drink and tobacco (III), timber products (XIV), chemicals (IV), metal manufacture (V) and paper, printing and publishing (XV) in that sequence (see Table 8.8). A priori, firms in these six Orders would appear to be the most sensitive to transport costs and the most apt to take them into account when deciding on new plant locations. Perhaps the most striking aspects of the list of transport-sensitive industry groups are the rankings of chemicals and metal manufacture, the stereotype 'heavy' industrial Orders, relative to the food and timber groups. Two possible explanations suggest themselves. First, while all four groups are dependent upon imports for a considerable proportion of their raw materials, this dependence is probably greatest in the cases of chemicals and metals. Furthermore, according to the freight factors developed by Moneta,[2] inbound transport costs are more onerous with respect to crude petroleum, crude fertilisers, iron ore and the various non-ferrous ores than grain, tobacco, roundwood, etc. As we have already seen, while none of the extra-UK freight charges on imports appear in our TCNO ratios, they are nevertheless real and form part of the 'heavy' image attributable to chemicals and primary metals. Thus, their exclusion will affect the 'heavy' industries more than the others. Second, own-account transport is much more important to the food and timber groups than to the other two. Own-account operators tend to have higher costs per ton-

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[1] Cf. Cyert & March(1963).

[2] Cf. Table 8.5. While the specific freight factors in this table may have little relevance to Britain in 1963, the rank order is probably applicable.

mile than their professional counterparts.[1] Hence, it is not entirely surprising that the food and timber groups display higher TCNO ratios than the so-called heavy industries.

Table 8.8 SIC Orders Ranked According to the Value of Their Transport Cost/Net Output Ratios, and the Coefficient of Variation for the Mills Within Each Order, Larger UK Manufacturers, 1963.

Order	Industry Group	Rank	Coefficients of Variation
XIII	Bricks, pottery, glass, cement, etc.	1	63.4
III	Food, drink & tobacco	2	49.1
XIV	Timber, furniture, etc.	3	28.1
IV	Chemicals & allied industries	4	64.0
V	Metal manufacture	5	18.7
XV	Paper, printing & publishing	6	29.2
IX	Metal goods n.e.s.	7	69.6
XI	Leather, leather goods & fur	8	23.6
XVI	Other manufacturing industries	9	22.9
X	Textiles	10	57.4
VI	Engineering & electrical goods	11	44.9
XII	Clothing & footwear	12	37.9
VIII	Vehicles	13	79.9
VII	Shipbuilding & marine engineering	14	n.a.

n.a. = not applicable.

Note: Dividing line in table = 5.8%, the TCNO ratio for all manufacturing industries.

Source: Derived from Table 8.7.

The Orders least sensitive to transport costs according to Tables 8.7 and 8.8 are shipbuilding and vehicles. Shipbuilding is an outstanding example of an industry whose output is marketed almost completely ex-works. Direct transport costs are incurred only in connection with some of the inputs. Many of the industries in the vehicles group share these characteristics, e.g., aircraft, locomotives, railway carriages and most of the motor vehicle manufacturers.[2] Of the other six 'loss-sensitive' Orders, XIX and VI have the lowest TCNO

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[1] Cf. Baylies and Edwards(1968), p.11.

[2] Ford is the major exception.

ratios. Interestingly, they have been two of the most important sources of migrants to Scotland and NI during the postwar period.[1] We return to this theme in ch. 11.

Table 8.8 ranks the Orders by TCNO ratio. To what extent is this ranking valid for the individual MLHs within each Order? In other words, are the Orders equally homogeneous? This problem is best approached by means of the coefficient of variation (v), a statistical device for measuring the degree of dispersion or variability of distributions. The coefficient is expressed as a per cent. A low figure indicates limited variability and vice versa. V-values for the various Orders are included in Table 8.8. The range is enormous from 17.9% (clothing and footwear) to 79.9% (vehicles). No figure appears for shipbuilding because it is a single-MLH Order. Clearly, one can feel confident that the Order-level TCNO ratio is reasonably representative of the ratios for the relevant MLHs in only four cases: XII, V, XVI and XI. For the majority of Orders, v was > 25% indicating widespread diversity at the MLH level.

So far, we have been discussing the TCNO ratios in Table 8.7 largely in terms of Orders. It is equally interesting to look at the figures from the viewpoint of the MLHs. It will be seen first that the range at the MLH level is exceedingly wide with the largest ratio (27.7) being almost 31 times the size of the smallest (0.9). The relevant industries are milk products (MLH 215) and locomotives and railway track equipment (384) respectively.

Transport-sensitive industries can be assumed to have a TCNO ratio greater than the arithmetic mean ($\bar{x}$) for all industries.[2] The reverse would apply to transport-insensitive industries. Degree of sensitivity can be measured by the distance of specific ratios from $\bar{x}$. Given a perfectly symmetrical distribution, $\bar{x}$ will coincide with the median and fully half of the industries making up the distribution will appear to be transport-sensitive. In fact, the TCNO ratio distribution for manufacturing industries in Britain is positively skewed;[3] only

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[1] Cf. ch. 7.

[2] Sensitivity is very much a relative matter. Absolute guides are simply not available. Cf. Munro's general conclusion as quoted earlier.

[3] The coefficient of skewness according to a modified version of Pearson's formula = 1.1. The formula used was $3(\bar{x} - M)/s$.

35.3% (42) of the industries for which data are available have ratios $> \bar{x}$.

The standard deviation(s) can be used as a measure of transport sensitivity. Using s together with $\bar{x}$ we can describe the distribution of TCNO ratios in Table 8.7 as follows:

$$\bar{x} \pm 1s = 6.5 \pm 5.7 = 12.2 \text{ and } 0.8$$

$$\bar{x} + 2s = 6.5 + 2(5.7) = 17.9$$

$$\bar{x} + 3s = 6.5 + 3(5.7) = 23.6$$

The number and percentage of industries falling within various ranges is shown below:

Range	No. of Industries	% of N(119)
$\bar{x} + 1s$	28	23.5
$\bar{x} + 2s$	35	29.4
$\bar{x} + 3s$	39	32.8
$> \bar{x} + 3s$	3	2.5
$\bar{x} - 1s$	76	63.9
$< \bar{x} - 1s$	0	0.0

It is clear that the great majority of those industries which we have defined above as transport-sensitive have TCNO ratios of $< \bar{x} + 1s$, i.e., their degree of sensitivity is relatively modest. This finding is somewhat surprising given the mildly platykurtic or slightly squashed shape of the TCNO ratio distribution. Platykurtosis is a particular type of kurtosis (the amount of peakedness in a specific distribution relative to a 'normal' curve). A platykurtic distribution has a lower than normal peak. The percentile coefficient of kurtosis (k) for a normal distribution is 0.263. Since the k-value for the TCNO ratio distribution is only 0.246 it is obvious that the ratios are more dispersed around the mean than would normally be the case.

We have noted that three industries were very transport-sensitive in 1963 relative to the norm, i.e., their TCNO ratios were $> \bar{x} + 3s$. These industries are:

milk products (MLH 215)
bread and flour confectionery (212)
sugar (216)

Interestingly, none of the industries in Order XIII are represented in this polar group despite the relative rankings of Orders XIII and III in Table 8.8.

A further four industries fall within the range, $> \bar{x} + 2s < \bar{x} + 3s$, namely:

miscellaneous building materials (469.2)
soft drinks, wines & cider (239.2/3)
bricks, fireclay & refractory goods (461)
coke ovens & manufactured fuel (261)

Seven industries fall within the range, $> \bar{x} + 1s < \bar{x} + 2s$, viz.:

animal and poultry foods (219)
fertilisers & chemicals for pest control (271.2)
grain milling (211)
margarine (229.1)
fruit and vegetable products (218)
bacon curing, meat & fish products (214)
cement (464)

Of the remaining 28 'transport-sensitive' industries, 19 are in Orders having TCNO ratios $> \bar{x}$, i.e., $> 6.5\%$. The other nine are from Orders with below-average ($\bar{x}$) TCNO ratios. Given their somewhat untypical nature, these industries warrant explicit identification as follows:

Order	Industry
VIII	Perambulators, handtrucks, etc. (389)
IX	Wire & wire manufactures (394) Cans & metal boxes (395)
X	Rope, twine & net (416) Canvas goods & sacks (422.2) Miscellaneous textile industries (429.2)
XV	Paper and board (481) Cardboard boxes, cartons & fibreboard packing cases (482) Miscellaneous manufactures of paper & board (483)

It will be noted that intermediate goods are the main output of most of these industries.

Five Orders - VI, VII, XI, XII and XVI - contained not a single transport-sensitive industry (as defined).

Communication Costs

Communication cost data were first collected by the 1948 Census of Production. All establishments employing more than 10 persons were asked to specify their payments to others for postage, telephone, telegram and cable services.[1] Similar data were not collected again until 1963. The 1963 results by Order appear in Table 8.9. No breakdown is available of the different categories of communication cost. Presumably the data are reasonably accurate although it is quite conceivable and indeed likely that many firms, especially smaller ones, do not keep a careful record of postage outlays. Inexplicably, telex expenditure was not sought in 1963 (or 1948), an important omission as will be evident from our case studies.

Table 8.9 Expenditures on Communications* by SIC Order, Larger** UK Manufacturers, 1963

1958 SIC Order	Industry Group	Communication Outlays £'000	%
III	Food, drink & tobacco	6,378	8.9
IV	Chemicals & allied industries	6,618	9.3
V	Metal manufacture	3,286	4.6
VI	Engineering & electrical goods	18,994	26.6
VII	Shipbuilding & marine engineering	667	0.9
VIII	Vehicles	5,883	8.2
IX	Metal goods n.e.s.	3,861	5.4
X	Textiles	4,281	6.0
XI	Leather, leather goods & fur	381	0.5
XII	Clothing & footwear	2,468	3.5
XIII	Bricks, pottery, glass, cement, etc.	2,437	3.4
XIV	Timber, furniture, etc.	1,860	2.6
XV	Paper, printing & publishing	11,339	15.9
XVI	Other manufacturing industries	3,015	4.2
III-XVI	Total manufacturing	71,448	100.0

* Postage, telephones, telegrams & cables.

** Firms employing ≥ 25 persons.

Source: Census of Production, 1963.

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[1] Detailed figures by Order and MLH(1948 SIC) are included in BOT, Census of Production for 1951: Summary Tables, Part II (London: HMSO, 1956), Table 7.

Communication cost/gross output (CCGO) and communication cost/net output (CCNO) ratios at the Order and MLH levels are presented in Table 8.10. As was argued earlier in connection with the transport cost/output ratios, gross output has certain deficiencies as a denominator. Consequently, we shall henceforth ignore the CCGO ratios although it is interesting to note their relationship to the CCNO figures.

Table 8.10 CCGO & CCNO Ratios by Order and Minimum List Heading, Census UK Manufacturers, 1963

1958 SIC Order	MLH	Communication Costs: Gross Output %	Communication Costs: Net Output %
III	211-240	0.1	0.5
	211	0.1	0.6
	212	0.2	0.5
	213	0.3	0.6
	214	0.2	0.9
	215	0.1	0.6
	216	0.02	0.3
	217	0.2	0.6
	218	0.3	0.8
	219	0.1	0.7
	229.1	0.1	0.4
	229.2	0.2	0.6
	231	0.1	0.4
	239.1	0.1	0.3
	239.2/3	0.3	0.7
	240	0.03	0.3
IV	261-277	0.2	0.7
	261	0.03	0.2
	262	0.1	0.4
	263	0.3	0.9
	271.1	0.2	0.4
	271.2	0.2	0.7
	271.3	0.2	0.5
	272.1	0.5	0.8
	272.2	0.7	1.1
	273	0.3	0.4
	274	0.5	1.0
	275.1	0.1	0.5
	275.2	0.3	0.7
	276	0.3	0.7
	277.1	0.4	0.9
	277.2	0.3	0.8
V	311-322	0.1	0.4
	311	0.1	0.3
	312	0.2	0.6
	313	0.2	0.4
	321,322	0.1	0.6
VI	331-369	0.4	0.8
	331	0.4	1.0
	332	0.4	0.7
	333	0.6	0.9
	334	0.4	0.9
	335	0.3	0.6
	336	0.4	1.0
	337	0.4	0.8
	338	0.3	0.6
	339	0.5	0.9
	341	0.4	0.9
	342	0.3	0.6
	349	0.4	0.7
	351	0.7	1.1
	352	0.6	1.1
	361	0.4	0.8
	362	0.2	0.7
	363	0.3	0.5
	364	0.4	0.8
	365	0.4	0.6
	369	0.4	0.8
VII	370	0.2	0.3
VIII	381-389	0.2	0.5
	381	0.2	0.5
	382	0.3	0.6
	383	0.3	0.6
	384	0.1	0.2
	385	0.1	0.2
	389	0.4	0.9

1958 SIC Order	MLH	Communication Costs Gross Output %	Net Output %
IX	391-399	0.3	0.7
	391	0.5	0.9
	392	0.5	0.7
	393	0.3	0.6
	394	0.2	0.8
	395	0.2	0.6
	396	0.1	1.0
	399	0.4	0.7
X	411-429	0.2	0.6
	411	0.1	0.2
	412	0.1	0.4
	413	0.2	0.5
	414	0.2	0.6
	415	0.1	0.4
	416	0.3	0.8
	417	0.3	0.6
	418	0.3	0.7
	419	0.3	0.7
	421	0.4	0.9
	422.1	0.3	1.1
	422.2	0.3	1.3
	423	0.3	0.5
	429.1	0.5	1.1
	429.2	0.4	1.1
XI	431-433	0.3	0.8
	431	0.2	0.7
	432	0.5	1.1
	433	0.3	0.7
XII	441-450	0.5	0.7
	441	0.3	0.7
	442	0.3	0.6
	443	0.3	0.7
	444	0.4	1.0
	445	0.4	1.0
	446	0.4	0.8
	449.1/3/4	0.5	1.1
	449.2	0.5	1.0
	450	0.3	0.5
XIII	461-469	0.3	0.6
	461	0.3	0.5
	462	0.5	0.8
	463	0.3	0.5
	464	0.2	0.4
	469.1	0.4	0.8
	469.2	0.4	0.9
XIV	471-479	0.4	0.8
	471	0.3	0.9
	472	0.4	0.7
	473	0.5	1.2
	474	0.4	0.7
	475	0.3	0.7
	479	0.4	0.9
XV	481-489	0.7	1.5
	481	0.1	0.4
	482	0.3	0.7
	483	0.4	1.0
	486	1.5	2.6
	489	0.9	1.5
XVI	491-499	0.4	0.8
	491	0.5	0.7
	492	0.3	0.7
	493	0.4	0.9
	494	0.6	1.0
	495	0.9	1.7
	496	0.5	1.0
	499	0.4	0.7
III-XVI	213-499	0.3	0.7

Source: Derived from 1963 Census of Production.

Perhaps the most striking aspects of the CCNO ratios in Table 8.10 are their generally minuscule size and limited range. For example, the ratio for all manufacturing industries is only 0.7%. Five Orders have ratios in excess of this figure, viz., VI, XI, XIV, XV and XVI. However, the range for all Orders is only 0.3% to 1.5%. Consequently, an explicit ranking seems unwarranted. On the other hand, coefficient of variation data (see Table 8.11) indicate considerable diversity, i.e., v >25%, within eight of the 13 Orders containing more than one MLH. The range in the coefficients, from 18.5% (IX) to 62.2% (XV), is also considerable.

Much less impressive is the range at the MLH level, from 0.2% (4 industries) to 2.6% (printing and publishing of newspapers and periodicals). With a coefficient of skewness = 0, the distribution of CCNO ratios would appear to be perfectly symmetrical. Therefore, the properties of the normal or Gaussian curve should apply, i.e., approximately

Table 8.11 Coefficients of Variation in the CCNO Ratios for the MLHs Within Each SIC Order, Larger UK Manufacturers, 1963

Order	Industry Group	Coefficients of Variation %
III	Food, drink & tobacco	32.2
IV	Chemicals & allied industries	37.4
V	Metal manufacture	27.4
VI	Engineering & electrical goods	20.2
VII	Shipbuilding & marine engineering	n.a.
VIII	Vehicles	49.0
IX	Metal goods n.e.s.	18.5
X	Textiles	42.2
XI	Leather, leather goods & fur	22.6
XII	Clothing & footwear	24.2
XIII	Bricks, pottery, glass, cement, etc.	29.1
XIV	Timber, furniture, etc.	21.2
XV	Paper, printing & publishing	62.2
XVI	Other manufacturing industries	34.4

Source: Derived from Table 8.10.

68% of the ratios should fall within the range, $\bar{x} \pm 1s$, 95% within $\bar{x} \pm 2s$ and virtually 100% within $\bar{x} \pm 3s$. In fact, as can be seen below, these percentages do not characterise the distribution. The polar values for the various ranges are as follows:

$$\bar{x} \pm 1s = 0.7 \pm 0.3 = 1.0 \text{ and } 0.4$$

$$\bar{x} \pm 2s = 0.7 \pm 0.6 = 1.3 \text{ and } 0.1$$

$$\bar{x} \pm 3s = 0.7 \pm 0.9 = 1.6 \text{ and } 0$$

The number and percentage of ratios (industries) falling within these ranges is:

Range	No. of Industries	% of N(119)
$\bar{x} \pm 1s$	87	73.2
$\bar{x} \pm 2s$	116	97.5
$\bar{x} \pm 3s$	118	99.2

These percentages suggest a certain amount of platykurtosis in the distribution. The actual k-value is 0.214.

Communication and Transport Costs Compared

This section has two purposes: 1) to summarise the analysis so far, 2) to indicate the extent to which transport and communication outlays are interrelated.

Arithmetic Mean

It is evident that transport costs form a much larger percentage than communication costs of net output in the manufacturing sector and thus prima facie should be of much greater significance for plant location decisions. The arithmetic means for the two sets of ratios are 6.3% and 0.7% respectively. This relationship, i.e., the TCNO ratio being considerably larger than the CCNO figure, is valid for all individual Orders and for the vast majority of MLHs. In a few instances, however, the gap narrows to the point where the CCNO figure = $\geq$ 50% of the corresponding TCNO ratio. The specific industries are as follows:

CCNO ratio = 50% of TCNO ratio

engineers' small tools and gauges (MLH 333)
ordnance and small arms (342)
radio and other electronic apparatus (364)

CCNO ratio => 50 <100% of TCNO ratio

scientific, surgical and photographic instruments, etc. (351)
aircraft manufacturing and repairing (303)
jewellery, plate and precious metal refining (396)
corsets, umbrellas & miscellaneous dress industries (449.1/3/4)
pens, pencils & miscellaneous stationers' goods (495)

CCNO ratio = TCNO ratio

watches and clocks (352)

These industries all have one thing in common, viz., a low TCNO ratio.

Coefficient of Variation

The TCNO ratios are much more widely spread than the CCNO figures at the MLH level: the relevant v-values are 86.9% and 42.4% respectively. At the Order level this situation is reversed in four out of the 13 cases to which the v-measure is applicable. The four exceptions are metal manufacture; clothing and footwear; paper, printing and publishing; and other manufacturing industries. While this finding is not what one would expect given the greater potential for variability in the TCNO ratios, it will be readily apparent by now that 'macro' relationships among the total number of MLHs are frequently not valid for the MLHs comprising individual Orders.

Coefficients of Skewness and Kurtosis

The distribution of TCNO ratios is positively skewed and slightly platykurtic. In contrast, the CCNO ratios are considerably less skewed but more platykurtic.

Correlation Coefficients

Prima facie, one would feel rather confident in assuming that transport and communication costs were closely related, both being in part, if not entirely, a function of distance. In fact, as the following analysis makes clear, the degree of association between them is very weak, at least when they are expressed in the form of ratios. This discrepancy between theory and reality probably mirrors the fact that most communication charges embody the 'postalisation' concept whereas transport charges do not but we have not delved into the matter in depth (cf. ch. 9).

Figure 8.1 is a scatter diagram showing the relationship between TCNO and CCNO ratios at the Order level. Being more important in

Fig. 8.1 Scatter Diagram Comparing Order-Level TCNO & OCNO Ratios, Larger UK Manufacturers, 1963

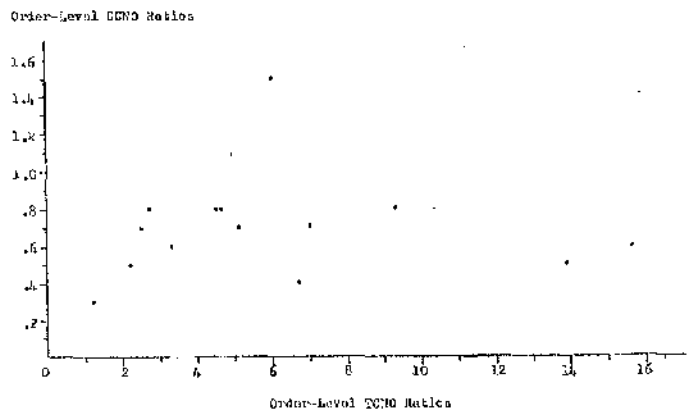
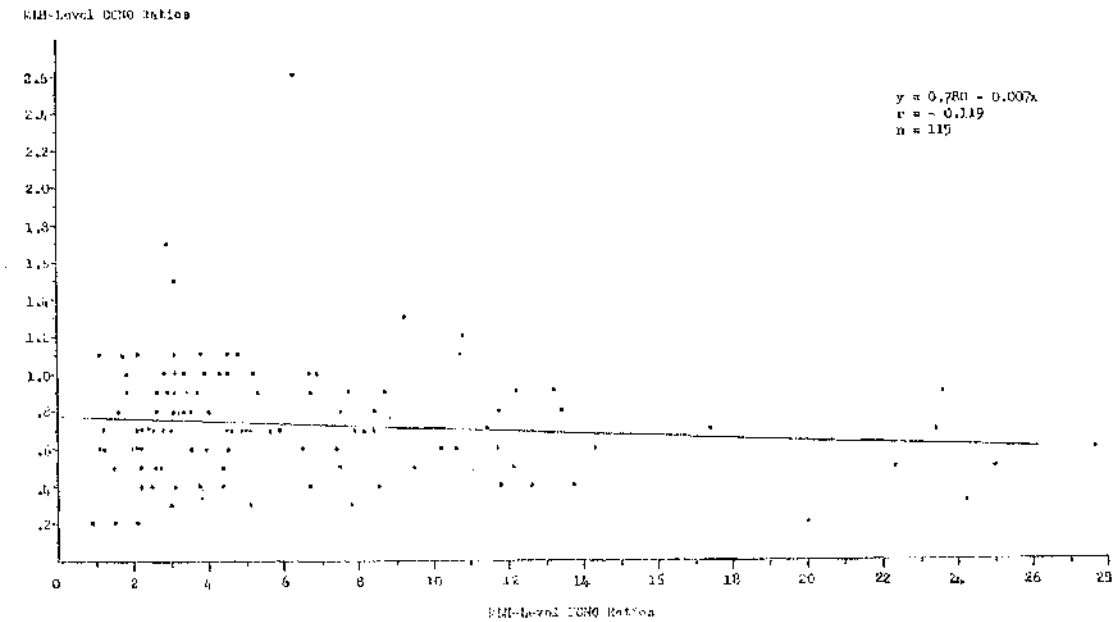


Fig. 8.2 Scatter Diagram Comparing KHH-Level TCNO & OCNO Ratios, Larger UK Manufacturers, 1963



Sources: Tables 8.7 & 8.10

absolute terms, transport costs have been treated as the independent variable (x) and communication costs as the dependent variable (y). It can be seen that the plotted points form a definite non-linear pattern.[1]

Because Order-level relationships do not necessarily apply to the MLH level and since MLH data possess greater homogeneity than Order figures making them more suitable for use in correlation studies, we did not pursue the Order-level analysis further; instead we plotted the bivariate data for individual MLHs (N = 119) as shown in Fig. 8.2. On the original diagram, we used different colours for MLHs from different Orders making it possible to show both the overall distribution pattern and the patterns for defined groups of MLHs. However, due to clustering and the many Orders involved, the colour effects were not particularly striking and thus they have not been reproduced here.

It will be evident from a comparison of Figs. 8.1 and 8.2 that the non-linear pattern of points apparent in the former disappears when MLH figures are plotted. This is striking confirmation of the above argument that Order-level relationships are not necessarily valid at the MLH level. From Fig. 8.2 it can be seen that the plotted MLH data are distributed in a random rather than a linear fashion. Indeed, the Pearson or linear coefficient of correlation is a very low -0.119.[2]

Order-level linear regression equations and x-values comparable to those in Fig. 8.2 are as follows:

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[1] Applying the linear regression and correlation formulae to the bivariate data, we obtained the following results: 1) the regression line ($y = 0.695 - 0.0003x$) took the form of a perpendicular to the y-axis; 2) the Pearson coefficient of correlation (r) = -0.005. Non-linear regression analysis was not attempted as explained in the text.

[2] It will be recalled that the transport cost data forming part of the TCNO ratios for the various MLHs have been adjusted to compensate for certain exclusions from the census transport cost figures. On the basis of the unadjusted transport cost data, r would = -0.127 and the linear regression line would be $y = 0.775 - 0.007x$. Correlating unadjusted transport cost/gross output ratios at the MLH level with communication cost/gross output ratios gives an r-value = -0.023. Spearman's coefficient of rank correlation between unadjusted transport cost/gross output and communication cost/gross output ratios (uncorrected for ties) = -0.009.

III	$y = 0.484 + 0.005x$	$r = +0.192$	$n = 15$
IV	$y = 0.745 - 0.010x$	$r = -0.201$	$n = 15$
V	$y = 1.028 - 0.087x$	$r = -0.796$	$n = 4$
VI	$y = 0.754 + 0.021x$	$r = +0.153$	$n = 20$
VII	n.s.		
VIII	$y = 0.247 + 0.086x$	$r = +0.826$	$n = 6$
IX	$y = 0.848 - 0.019x$	$r = -0.451$	$n = 7$
X	$y = 0.386 + 0.074x$	$r = +0.637$	$n = 15$
XI	$y = 0.620 + 0.052x$	$r = +0.266$	$n = 3$
XII	$y = 0.387 + 0.163x$	$r = +0.391$	$n = 9$
XIII	$y = 0.679 - 0.002x$	$r = -0.099$	$n = 6$
XIV	$y = 0.563 + 0.031x$	$r = +0.447$	$n = 6$
XV	$y = 2.587 - 0.206x$	$r = -0.510$	$n = 5$
XVI	$y = 1.658 - 0.159x$	$r = -0.488$	$n = 7$

Clearly, the x-values range widely from a low of -0.099 in the case of building materials (XIII) to a high of +0.826 in the case of vehicles (VIII). Only two x-values (VIII and V) exceed ± 0.7, the values below which less than 50% of the variance in y (the CCNO ratios) is explained by changes in x (the TCNO ratios). In other words, when $r = \leq \pm 0.7$, exogenous factors are affecting the value of y more than changes in the value of x.

Interpreting the high correlation coefficients for Orders V and VIII requires great care. In the case of Order V, $r = -0.796$ and the linear regression equation is $y = 1.028 - 0.087x$. Since the value of b is negative, the regression line will slope downwards from left to right. Thus, an increase of one unit in the TCNO ratio for the metal manufacturing industry group will *prima facie* largely cause and be accompanied by a 0.087 decrease in the value of the CCNO ratio for the same group of industries. In simpler terms, an increase in transport costs will be of major importance in reducing communication costs. In contrast, an increase in transport costs in the vehicles sector (Order VIII) will raise vehicle manufacturers' communication costs. These findings are inexplicable. On the one hand, they are contradictory. On the other, why should high x-values characterise only two out of the 13 Orders containing >1 MLH? We must conclude therefore that transport costs are not related to communication outlays even in the cases of Orders V and VIII. The high r-values in these two instances would appear to reflect chance rather than meaningful association.

Distance Costs Relative to Net Profits

Our final objective in this chapter is to assess the significance of distance costs to the industrial decision-maker in terms of their

relationship to pretax net profits arising in the UK.[1] It can be assumed that decision-makers will be most sensitive to changes in those costs when the distance cost/net profits ratio ≥ 1.0 although insensitivity is not likely to become evident until the ratio falls a long way below 1.0.[2] Regrettably, available information precludes greater precision in defining the sensitivity zone. It might be argued in view of the extremely weak relationship between transport and communication costs discovered earlier that the two types of cost should not be added for the purpose of computing distance cost/net profit ratios. Support for this argument is implicit in the possibility that communication costs in many businesses may be treated as general overhead expenditures whereas transport costs are both more variable in the theoretical sense, and more likely to be the responsibility of a separate profit centre, viz., the transport department. That is to say, management may not view transport and communication costs in the same light. On the other hand, both types of cost are conceptually a function of distance. Therefore, they can be regarded as similar for analytical if not for intra-firm decision-making purposes (see ch. 9).

Table 8.12 shows the relationship between distance costs and pretax net profits in 1963[3] for each of the 14 Orders comprising the manufacturing sector. The distance cost figures have been computed by summing the relevant totals in Tables 8.1 and 8.9. These tables, it will be recalled, are based upon the 1963 Census of Production. The net profits data are taken from the 1968 National Income Blue Book. However, their ultimate source is the Board of Inland Revenue.[4]

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[1] Profits earned abroad are excluded from this analysis.

[2] Support for this assumption can be found in the outcry from industry when the Post Office announced higher telephone and telex charges on 3 April 1970. See, e.g., "Phone Rises Blow to Industry", The Times, 4 April 1970, p.11; Harold Bolter, "Protest Grows Over Rise in Post Office Charges", Financial Times, 27 April 1970. While communication costs generally seem picayune relative to net manufacturing output, they assume very great significance in periods of acute pressure on profit margins.

[3] The net profits data do not relate strictly to 1963. See the note accompanying Table 8.12.

[4] "It is important to remember that profits as computed for income tax purposes may differ from what are usually described as 'commercial profits'." Inland Revenue, Report of the Commissioners of Her Majesty's Inland Revenue for the Year Ended 31st March 1967: Hundred and Tenth Report, Cmnd. 3508 (HMSO, 1968), p.78.

Pretax net profits are defined as gross trading profits minus allowable depreciation.

An important consideration before we proceed to analyse the ratios in Table 8.12 is the extent to which the distance cost and net profit data are comparable.[1] Both sets stem from a more or less common method of accounting and they refer generally to the same 12-month period. But the census of production seeks information from all UK manufacturing firms whether they be a) large or small, b) incorporated or unincorporated, c) nationalised or private, or d) nonprofit or operating for private gain, and the 'establishment' is the basic reporting unit. In contrast, the net profits data relate solely to incorporated companies resident in the UK and operating for private gain, and the 'company' is the reporting unit. Unincorporated business profits appear in the national accounts as personal income because of the difficulties involved in distinguishing between the business and the personal income paid or accruing to the proprietors of unincorporated businesses. Net profits or surpluses made by public corporations or by government manufacturing enterprises such as HMSO, the Royal Mint or the Royal Ordnance Factories do not appear in the annual Blue Books as part of the company sector or anywhere else. Obviously therefore they are not included in Table 8.12.

How important are the various differences between the census of production and the Inland Revenue figures? It seems reasonable to assume first that unincorporated businesses will usually be rather small in employment terms. Since the distance cost column in Table 8.12 refers only to larger firms, the exclusion of unincorporated business profits from the net profits column probably enhances rather than reduces the comparability of the two sets of figures.

Second, while the census of production does cover some publicly-owned manufacturing establishments, their effect upon the distance cost column in Table 8.12 can safely be regarded as minuscule. For example, Order V includes one publicly-owned iron and steel concern. Order VI

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[1] This paragraph is based upon 4 sources: 1) the notes to the 1968 Blue Book; 2) Central Statistical Office, National Accounts Statistics: Sources and Methods, ed. by Rita Maurice, Studies in Official Statistics, No. 3 (London: HMSO, 1968); 3) Central Statistical Office, National Income Statistics: Sources and Methods, Studies in Official Statistics, No. 3 (London: HMSO, 1956); 4) F.W.M. Lewes, Statistics of the British Economy (London: George Allen & Unwin Ltd., 1967).

Table 8.12 Distance Cost/Net Profit Ratios, UK Manufacturing Orders, 1963*

	(1)	(2)	(3)	(4)	(5)	(6)
1958 SIC Order	Distance Costs £m	Pretax Net Profits £m	Distance Cost/Net Profit Ration	Index 0.43=100	Pretax Net Profits as a % of Gross Output %	Index 5.9%=100
III	173.8	325.3	0.53	123	6.6	112
IV	78.0	166.0	0.47	109	5.8	98
V	96.9	85.3	0.67	156	3.4	58
VI	82.6	366.3	0.23	53	8.1	137
VII	3.2	1.7	1.88	437	0.4	7
VIII	30.4	90.7	0.34	79	3.2	54
IX	30.9	90.0	0.34	79	6.0	102
X	29.9	110.3	0.27	63	5.3	90
XI	2.5	7.7	0.32	74	5.5	93
XII	10.6	43.0	0.25	58	5.7	97
XIII	62.0	68.0	0.91	212	9.4	159
XIV	23.2	19.3	1.20	279	3.7	63
XV	57.1	120.3	0.47	109	7.8	132
XVI	19.3	43.7	0.44	102	5.7	97
Totals	660.5	1,557.7	0.43	100	5.9	100

*The net profits data refer, not to 1963, but to the period, 1962-64. The figures in the table are averages for those 3 years centred, of course, on 1963. This procedure was adopted for 3 reasons. First, net profits were assumed to be more volatile than distance costs. Thus, a 3-year average was felt to be more representative (less subject to C and I to use the terminology of time series analysts) than a single year's figures. Second, the winter of 1963 was particularly harsh introducing a strong I factor into the 1963 results. Third, single-year profits for some industries, e.g., shipbuilding, where contracts may straddle 2 or more years, can misrepresent the true economic situation.

Sources: 1) Distance costs: Tables 8.1 and 8.9.
2) Pretax net profits: GB, Central Statistical Office, National Income and Expenditure, 1968 (London: HMSO, 1968), Table 35.
3) Gross output: 1963 Census of Production.

includes the Royal Ordnance Factories. Order VIII includes the railway workshops of the British Railways Board. Order IX includes the Royal Mint and Order XV the government printing office. Unless we have overlooked other government manufacturing enterprises, this list can be taken as complete.

Third, while both establishments and companies are classified according to the same SIC, classification by company may result in some manufacturing establishments being overlooked because companies are allocated to specific classes on the basis of their principal economic activity. Thus, an essentially non-manufacturing company could own a manufacturing establishment and the latter would form part of column 1 but not of column 2. In contrast, there is greater likelihood of column 2 containing profits from non-manufacturing activities than of column 1 containing distance costs incurred as a result of non-manufacturing operations simply because the 'company' is a larger and more comprehensive reporting unit in many cases than the 'establishment'. Any distortion as a result of these sorts of possibility, however, must be viewed as insignificant, particularly at the Order level. According to the Central Statistical Office, while the net profits by industry data in the Blue Books "is not precisely comparable with . . . the census of production data . . . it seems likely that profit figures on a financial unit basis for broad industry groups . . . are reasonably comparable with those on an establishment basis".[1]

Turning to the actual figures in Table 8.12, we see (column 3) that, overall, distance costs in 1963 were equal to 43% of manufacturers' net profits. This proportion is clearly much more important than the TCNO and CCNO ratios discussed earlier. It is high enough to suggest not only that distance costs warrant careful scrutiny by the managements of most private concerns, but that distance cost/net output ratios in isolation may be highly misleading as guides to the suitability of specific plant locations and as measures of footlooseness. The range in the column 3 ratios was extensive, extending from a low of 0.23 in the case of engineering and electrical goods (Order VI) to a high of 1.08 in the case of shipbuilding and marine engineering (VII). Only one other ratio - that for timber, furniture, etc. (XIV) - exceeded 1.0 but three lay within the range, 0.5 - 1.0, viz., building materials (XIII), metal manufacture (V), and food, drink and tobacco (III). Three more - chemicals (IV); paper, printing and publishing (XV); and other manufacturing industries (XVI) - fell between the ratio for total manufacturing (0.43) and 0.50. Six out of the 14 ratios were less than 0.43.

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[1] National Income Statistics (1956), p.151.

Column 4 expresses the column 3 ratios in index form taking the ratio for total manufacturing as 100. Column 5 is designed to assist in the interpretation of the ratios in column 3. It shows for each Order, and for total manufacturing, net profits as a percentage of gross output. Column 6 expresses these percentages in index form. It can readily be seen that distance costs relative to net profits were unusually high in shipbuilding and marine engineering (VII), for example, largely because net profits were unusually low.

Unfortunately, comparable net profit data were not available for individual MLHs.[1] Readers may be tempted to assume that the relationships evident in Table 8.12 for a particular Order apply to the MLHs making up the Order. This temptation should be resisted for reasons developed earlier.

Summary and Conclusions

Although this is a lengthy chapter, there is little need to reiterate the more detailed comments and findings. Our main purpose was to compute transport cost/output and communication cost/output ratios for British manufacturing industries, using as fine an industry breakdown as possible. In practice, this meant using the results of the 1963 Census of Production published, rather belatedly, between 1968 and 1970. Trend analyses were out of the question for technical reasons. Thus it was not possible to determine whether transport was increasing

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[1] The annual reports of the Commissioners of Inland Revenue contain tables showing inter alia: 1) company income tax assessments by country (England, Scotland and Wales) and industry group, 2) net trading profits as a percentage of turnover by industry group. While the industry groups are basically SIC Orders, some sub-Order aggregates are also given. Unfortunately, the Inland Revenue figures published in these reports are not directly comparable with the corresponding data in the Blue Books. See Devons, British Economic Statistics, p.209; the notes to the Blue Books; the annual reports of the Commissioners of Inland Revenue; and "Quarterly Figures of Company Profits" in Central Statistical Office, Economic Trends, No. 57 (July 1958), p.xvii. The Economist publishes quarterly analyses of company profits by industry, but again the results are not comparable to the Blue Book data. See, e.g., "Corporate Profits: Worst Over?", Economist, 25 April 70, pp.82 & 87. Not clear is the degree of incomparability between Blue Book and other published profit data. It could be rather limited. The same would apply of course to individual company results as they appear in annual corporate reports. This whole area of inquiry is worthy of much more detailed investigation.

or decreasing in importance over time as a cost item. In other words, the 1963 ratios stand on their own, at least for the moment, although it should be possible soon to compare them with analogous ratios developed from the 1968 Census of Production results. On the other hand, there are certain technical differences between the two censuses, the most important being the adoption of a new SIC in 1968, and it remains to be seen how far the statisticians can guarantee comparability.

How useful are the 1963 ratios in terms of our working hypotheses? It can be concluded first that, despite some inadequacies, they provide a reasonably accurate guide to the relative size of the direct transport and communication expenditures by the 119 manufacturing industries distinguished in the census reports. Direct expenditures, of course, are the type taken into account by private firms when making location decisions. Thus, the ratios should be of help in testing our second hypothesis, viz., that private transport and communication costs are not an important constraint on interregional industrial mobility within the UK for most types of manufacturing industry. Indeed, it has already become evident that communication costs are not an important constraint because they appear to correlate poorly with transport costs and do not in practice vary much with distance due to Post Office pricing policies. Transport costs, in contrast, do vary significantly with distance; it follows, at least *prima facie*, that a TCNO ratio should be indicative of an industry's relative distance-sensitivity and hence its migration potential. We test this assumption in chapter 11. Clearly, there is more to migration potential than distance-sensitivity as was demonstrated, for example, by our analysis of distance costs and not profits, but, *ceteris paribus*, a high-TCNO-ratio industry should figure less prominently in interregional industrial mobility than one characterised by a low TCNO ratio.

Regardless of the outcome of the test mentioned above, it can be argued on the basis of the evidence in this chapter that TCNO ratios are of little operational consequence on two grounds: 1) distance-sensitivity as defined here is a purely ordinal concept - TCNO ratios have no cardinal value, 2) nothing is known about the extent to which MLH-level TCNO ratios are representative of the cost situation faced by individual establishments, the units actually involved in industrial mobility. These are serious criticisms but obviously they only restrict TCNO ratios' utility: they do not destroy it entirely.

A second conclusion of relevance to our hypotheses stems from the fact that TCNO ratios are a poor guide to transport demand or traffic generation and thus to the need for communications facilities. Almost invariably, they understate the transport implications of interregional industrial mobility. Low TCNO ratios are particularly misleading in this respect although sometimes they are low, not because of manufacturers' pricing policies or high per ton output values, but due to the extensive use made of the parcel post by some industries, e.g., drugs and electronic components. Clearly, however, low TCNO ratios should not be construed as meaning that a good interregional communications network is unimportant. We turn now to the subject of transport and communication expenditures by manufacturers in N.I.

CHAPTER 9

OUTLAYS ON TRANSPORT AND COMMUNICATIONS BY MANUFACTURERS IN NORTHERN IRELAND

Introduction

Northern Ireland and Scotland are the regions furthest removed from Britain's industrial heartland. Manufacturers supplying the national market from these areas will almost certainly incur greater distance costs than their competitors elsewhere in the UK. Yet this likelihood should be of little consequence insofar as distance costs are minuscule relative to net output. Conversely, relatively high distance costs could have the effect of forcing peripheral producers to orient themselves primarily towards local or export markets. Unfortunately, short of a special survey for the purpose, it is impossible to get a comprehensive picture of the extent to which firms in the several regions of the UK do serve various markets.[1] From the 1963 Census of Production, however, one can obtain transport and communication expenditure data for firms in each of the kingdom's three Celtic members: NI, Scotland and Wales. Although the NI figures were collected by MinCom at Stormont rather than the BOT, both agencies used similar concepts and questionnaires thereby ensuring comparability. The results of the Ulster Census have been published both separately and as part of the UK reports. In this chapter, we analyse these results and compare them with our previous findings for the UK as a whole. In the following chapter, we look at the Scottish figures. This sequence is partly arbitrary. On the other hand, it reflects an *a priori* assumption that distance costs will be relatively larger in NI than Scotland because of the North Channel and Irish Sea. The special problems and costs associated with these water barriers will be of direct concern to many Ulster manufacturers but of negligible importance to most Scottish firms. Thus, we can

[1] Such information is available for NI and will be examined below.

view NI as a polar case. A second reason for looking at NI prior to Scotland is the existence of some interesting time series of payments for transport by NI manufacturers. While historical data of this type are unique to the province, their implications have much wider relevance. By inserting our analysis of this material between the UK and Scottish chapters, we hope to enhance its impact.

Transport Costs in 1963

We begin our examination of transport costs in NI's manufacturing sector by looking at the expenditure pattern in 1963. Table 9.1 shows payments to other organisations for transport, the cost of operating road goods vehicles on own-account, total transport costs and net output by SIC Order. The figures correspond to those in Table 8.1. Comparing the two tables, it can be seen first that Ulster manufacturers generally used own-account transport more extensively than their UK counterparts, relying less on commercial carriers (assuming, of course, that the propensity of firms to set up separate accounts was the same in both cases). Indeed, own-account transport was slightly more important to NI producers overall than purchased transport; the precise ratio was 1.04 : 1. At the UK level, the ratio was 1.37 : 1 in favour of purchased transport. Second, direct outlays on transport in NI represented only 1.7% of the UK total. Third, the food, drink and tobacco industry group was the largest single user of transport in both jurisdictions. However, its prominence was much greater in the province than the kingdom. Two other industry groups, viz., textiles and clothing, were also more important users of transport in NI than in the UK relative to total transport costs. Finally, net output and total transport costs correlated much more closely in NI than in the nation as a whole. The respective r-values for Order-level data were 0.76 and 0.53.

Table 9.2 shows transport payments as a proportion of total transport expenditures at the Order level of detail for NI and the UK. The figures are generally comparable to those in Table 8.2 and Appendix C. It will be noted, however, that Orders XII, IV, V, VI, IX and X are less comprehensive in NI than the UK. The precise contents of the NI Orders are indicated in the second column of Table 9.2.

Table 9.1: Expenditure on Goods Transport by SIC Order, Larger* Manufacturers, Northern Ireland, 1963

1958 SIC Order	Industry	(1) Payments to Other Organisations for Transport £'000	(2) Cost of Operating Own Road Goods Vehicles £'000	(3) Total Transport Costs £'000	(3) Total Transport Costs %	(4) Net Output %
III	Food, drink & tobacco	2,085	3,098	5,183	51.7	25.5
IV	Chemicals & allied industries	145	96	241	2.4	3.6
V,VII-IX	Iron castings, shipbuilding & marine engineering, vehicles, metal goods n.e.s.	282	199	481	4.8	11.7
VI	Engineering & electrical goods	424	336	760	7.6	19.1
X	Textiles[a]	1,209	427	1,636	16.3	22.8
XI,XVI	Leather, other industries	106	41	147	1.5	1.3
XII	Clothing & footwear	326	59	385	3.8	7.8
XIII	Bricks, pottery, glass, cement, etc.	130	457	587	5.9	3.1
XIV	Timber, furniture, etc.	59	189	248	2.5	1.8
XV	Paper, printing & publishing	148	219	367	3.7	3.3
III-XVI	Total manufacturing	4,912	5,120	10,032	100.0	100.0
Per cent of UK total		1.4	2.1	1.7		

*Firms employing $\geq$ 25 persons.

[a] Includes part of MLH 810.4.

Source: NI, Min Con, Report on the Census of Production of Northern Ireland, 1963, Vols. 1-4 (Belfast: HMSO, 1966). Col. 2 = Census data x 109%.

The UK figures in the table have been adjusted accordingly. Overall, as already noted, transport payments were less significant in NI than the rest of the kingdom, the NI percentage being only 89/100s of the UK figure. On the other hand, this aggregate relationship was not characteristic of the bulk of the NI/UK ratios at the Order level. Indeed, the linear correlation coefficient between the NI and UK Order-level data (cols. 3 and 4) is a very low 0.178.

Because of Ulster's limited industrial base and the concomitant problem of disclosure, completely separate data are available for only a handful (16) of the 119 industries distinguished in the UK Census of Production. Transport payment/total transport cost ratios for the individual MLHs found in NI, and for three limited MLH groupings, are shown in Appendix D together with corresponding data for the UK. Again, there is little correlation between the two sets of statistics ($r = 0.227$).

Much of this general lack of similarity in transport arrangements between NI and the UK undoubtedly reflects the Ulster Transport Authority's long-standing near-monopoly of inter-urban for-hire road haulage. As explained in ch. 6, this situation did not end until 1966; one of its effects, while it lasted, was the stimulation of own-account transport. Additional reasons for the NI/UK divergency are suggested by the following analysis involving inter alia Table 9.3 showing the value of NI manufacturers' sales by SIC Order and market area during the period, 1960-65 (excluding 1963). We saw in the preceding chapter that own-account transport is closely associated with short-haul traffic, i.e., with the sort of traffic that would predominate in the case of plants geared primarily to the NI market.[1] Relatively few Orders fall into this category according

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[1] Exports to Eire might also be considered to be short-haul traffic. However, they were very limited in the early 1960s. In the words of the Hall Report (para. 11) published in October 1962: "The industries of Northern Ireland have for the most part never looked to the South for their main markets; they have now only restricted outlets there." A market analysis of manufactured exports from NI to foreign destinations in 1964 and 1965 is included in the report on Ulster's 1965 census of production. Exports to Eire in 1964 by larger firms totalled £3,197,000 or 5.8% of total exports. In 1965, 5.9% of total exports went to Eire. Comparable information was not collected by the 1963 census. See NI, Min Com, Report on the Census of Production of Northern Ireland, 1965 (Belfast: HMSO, 1967), p.12 & pp. 7-22, passim. Cf. "Ulster: A Survey," Economist, 29 May 71, p. xxvi.

Table 9.2: Transport Payments as a Proportion of Total Transport Expenditures by SIC Order, Larger Manufacturers, NI and the UK, 1965.

(1)	(2)	(3)	(4)	(5)
1958 SIC Orders	MLHs Represented in NI	UK* %	Northern Ireland %	NI as a Proportion of UK
III	211-215, 217-219, 229.2-240	38.3	40.2	105
IV	261, 271-277	71.6	60.2	84
V,VII-IX	313, 370, 381-391, 393-395, 399	57.0	58.6	103
VI	331-349, 361-369	53.1	55.8	105
X	411-429.1	59.3	73.9	125
XI,XVI	431-433, 491-499	63.3	72.1	114
XII	441-450	55.0	84.7	154
XIII	461-469	71.4	22.1	31
XIV	471-479	37.4	23.8	64
XV	481-489	68.6	40.3	59
III-XVI		55.0	49.0	89

*UK figures adjusted to correspond to NI percentages in terms of MLH content.

Source: Derived from NI & UK censuses of production, 1963.

to Table 9.3. Only three - building materials and mineral products (XIII), timber and furniture (XIV), and paper, printing and publishing (XV) - sold over half of their output to Ulster customers in each of the five years specified, but in all three cases own-account transport predominated. In other words, the Bayliss-Edwards assertion about own-account transport and short-haul traffic was corroborated.[1] It follows that the obvious discrepancies between the UK and NI figures for these three Orders in Table 9.2 can be explained, at least in large part, by different market patterns.

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[1] 'Other manufacturing trades', a heterogeneous amalgam of Orders IV, XI and XVI, catered mainly to the NI market only in 1960. By 1965 it was selling three/fifths of its output in GB or abroad. Thus, it is hardly surprising that the component Orders appear as substantial users of commercial transport in Table 9.2 (relating to 1963). Orders V - IX are grouped together in Table 9.3 because of the disclosure problem. In aggregated form, they were clearly non-NI in orientation and biased towards commercial transport during the years, 1960-65. However, this finding might not be universally true at the single Order level. Particularly suspect in this regard is Order V, metal manufacture, which in NI's case consists of only one MLH, viz., iron castings. Economies of scale are relatively limited in this industry (cf. George Maxcy and Aubrey Silberston, The Motor Industry, Cambridge Studies in Industry (London: George Allen & Unwin Ltd., 1959), p.80) and it is quite conceivable that output in NI goes mainly to local buyers. If so, own-account transport could predominate, contrary to the UK experience (see App. C).

Table 9.3: Sales by SIC Order and Market Area, Larger NI Manufacturers, 1960-62, 1964-65.[a]

Total Manufacturing

Year	Value of Sales[b] £'000	Market Area (Total Sales = 100%) NI %	Non-NI %	GB %	Non-UK %
1960	509,128	29.9[c]	70.1	62.5	7.6
1961	526,090	30.2	69.8	62.1	7.7
1962	525,894	32.3	67.7	59.2	8.5
1964	600,777	31.0	69.1	60.0	9.1
1965	670,096	29.3	70.6	61.9	8.7
III Food, Drink & Tobacco					
1960	287,032	28.9	71.1	70.7	0.4
1961	300,059	29.4	70.6	70.2	0.4
1962	301,386	31.9	68.1	67.6	0.5
1964	317,320	32.6	67.4	66.2	1.2
1965	365,401	30.0	70.0	68.8	1.2
V-IX Engineering					
1960	77,873	8.0	92.1	67.0	25.1
1961	72,980	9.4	90.6	63.6	27.0
1962	64,551	10.6	89.4	56.5	32.9
1964	74,971	11.8	88.3	59.5	28.8
1965	78,926	11.4	88.6	61.5	27.1
X Textiles					
1960	87,068	42.7	57.3	39.0	18.3
1961	86,357	39.9	60.1	42.8	17.3
1962	86,490	39.4	60.6	42.1	18.5
1964	112,369	29.1	70.9	52.3	18.6
1965	120,592	27.4	72.6	54.1	18.5
X (MLHs 412, 413, 422.1, 423 & part of 810.4) Linen					
1960	63,249	48.6	51.4	30.7	20.7
1961	60,470	44.9	55.0	35.9	19.1
1962	60,204	44.4	55.7	35.1	20.6
1964	67,738	40.0	60.0	39.4	20.6
1965	67,923	39.5	60.5	39.2	21.3
X (MLHs 411, 414-19, 421, 422.2 & 429.1) Non-Linen Textiles					
1960	23,819	26.9	73.1	61.1	12.0
1961	25,887	28.1	71.9	59.0	12.9
1962	26,207	28.0	72.0	58.3	13.7
1964	44,631	12.6	87.4	71.8	15.6
1965	52,669	11.8	88.2	73.4	14.8

Table 9.3 (contd.)

XII Clothing

Year	Value of Sales £'000	Market Area (Total Sales = 100%) NI %	Non-NI %	GB %	Non-UK %
1960	26,219	12.1	87.9	85.9	2.0
1961	27,772	13.4	86.7	84.3	2.4
1962	28,408	13.0	87.0	84.8	2.2
1964	33,796	8.9	91.1	87.8	3.3
1965	34,483	9.1	90.9	88.1	2.8

XIII Mineral Products & Building Materials

1960	8,195	73.8	26.2	18.6	7.6
1961	9,075	75.2	24.8	18.0	6.8
1962	9,657	76.6	23.4	16.6	6.8
1964	11,741	74.1	25.9	19.1	6.8
1965	12,161	72.2	27.8	21.1	6.7

XIV Timber & Furniture

1960	6,430	97.7	2.3	2.0	0.3
1961	6,853	95.8	4.3	3.6	0.7
1962	6,997	94.9	5.1	4.1	1.0
1964	9,377	91.4	8.6	7.7	0.9
1965	10,916	90.3	9.7	8.4	1.3

XV Paper, Printing & Publishing

1960	7,930	67.6	32.3	30.0	2.3
1961	8,017	66.9	33.1	29.5	3.6
1962	9,004	66.3	33.8	29.8	4.0
1964	11,873	69.8	30.2	25.7	4.5
1965	13,002	72.6	27.4	22.7	4.7

IV, XI, XVI Other Manufacturing Trades

1960	8,378	60.4	39.7	29.0	10.7
1961	14,978	45.5	54.5	34.4	20.1
1962	19,400	47.6	52.3	30.7	21.6
1964	29,331	42.9	57.1	35.9	21.2
1965	34,615	39.4	60.6	37.6	23.0

[a]Equivalent data were not collected in 1963.

[b]Referred to as 'value of goods sold' in source report.

[c]Percentages in table may not add due to rounding.

Source: Calculated from Census of Production of Northern Ireland, 1965, pp. 8-9.

The other two major discrepancies in Table 9.2 involve Orders X and XII. Again the differences can be explained by looking at market patterns. Table 9.3 shows that the markets for NI's output in these two instances were mainly outside the region, particularly in 1964-65. Therefore, according to our theory, the propensity to use own-account transport should have been rather low. In fact, it was (cf. Table 9.2). Presumably 'distant' markets were not so important to producers in GB - hence their greater propensity towards own-account vehicle operation.[1]

Sales information for individual MLHs is not published in the annual NI census reports. Nevertheless, in seeking to explain the lack of correlation between the UK and NI figures in Appendix D, it would seem reasonable to assume from our Order-level findings that differences in market pattern are again a prime cause. Consider, for example, MLH 214 - bacon curing, meat and fish products. The NI percentage in Appendix D is 192% of the UK figure. As discussed at length in ch. 6, Ulster specialises in pigment products, especially bacon, and sells the bulk of its output in GB. Thus, payments for transport should form a substantial part of the NI producers' total transport costs given two conditions, both of which appear highly realistic: 1) use of own-account transport is largely confined to intra-NI movements, 2) pigment products are the most important item of output by MLH 214. In GB, on the other hand, local markets will be much more important and the propensity to use commercial transport services will be correspondingly reduced.

Mention might be made of the market data from the NIDC survey presented in ch. 6. A comparison of this material with the figures in Appendix D generally corroborates our hypothesis linking choice of transport method and market pattern although there are exceptions, e.g., MLH 423. Too much weight should not be attached to the NIDC statistics as evidence, however, either for or against our main argument, in view of their frequently pronounced lack of comprehensiveness.

While the foregoing does not amount to a definitive case, enough has been said to establish tentatively the explanatory power

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[1] While market data cannot be adduced in support of this argument, it seems logically sound.

of our thesis that market patterns are a prime determinant of the transport payment/total transport cost ratio. We turn now to the subject of payments for transport over time mentioned at the beginning of this chapter. Our object is to determine the extent to which transport costs have become more or less important relative to net output. As a little reflection will make clear, this question is highly relevant to location of industry policy.

Transport Costs Historically Relative to Net Output

We saw in chapter 8 that official figures on total[1] transport payments by UK manufacturers over time exist only for the years, 1951-58 and 1963. The gaps in this series before and after 1963, the uncertainties raised by the SIC conversion in 1958, the 1958 change in the establishment exemption limit from 11 to 25 persons employed, and the lack of official summary tables pulling together the figures for the various years combine to make the compilation of a UK historical series a time-consuming and possibly unrewarding task. In NI, however, not only has total transport payment data been collected each year since 1951 but an official series (updated annually) of total payments by firms employing 25 or more persons is available for the entire period, 1951-65.

Payments for transport do not equal total transport costs. Moreover, the payments/total cost ratio has altered over time with own-account transport becoming progressively more important, especially

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[1] Transport inwards and outwards.

in NI.[1] How far back this trend goes is difficult to say with precision but doubtless it extends to the beginning of the postwar period. The reasons for the relative growth in own-account transport have been touched on in the preceding chapter. In addition to the points raised there, we might mention developments like the emergence of new and the expansion of existing road-using industries,[2] the inappropriate pricing policy and financial difficulties of British Rail and the concomitant absolute decline in rail traffic,[3] and the restrictive effects of the pre-1968 carriers' licensing system on commercial road hauliers.[4] To some extent these factors have been offset by the growing tendency referred to in chapter 6 for firms to

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[1]The NI situation has been discussed previously. Road goods vehicle licence data for GB reveal a phenomenal postwar increase in the absolute number of C-licences relative to the 'A', 'Contract A' and 'B' categories. Percentage increases between 1946 and 1959, the period during which private operators were most haunted by the spectre of nationalisation, were as follows:

'A' and 'Special A'	8.0%
'Contract A'	143.5%
'B'	13.3%
'C'	196.6%

The actual numbers of licences outstanding in December 1959 were: 'A' and 'Special A' - 87,400; 'Contract A' - 22,400; 'B' - 65,500; 'C' - 1,137,900. See Eric Schenker, "Nationalization and Denationalization of Motor Carriers in Great Britain," Land Economics, XXXIX (August 1963), Table I, p.224. Between 1952 and 1962, user-owned (defined as 'C' plus 'Contract A') lorries in GB doubled their share of inland goods transport by road and rail from 21% of total ton-mileage to 40%. The joint share of 'A' and 'B' licences rose from 25% to 28%. BR's share fell from 54% to 32%. See G.F. Ray and C.T. Saunders, "Problems and Policies for Inland Transport," Ch. XI in The British Economy in 1975, by W. Beckerman, et.al., National Institute of Economic and Social Research, Economic and Social Study No. XXIII (Cambridge: Cambridge University Press, 1965), Table 11.2, p.326.

[2]Cf. GB, MOT, Committee on Carriers' Licensing, Report, Lord Geddes, chairman (London: HMSO, 1965), paras. 3.17-3.20. (Hereinafter referred to as the Geddes Report).

[3]Cf. Reid & Allen (1970), ch. 5; K.F. Glover, "Statistics of the Transport of Goods by Road," Journal of the Royal Statistical Society, CXXIII, Series A (Part 2, 1960), Table 11 & Fig. 2, p.122; GB, MOT, Cmnd. 3470 (1967), Table 2 & para. 3 in App. 1, pp. 24-25; Gwilliam (1964), p.138.

[4]Geddes Report, ch. 7, pp. 57-63. It should also be noted that the for-hire road haulage industry has shown a moderate decline in profitability since 1948. See Eric Schenker, "The Profitability of the British Motor Carrier Industry," Land Economics, XLI (August 1965), Tables III & V, pp. 260 & 262. See also Reid & Allen (1970), Table 25, p.144.

set up separate transport departments with their own accounts. This tendency can be expected to keep growing as a result of the 1968 Transport Act. Indeed, before long it could counterbalance or even reverse the now weakening forces behind the relative growth of own-account transport[1] leading to a levelling-off in the payments/total transport cost ratio. Once this occurs, of course, it will become possible to compute total transport costs from payments data alone. In the meantime, we are left with the formidable task of trying to develop a total transport cost time series on the basis of an unstable payments/total cost ratio. In fact, the problem is not entirely insoluble as argued below. Before tackling it, however, we take a look at the published NI transport payments data which are of considerable interest in themselves.

The payments figures are best presented as proportions of net output. This is done in Table 9.4 which shows the changes in the proportions during the period, 1951-65, for eight Orders or groups of Orders, for total manufacturing and for two subdivisions of the textile Order (X). Fig. 9.1 presents the same information (excluding the textile subdivisions) in the form of linear trend lines. They have been projected to 1970 on the basis of the 1951-65 development patterns.

Three points stand out from this mass of material. First, payments for transport are much more important relative to net output in some industry groups, e.g., timber and furniture (XIV), than others, e.g., engineering (V-IX). This finding is what one would expect given our UK results.

Second, whereas the payments/net output ratio for total manufacturing declined during the period, the ratios for half of the component series increased. Even more interesting, the 1951 y-values (Fig. 9.1) of the four increasing series are uniformly lower than the corresponding y-values for the four decreasing series. In other words, the amount of dispersion in these eight y-values declined during the period.

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[1] Among those forces paradoxically is the self-same 1968 Transport Act, one of the effects of which has been to induce many own-account operators to re-examine their overall transport policy. The economics of own-a/c vehicle fleets have frequently been found wanting. Cf. "Vehicle Fleet Management: A Survey," Financial Times, 11 Feb 71, pp. 15-24.

Table 9.4: Payments for Transport as a Proportion of Net Output by SIC Order and Year, Larger Manufacturing Firms, NI, 1951-65.

Year	1958 SIC Order III %	V-IX %	X Total %	X Linen[a] %	X Other[b] %	XII %	XIII %	XIV %	XV %	IV,XI, XVI %	Total Mfg. %
1951	7.0	1.3	2.7	2.4	4.6	1.8	8.2	4.9	3.5	4.4	3.2
1952	7.9	1.4	3.7	3.3	6.6	2.4	6.8	3.8	4.5	7.9	3.9
1953	7.4	1.1	3.6	3.3	4.8	2.3	6.1	2.3	4.6	8.6	3.5
1954	7.3	1.5	4.3	3.6	6.4	2.3	6.6	3.4	4.1	6.9	3.8
1955	7.9	1.3	4.1	3.5	6.0	2.4	6.7	9.0	4.1	6.3	4.0
1956	7.2	1.3	4.3	3.6	6.5	2.7	6.9	5.1	3.9	5.6	3.8
1957	7.3	1.4	4.4	3.9	6.0	2.7	6.9	5.2	3.9	6.0	3.9
1958	6.1	1.5	4.5	4.0	6.1	2.8	5.9	4.1	3.4	6.2	3.7
1959	5.7	1.3	4.5	3.7	6.5	2.5	3.4	4.4	4.0	7.1	3.5
1960	5.3	1.2	4.5	3.9	6.0	2.5	2.9	5.6	3.9	7.2	3.3
1961	5.0	1.4	4.4	3.9	5.4	2.7	2.7	6.1	4.2	6.3	3.5
1962	5.0	1.4	4.3	4.0	4.9	2.8	2.7	5.7	4.1	5.8	3.5
1963	5.0	1.4	3.3	2.9	3.9	2.6	2.6	2.0	2.7	3.2	3.0
1964	5.1	1.6	3.5	3.4	3.6	2.9	2.8	6.5	3.3	2.3	3.2
1965	4.4	1.4	3.3	3.4	3.2	3.1	2.1	6.4	3.4	3.2	3.1

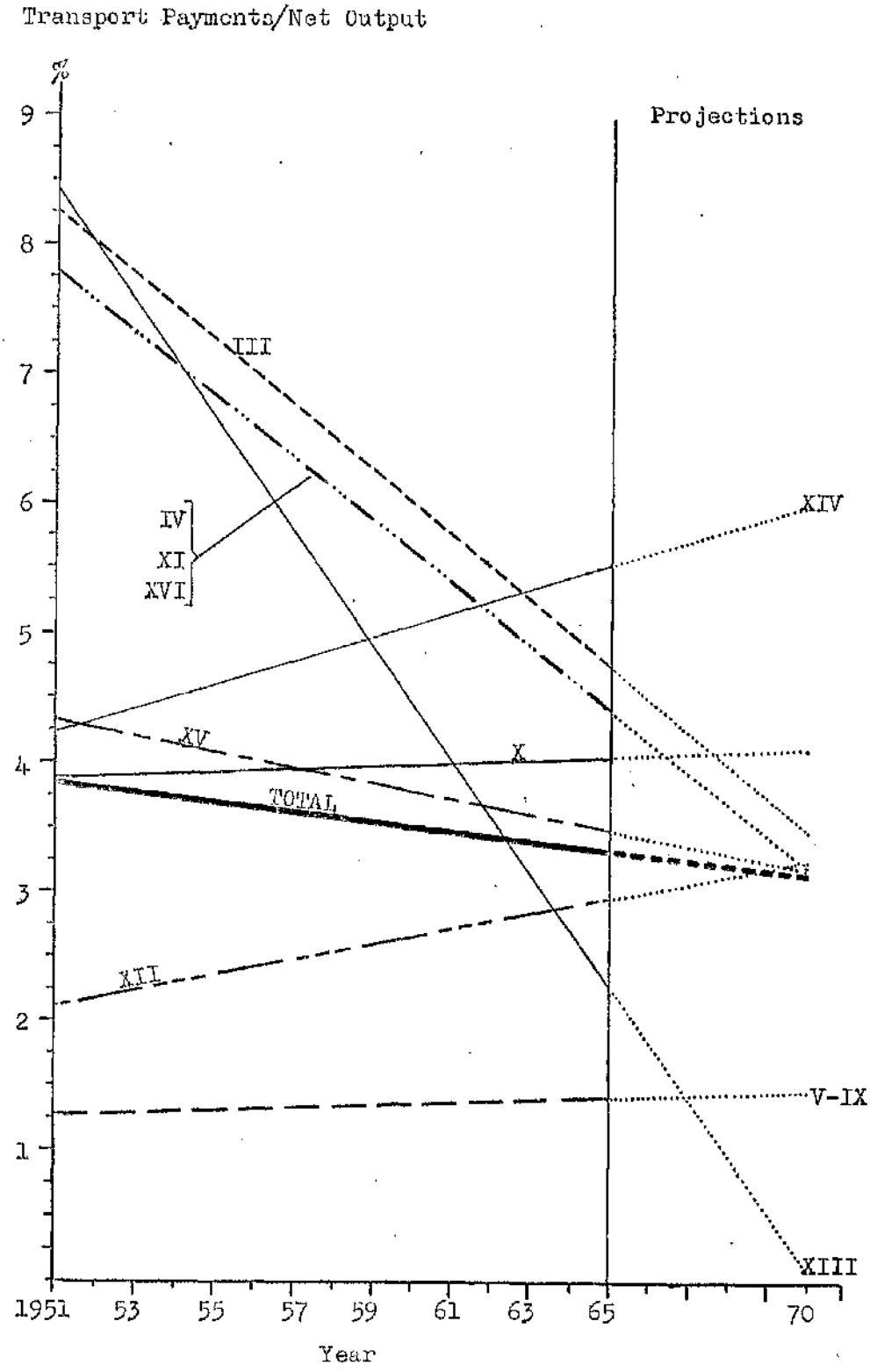
[a] 'Linen' in the NI census refers to the spinning, weaving, printing, other finishing or converting of non-wool materials. This definition embraces MLHs 412, 413, 422.1, 423 and part of 810.4.

[b] 'Other' refers to MLHs 411, 414-19, 422.2 and 429.1.

Sources: Derived from data in: (1) Census of Production, 1963, I, pp. 8-12; (2) Census of Production, 1965, pp. 15-18.

Third, none of the ratios moved steadily upwards or downwards. Indeed, in the majority of cases movement correlated rather poorly with time, taking the latter as the independent variable. The exceptions (see Table 9.5) were mineral products and building materials (XIII); food, drink and tobacco (III); and clothing (XII).

Fig. 9.1 Trend Lines: Payments for Transport as a Proportion of Net Output by SIC Order, Larger Manufacturing Firms, NI, 1951-70



Source: Computed from Table 9.4.

Table 9.5: Linear Correlation Coefficients: Transport Payments/Net Output Ratios by SIC Order (y) and Time (x), Larger Manufacturing Firms, NI, 1951-65

Order	Product Moment Coefficients of Correlation (r)
XIII	-0.92
III	-0.91
XII	0.82
IV, XI, XVI	-0.61
XV	-0.54
V-IX	0.39
XIV	0.23
X	0.08
X-Linen	0.29
X-Other	-0.57
Total manufacturing	-0.58

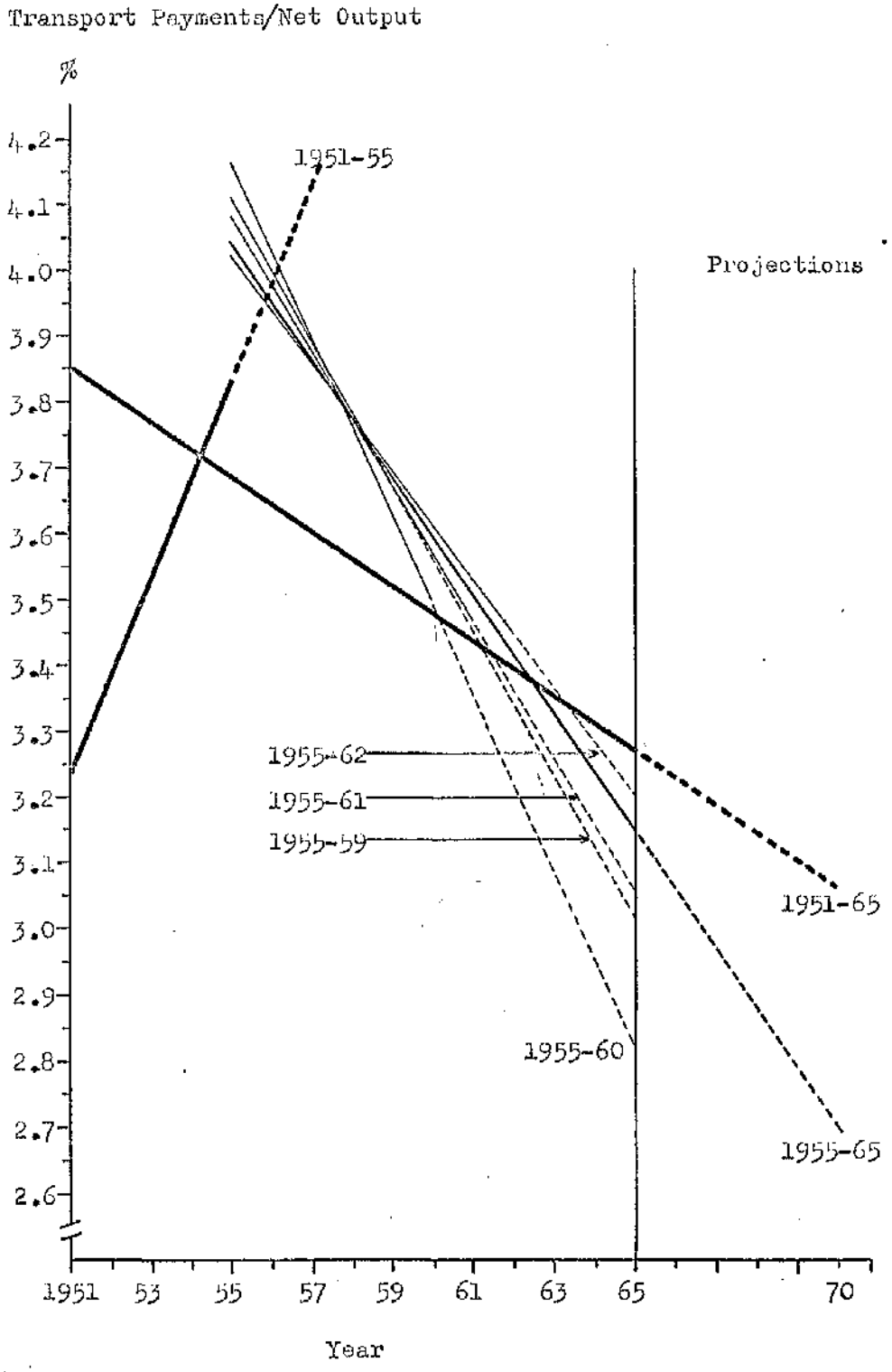
Source: Computed from Table 9.4.

While the drop in the value of the ratio for total manufacturing is in accord with the conventional wisdom about the diminishing role of transport costs in modern industry, it is important in view of the inconstant gap between payments and total transport costs not to attach too much significance to this finding. As will be clear by now, it is quite possible theoretically for a total transport cost/net output ratio to be rising or steady over time despite a concomitant fall in the corresponding payments/total cost ratio.

Because of the importance of our finding on the behaviour of the ratio for total manufacturing, we subjected the time series to further analysis to see if the trend for the total period was representative of movement in the more recent ratio values. It was not. Indeed, two contrasting trends can be discerned in the series. The first relates to the years, 1951-55. In technical terms, b is positive (see Fig. 9.2) and r = 0.73. The second trend covers the period, 1955-65. This time b is negative and r = -0.92. There is little doubt that 1955 was an important turning-point. Why this was so requires more detailed inquiry than we have been able to undertake. Still, we can explain some of the detailed movement in the figures. The second trend, for example, might have been even more pronounced had there not occurred the Suez crisis in 1956-57. It is evident from Table 9.4 that the 1957 ratio is out of line with the 1955-56 and 1958-59 figures. Glover[1] has suggested that fuel rationing at the

[1](1960), p.123.

Fig. 9.2 Trend Lines: Payments for Transport as a Proportion of Net Manufacturing Output, Larger Firms, NI, Various Time Periods



Source: Computed from Table 9.4.

time of Suez probably curbed the growth of road transport by diverting some traffic to rail. If so, own-account transport, being predominantly road, would likely have been affected adversely leading to the observed upward movement in the payments/total cost ratio.[1] This same upward movement is apparent in five out of the eight Order columns in Table 9.4. In the other three cases, the 1956 and 1957 ratios are the same.

Trend lines have also been computed for the years, 1955-59, 1955-60, 1955-61, etc. to see if there has been any significant change in the slope of the overall trend line (1955-65) since the trend first became apparent. The results appear in Fig. 9.2. Clearly, the time period chosen can have an important bearing on the slope of the trend line although, ceteris paribus, trends based on a large number of observations are to be preferred to trends based on a small number, especially when projections are involved. An alternative approach to the problem of determining the suitability of the 1955-65 trend line for projection purposes is to graph successive 5-year trend values beginning with 1955-59 and ending with 1961-65 as is done in Fig. 9.3. The results demonstrate the importance of time period selection even more strikingly than Fig. 9.2. Compare for example the slopes of the lines for 1958-62 and 1961-65. The slope for the latter period is the more significant of the two with $r = -0.76$ compared with an r-value of only -0.45 in the former case.

Two further conclusions can be drawn from this analysis: 1) the trend since 1955 in the transport payments/net output ratio for total manufacturing has been consistently downwards, 2) the 1955-65 trend line can be projected to 1970 with considerable confidence.

The same sort of detailed analysis is usefully applied to the Order-level data. Half of the eight series in Table 9.4, it will be recalled, displayed a rising trend over the period, 1951-65. In one of these cases, however, viz., XII (clothing), this overall result is highly misleading. The slope of XII's trend line for the five years,

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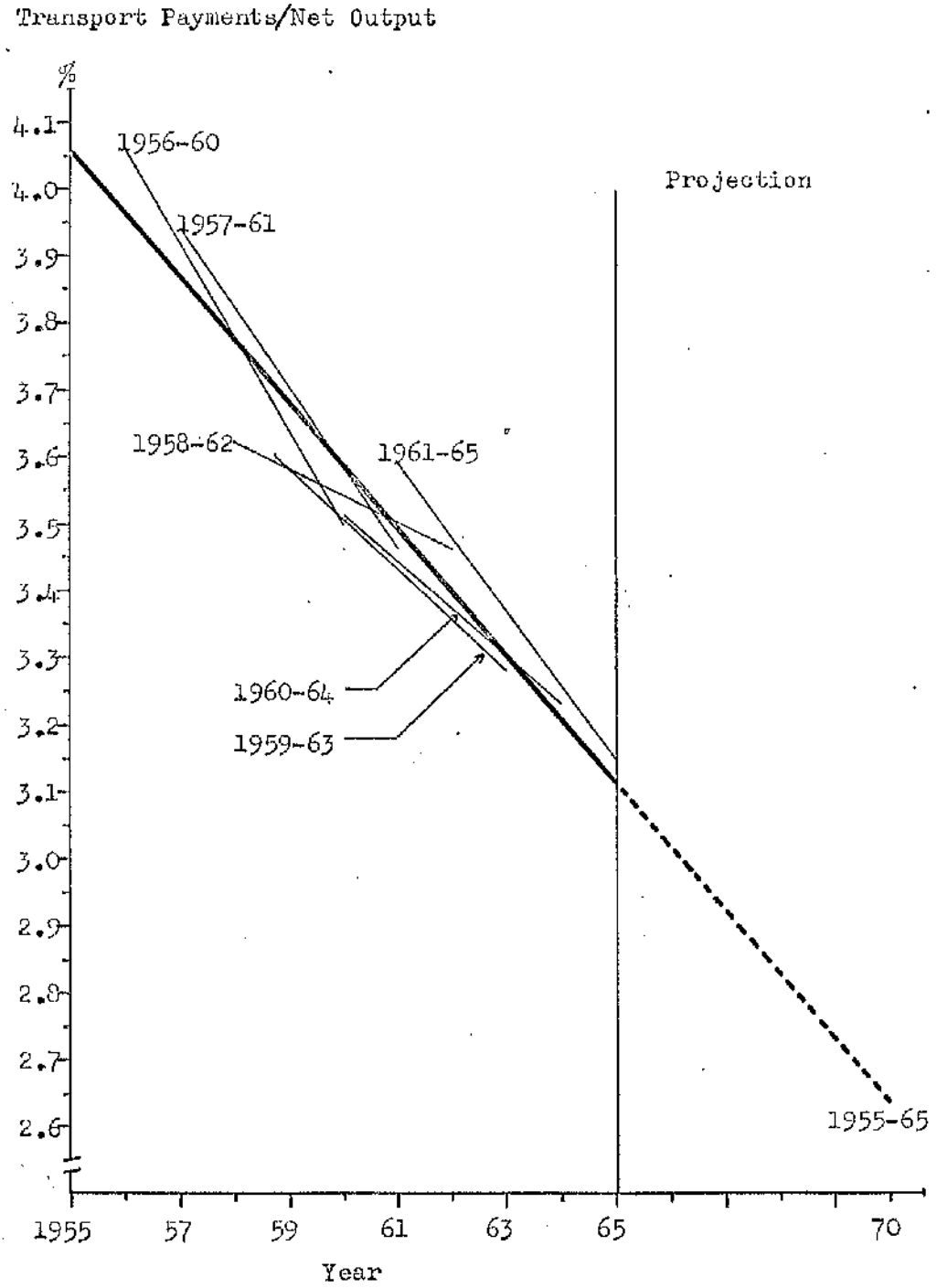
[1] In fact, the Ulster Transport Authority showed its first surplus following the Suez crisis. The surplus, however, like the crisis, was short-lived. See the Benson Report (1963), para. 7.

Fig. 9.3 Trend Lines: Payments for Transport as a Proportion of Net Manufacturing Output, Larger Firms, NI, 1955-65 and Successive 5-Year Time Periods Beginning with 1956-60



Source: Computed from Table 9.4.

1961-65, is actually negative. Furthermore, the value of r (-0.87) is much higher for these years than it is for the 15-year period (0.08).

Turning to the sectors displaying downward trends between 1951 and 1965, we see that one of them, i.e., XII (food, drink and tobacco), disaggregates into two conflicting trends, a positive one for the period, 1951-55, and a negative one for the years, 1955-65. Obviously, the latter is the dominant trend producing a downward slope in the total 15-year trend line. In two cases -- III and XIII (building materials and mineral products) -- the trend line slopes downwards less sharply in 1961-65 than it does in 1951-65 indicating a reduction in the rate of decline. In the other two cases, XV (paper, printing and publishing) and IV, XI, XVI (chemicals, leather and other) the reverse occurred.

These findings on the temporal behaviour of various transport payments/net output ratios are interesting but they tell us nothing definitive about total transport costs. One seemingly attractive way round this problem is to make use of the fact that total transport costs in 1965 frequently correlated rather closely with net output with the exact degree of correlation being a function of the industry mix as indicated by Table 9.6.[1]

Table 9.6 Linear Correlation Coefficients and Coefficients of Determination: Total Transport Costs (y) and Net Output (x), Selected Groupings of Larger Manufacturing Firms, NI, 1965.

1958 SIC Orders	N	Product Moment Coefficient of Correlation (r)	Coefficient of Determination (r^2)
XII-XVI	10	0.76	0.59
IV-XVI	9	0.86	0.74
MLHs			
211-499	31	0.37	0.14
261-499	24	0.82	0.67
261-479,491-499	21	0.82	0.67
211-240 (XII)	7	0.29	0.08
411-429.1(X)	9	0.86	0.74

Source of raw data: Census of Production of NI, 1963.

[1] Probably the observed relationships would have been even closer if hidden transport costs could somehow have been made explicit. Of course, for reasons discussed at length in the preceding chapter, this was impossible short of a special survey.

An important exception to the generally high r-values in the table is the food, drink and tobacco group of industries, but the resulting problem is confined in large part to the MLH level of aggregation; the Order-level regression equation is $y = -24.9741 + 0.7731\,x$ with $N = 10$ and $r^2 = 0.58$. Given the availability of net output data back to 1949, it is possible by substituting these data for x in the equation to obtain comparable total transport cost estimates.[1] These derived figures can in turn be plotted against the published transport payments data. The result is a measure of the size of the transport payments/total transport cost gap over time. Fig. 9.4 and Table 9.7 illustrate the precise nature of this gap during the period, 1949-65. A semi-log scale has been used in the former case to emphasize relative rather than absolute changes in the two series. For this reason the percentages in column 3 of the table do not appear at first glance to correspond with the size of the gap between the two series portrayed by the graph. In fact, this impression can be seen to be illusory.

Before looking at Fig. 9.4 and Table 9.7 more closely, it is essential that we justify the estimating procedure involved in the production of the historical total transport cost figures. We have evidence (see Table 9.6) of significant degrees of correlation between transport costs and net output for various groups of MI manufacturing industries in 1963 including total manufacturing and textiles (see below). We assume that these relationships are stable over time but have no independent proof that this is so. Indeed, there appears to be remarkably little published work in Britain on the relationship between transport and output. The evidence that does exist corroborates our assumption, taking the period as a whole, but not necessarily year by year. A brief survey of the literature will make this point clear.

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[1] For reasons developed below, it is felt that the danger of an extrapolation trap is generally minimal.

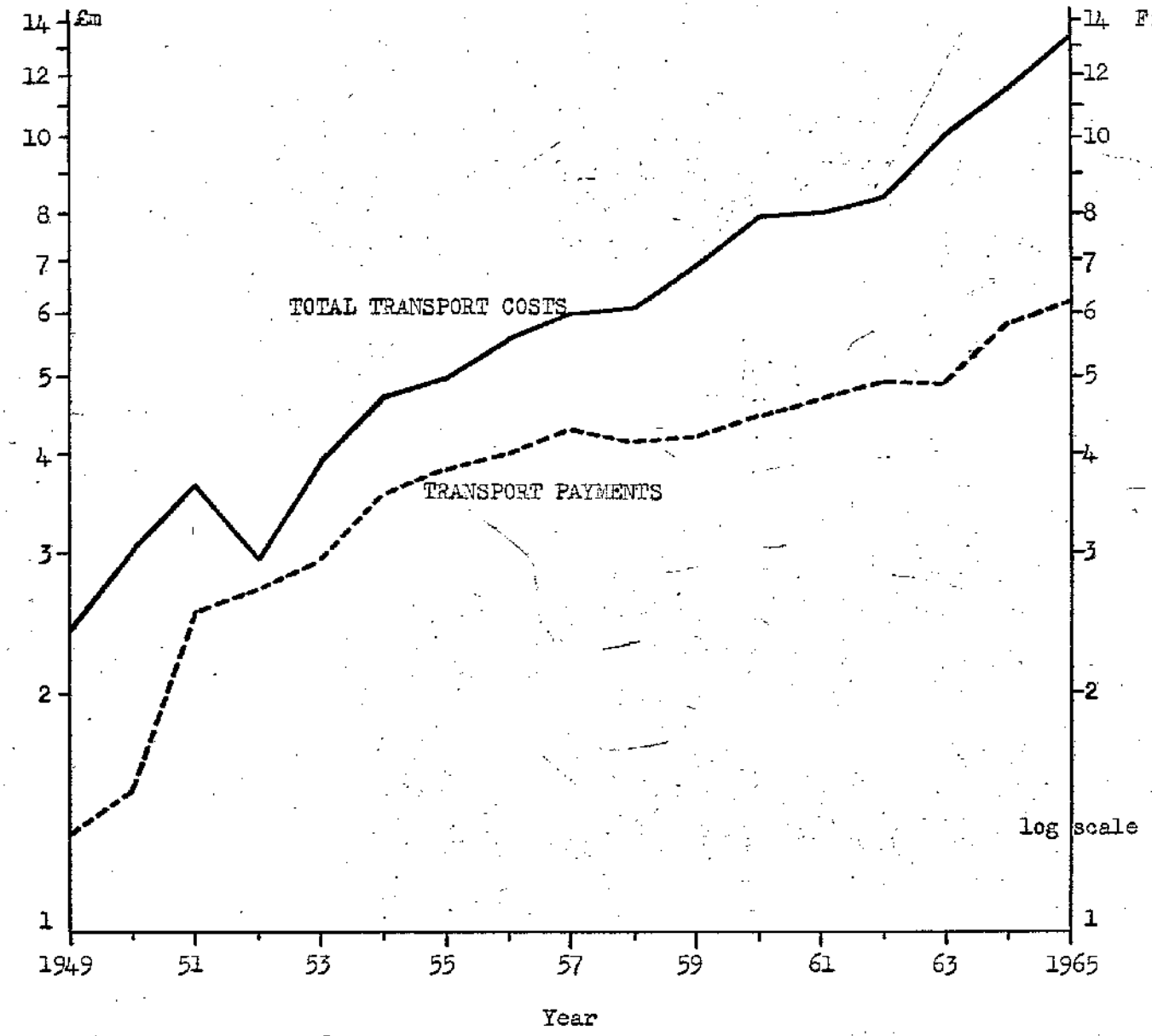

Fig. 9.4 Transport Payments Relative to Total Transport Outlays, Larger Manufacturing Firms, NI, 1949-65

Source: Table 9.7.

Table 9.7 Transport Payments Relative to Total Transport Outlays, Larger Manufacturing Firms, NI, 1949-65.

Year	(1) Transport Payments £'000	(2) Total Transport Costs[b] £'000	(3) (1)/(2) %
1949	1333[a]	2404	55.4
1950	1521[a]	3038	50.1
1951	2558	3680	69.5
1952	2705	2930	92.3
1953	2938	3904	75.3
1954	3583	4723	75.9
1955	3829	4986	76.8
1956	4001	5561	71.7
1957	4312	5968	72.3
1958	4158	6099	68.2
1959	4220	6927	60.9
1960	4500	7909	56.9
1961	4703	8001	58.8
1962	4961	8372	59.3
1963	4912	10042	48.9
1964	5847	11519	50.8
1965	6249	13274	47.1

[a]Estimates. The published payments data for 1949 and 1950 relate to transport outwards only. They have been transformed into total payments estimates (transport inwards and outwards) on the basis of the 1951 payments for transport outwards/total transport payments ratio for all manufacturing industries computed from NI, Min Com, Report on the Census of Production of Northern Ireland, 1951 (Belfast: HMSO, 1954), p.156a (see App. B below).

[b]Estimates obtained by substituting published net output data for x in the regression equation, $y = -24.9741 + 0.7731\,x$ where y = total transport costs. The equation has been computed from modified 1963 Census of Production data.

Sources of transport payment and net output data: NI censuses of production, 1963 and 1965.

Glover & Miller, in a comment during the discussion on their pioneering paper before the Royal Statistical Society in April 1954,[1] called attention to the need for research on the relationship between changes in national income and the demand for transport, but apparently no one took up the challenge. Glover returned to this theme in a 1960 paper[2] on goods transport by road; in what was essentially a

[1]Glover & Miller (1954), p.329.

[2]Glover (1960), sec. 5, pp. 123-29.

speculative aside, he examined the relative movements in inland goods transport (measured in terms of ton-miles) and the index of industrial production between 1938 and 1959. He concluded, somewhat heroically,[1] that industry generally was becoming less transport-intensive, i.e., that industrial output was growing more quickly than inland goods transport. Edwards has attacked this conclusion on two grounds.[2] First, more recent work (whether by himself or by others is not made clear) has uncovered an extremely high correlation ($r = 0.99$) since 1958 between transport (measure unspecified) and transport-weighted real gross national product. Second, Glover's conclusion rests heavily on transport movements during the years, 1951-54, a "fairly abnormal" period in Britain as a result of Tory measures to denationalise road haulage and to remove geographical restrictions on A and B licences. Edwards concludes:

> Although significant changes can occur from time to time in transport requirements per unit of output in particular firms or industries, taking industry as a whole, in the long term, growth in transport is broadly in line with growth of industrial output.[3]

A Dr Garwood of the Road Research Laboratory, Department of Scientific and Industrial Research, commenting on Glover's 1960 paper,[4] argued that the relationship between inland transport and the level of economic activity was likely to change over time because of improved productivity in the transport sector. Implicit in this argument is the view that productivity in transport can be expected to increase at a more rapid rate than productivity in manufacturing. This assumption remains to be proven.

Colin Clark offered five reasons why transport (ton-miles) per unit of real GNP can be expected to decline in Britain and indeed in any developed country over time: 1) the growing importance of the service sector relative to GNP, 2) the increasing number of branch plants, 3) the

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[1] The possibility of error in his largely unofficial and provisional road ton-mileage series is sufficiently high to render highly tentative any conclusions based on its use. Glover's overall transport series omitted coastal shipping, a transport mode of considerable importance for some of the industries entering into the compilation of the index of industrial production.

[2] Edwards, op.cit.

[3] Ibid.

[4] Op.cit., pp.131-32.

long-term decline in the relative role of agriculture, a major user of transport, 4) the drop in the unit weight of capital goods as a result of i) a reduction in the metal content of each unit, ii) the substitution where possible of aluminium for steel, 5) decreased fuel requirements per unit of output.[1] While only three of these points - the second, fourth and fifth - are relevant to our purposes, all five are debatable. For example, ton-mile trends are not necessarily a good guide to cost developments; total transport costs may well rise even as total ton-miles decline. Clark obviously assumed that branch plants are for the most part market-oriented. However, this assumption is not valid in the UK due to regional policy and the country's small geographic size. Indeed, in some relatively transport-intensive industries, e.g., brewing, mergers are actually reducing the number of plants; economies of scale in production and packaging are such that they more than offset the increased transport costs involved in operating fewer production units while servicing the same markets.[2]

The Hall Group Report,[3] issued in 1963 and the "first official published report to attempt a quantitative forward look at the problems of inland transport as a whole",[4] postulated that the demand for goods transport, especially in the short run, was affected more by changes in the level of output than any other variable but noted that "most of the transport series necessary for establishing a statistical relationship between output and transport are available only for a very short period, from 1952 to 1961."[5] Unfortunately, the precise relationships between industrial production and transport demand underlying the forecasts in the Report were not published.

Ray & Saunders,[6] in a detailed examination of the outlook to 1975 for road and rail transport in GB, also assumed that the demand

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[1] Ibid., pp. 135-36.

[2] See Anthony Cockerill, "Beer Mergers Start to Pay", The Times, 14 May 70, p.27.

[3] GB, MOT, The Transport Needs of Great Britain in the Next Twenty Years, Report of a Group Chaired by Sir Robert Hall (London: HMSO, 1963).

[4] Ray & Saunders (1965), p.332.

[5] Hall Group Report, para. 15.

[6] Op.cit.

for transport was closely related to the level of output. However, they made explicit the relationships involved in their forecasts. On a theoretical plane, they argued that there are three major determinants of the transport-intensity of aggregate industrial output, viz.: 1) the industry mix, 2) the geographical distribution of supply sources, manufacturing plants and markets, 3)the state of technology. Of the three, the first was considered to be the most volatile over time, at least potentially. The other two were felt to be relatively stable, especially in the short run.

In practice, of all the manufacturing industries, only steel was expected to show a decrease in transport-intensiveness between 1965 and 1975, primarily because of reduced transport requirements per unit of input. This reduction was attributed to three factors: 1) the siting of new plants closer to supply sources, 2) an increase in geographical integration, 3) a drop in the tonnage of materials and fuel required per unit of finished steel. Other manufacturing industries were expected to show a stable demand for transport. The basis for this assumption was the close correlation ($r^2 = 0.94$) between the movements in two indices, road and rail ton-mileage and physical supplies (output + imports), during the period, 1952-63. Interestingly, these indices correlated rather poorly on a year to year basis. Ray & Saunders attributed this finding to the repercussions of the Suez crisis and to the unequal incidence of the trade cycle on various industries. They also detected a tendency since 1958 for transport demand to grow faster than physical supplies offsetting a reverse tendency apparent in the pre-Suez period.[1] Nonetheless, they concluded that not much significance could be attached to the post-Suez trend given the shortness of the period and the considerable margin of error in the statistics.

In addition to this literature review, we attempted to check the accuracy of our historical total transport cost projections by developing independent cost estimates for 1954 and 1965 from motor fuel expenditure data collected by the Census of Production.[2] We

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[1] Glover, it will be recalled, had also detected a tendency for transport to decline relative to output during the early 1950s. However, writing at the end of the decade, he could not reasonably have been expected to see the apparent reversal of this trend uncovered by Ray & Saunders 4-5 years later.

[2] Such data are available only for 1954, 1963 and 1965.

assumed that the motor fuel/total own-account transport cost ratio in 1963 (18.1%) was sufficiently stable to permit its use in the other two years. This assumption proved fallacious. Whereas the 'independent' 1954 total cost estimate was equal to 161% of the projected figure, the 1965 independent estimate was only 9/10ths as large as expected. These differences cannot readily be explained in terms other than faulty methodology.

Turning to Fig. 9.4 and Table 9.7, we see that transport payments as a percentage of total transport costs fell over the period, 1952-65. While there were year to year fluctuations in the data, the general trend was undoubtedly downwards. These findings are in complete accord with what we have been led to expect on the basis of other studies as discussed earlier. They are particularly useful in helping to interpret temporal movements in the transport payment/net output ratios.

In contrast, the 1949-52 results are not what we expected and must be viewed as suspect. They show a diminution of the payments/total cost gap over time. By 1952, according to the table, identifiable own-account outlays had shrunk to less than 8% of total transport expenditures by NI manufacturers. Clearly, this situation is highly improbable. Indeed, it could only have come about as a result of defects in the data. Three types of defect are possible. First, our regression equation may not apply to 1949-52. In at least partial support of this contention is the fact that 11 years separate the period from the 1963 data forming the basis for the equation. Second, the payments data may be faulty. The 1949 and 1950 figures, for example, are unofficial estimates. While the estimating procedure used in obtaining them (see Table 9.7) seems reasonable, in fact it might not be so for two reasons. On the one hand, the transport inwards/transport outwards ratio could be more unstable than anticipated although this possibility was checked (see App. E) and seems unlikely. Alternatively, the 1958 changes in SIC and minimum establishment size could be responsible for a certain amount of distortion although, again, the effects are probably minimal. The payments data for 1949 and 1950 (relating to transport outwards only), published as part of the Report on the Census of Production, 1963, have been officially converted on the basis of the 1958 changes noted above.

The 1951 conversion ratio, however, reflects the 1948 SIC and the lower establishment exemption limit prevailing between 1949 and 1957. The published payments series shows a rise between 1951 and 1952 from £2,558,000 to £2,705,000. Net output on the other hand fell from £79.9m to £70.2m. Such a situation is conceivable - the output cut could reflect a mammoth but temporary rise in inventory the marketing of which resulted in extra transport outlays - but is most unlikely, especially in view of the drop in own-account expenditures accompanying the rise in transport payments. The third possibility is faulty net output data. It seems the least probable of the three given the political, statistical and economic importance of these figures. Certainly, government statisticians will have spent more time on them, checking and revising, than on the transport statistics. In conclusion, while definite proof is not available, what evidence there is suggests that the problem most likely lies in the quality of the transport payments data in the original census returns.

Ignoring then the 1949-52 total transport cost data in Table 9.7, we took the remaining figures in column 2 and expressed them as a proportion of net output. The result was a steadily rising time series as indicated by Table 9.8 below. This finding, which suggests that own-account transport outlays rose faster than transport payments declined over the 1953-65 period, is most significant since it runs

Table 9.8 Total Transport Costs as a Proportion of Net Output, Larger Manufacturing Firms, NI, 1953-65

Year	TCNO Ratios %
1953	4.7
1954	5.1
1955	5.2
1956	5.3
1957	5.5
1958	5.5
1959	5.7
1960	5.9
1961	5.9
1962	6.0
1963	6.2
1964	6.4
1965	6.5

Sources: Col. 2 of Table 9.7 and annual NI censuses of production.

counter to the conventional wisdom concerning the trend in total transport costs relative to manufacturing output. Furthermore, one can be reasonably certain that the rate of increase implicit in the table will be accelerated, at least for a while, by the effects of the 1968 Transport Act.

Total Transport Costs in the Textile Industry

The preceding analysis relates to manufacturing as a whole. What can we say about historical trends at the Order level? A short answer is very little with confidence. Because of the formidable disclosure problem in NI, meaningful regression equations showing the relationship in 1963 between total transport costs and net output can be computed for only two Orders - III and X. As indicated by Table 9.6, the degree of correlation between the two variables in the former instance was very low; thus, Order III can be dismissed from further consideration. In the latter instance, however, the degree of correlation was very high. The question can therefore be asked regarding Order X, is the 1963 relationship between transport costs and net output stable over time? We were able to confirm from independent evidence that the corresponding relationship for total manufacturing was stable. But independent analyses are not available for individual Orders or industries with the exception of steel in which case the temporal relationship was felt to be unstable. Obviously then, we cannot assume on *a priori* grounds that what is true for total manufacturing is true for all manufacturing industries. We can assume though, in the absence of evidence to the contrary, that temporal stability is characteristic of the textile group of industries. This assumption underlies Table 9.9 showing transport payments relative to total transport outlays by textile firms during the period, 1949-65, and total transport outlays as a proportion of net textile output for the years, 1953-65.

As in the case of total manufacturing, the results shown in column 3 of Table 9.9 for the early part of the period must be considered peculiar. Still, it seems clear that own-account transport has been used less widely by textile firms than by manufacturers generally. Indeed, until 1960 the trend was in favour of purchased transport. The reverse has been true, however, since

Table 9.9 Transport Payments Relative to Total Transport Outlays, and Total Transport Outlays as a Proportion of Net Output, Larger Textile Firms, NI, 1949-65 & 1953-65 Respectively

Year	(1) Transport Payments £'000	(2) Total Transport Costs[b] £'000	(3) (1)/(2) %	(4) (2)/Net Output %
1949	468[a]	1165	40.2	
1950	434[a]	1344	32.3	
1951	873	1477	59.1	
1952	782	1083	72.2	
1953	912	1244	73.3	4.9
1954	1168	1312	89.0	4.8
1955	1107	1293	85.6	4.8
1956	1181	1311	90.1	4.8
1957	1259	1350	93.3	4.7
1958	1139	1235	92.2	4.9
1959	1281	1357	94.4	4.7
1960	1384	1439	96.2	4.7
1961	1306	1406	92.9	4.7
1962	1329	1442	92.2	4.7
1963	1209	1661	72.8	4.5
1964	1560	1924	81.1	4.3
1965	1602	2084	76.9	4.3

[a] Estimates. The published payments data for 1949 and 1950 relate to transport outwards only. They have been transformed into total payments estimates on the basis of the 1951 payments for transport outwards/total transport payments ratio for the textile group of industries - see Table 9.7 and App. E.

[b] Estimates obtained by substituting published net output data for x in the regression equation, $y = 3.1345 + 0.364x$ where y = total transport costs, N = 9, and $r^2 = 0.74$. The equation has been computed from modified 1963 Census of Production data.

Sources of transport payment and net output data: annual NI censuses of production.

that date. Total transport costs as a proportion of net textile output declined over the 1953-65 period as a whole contrary to our finding for total manufacturing.

Communication Costs

Communication cost data were collected for the first and only time in NI during 1963.[1] Outlays by SIC Order are shown in Table 9.10. These figures correlate rather closely with net output as depicted by Table 9.11.

[1] In GB, it will be recalled, they were first collected in 1948. However, NI did not conduct a census that year.

Table 9.10 Outlays on Communications* by SIC Order, Larger NI Manufacturing Firms, 1963.

1958 SIC Order	Industry Group	Communication Outlays £'000	%
III	Food, drink & tobacco	143	15.6
IV	Chemicals & allied industries	30	3.3
V,VII-IX	Iron castings, shipbuilding & marine engineering, vehicles, metal goods n.e.s.	70	7.6
VI	Engineering & electrical goods	130	15.1
X	Textiles	247	27.0
XI,XVI	Leather, other industries	37	4.0
XII	Clothing & footwear	109	11.9
XIII	Bricks, pottery, glass, cement, etc.	31	3.4
XIV	Timber, furniture, etc.	19	2.1
XV	Paper, printing & publishing	91	10.0
III-XVI	Total manufacturing	914	100.0

*Postage, telephones, telegrams & cables.

Source: Census of Production of NI, 1963.

The degree of correlation is much less at the MLH level, however, especially in the case of the seven food, drink and tobacco industries. Still, the results for the 24 other industries or groups of industries are reasonably significant with 50% of the variation in communication costs being explained by variation in net output.

Table 9.11 Linear Correlation Coefficients and Coefficients of Determination: Communication Costs (y) and Net Output (x), Selected Groupings of Larger Manufacturing Firms, Northern Ireland, 1963.

1958 SIC Orders	N	Product Moment Coefficient of Correlation (r)	Coefficient of Determination (r^2)
III - XVI	10	0.85	0.72
IV - XVI	9	0.89	0.79
MLHs			
211 - 499	31	0.61	0.37
261 - 499	24	0.71	0.50
211 - 240(III)	7	0.42	0.18
411 - 429.1(X)	9	0.56	0.31

Source of raw data: Census of Production of NI, 1963.

It was felt that communication costs might be associated with non-operative employment as measured by the non-operative/total employment ratio. The tentative hypothesis was that an increase in the non-op/total employment ratio would result in an increase in communication outlays on the ground that administrative, clerical and

managerial personnel would be more apt to incur such expenses than operatives. This hypothesis was tested using Order-level data. Surprisingly, the results were the reverse of what was expected. The linear regression coefficient turned out to be negative. However, this finding must be considered as highly tentative in view of the very low correlation coefficient ($r = -0.34$).

A comparison of Tables 9.6 and 9.11 shows that Order-level communication costs were more closely associated than equivalent transport outlays with net output in 1963. At the MLH level, on the other hand, transport costs were more closely related to net output with the exception of the food, drink and tobacco group of industries in which case neither of the two y-variables, communication costs and transport costs, proved to be particularly dependent.

Given the discrepancy between the Order-level and MLH-level results in Tables 9.6 and 9.11, it seemed worthwhile investigating directly the degree of correlation between communication and transport costs as opposed to CCNO and TCNO ratios. We assumed on the basis of our UK (ch. 8) findings that any association between these two variables would be either negligible or spurious. In the case of communication costs, intra-UK telephone charges are distance-related but only mildly so while postage and telegram charges are entirely distance-insensitive. In contrast, transport costs vary significantly with distance. Thus a firm (A) in NI selling in GB and incurring sizable distribution costs rather than selling ex-works or ex-NI port of shipment will expend more on transport per sales unit than a firm (B) confining its activities to the NI market. Communication costs per sales unit, however, will likely be much the same in <u>both</u> cases unless extensive use is made by firm A of the telephone (or telex). The propensity to use the telephone, of course, will vary with the type of industry, the size of firm, the degree of competition in the industry, the nature of the management, etc. It could be either very high or very low. But of prime importance is the fact that, in many instances, it will not <u>necessarily</u> be high. It follows that there need not be a strong correlation between communication and transport costs.

Table 9.12 sets out the results of an empirical analysis of the degree of correlation between transport and communication costs in 1963 for various groups of manufacturing industry in NI. Communication costs have been taken as the dependent variable both for reasons of logic and because of the far greater absolute importance of transport costs. The table requires careful interpretation.

Table 9.12 Linear Correlation Coefficients & Coefficients of Determination: Communication costs (y) & Transport Costs (x), Selected Industry Groupings, Larger Manufacturers, NI, 1963.

1958 SIC Orders	N	r	r^2
III - XVI	10	0.49	0.24
IV - XVI	9	0.90	0.81
MLHs			
211 - 499	31	0.20	0.04
261 - 499	24	0.69	0.47
211 - 240 (III)	7	0.73	0.53
411 - 429.1 (X)	9	0.75	0.57

Source of raw data: Census of Production of NI, 1963.

On the one hand, our a priori reasoning would appear to be confirmed by the results for all Orders (N = 10) and for all MLHs (N = 31). However, this conclusion is easily overturned. One has simply to remove Order III (MLHs 211-240), i.e., the food, drink and tobacco group of industries, from consideration. At the Order level, the effect is sensational - the value of r^2 rises from 0.24 to 0.81. This finding can be attributed to the extreme sensitivity of the correlation coefficient to changes in the range of the transport cost variable rather than the possibility that Order III is different from the others in terms of the relationship between the two variables (see below). Order III transport costs in 1963 totalled £5.2m. The next largest comparable value was £1.6m (Order X). The smallest was £147,000 (Orders XI and XVI combined). In contrast, the Order III communication cost figure (£143,000) was well within the range for all Orders (£19-247,000).

At the MLH level, the effect of removing industries 211-240 from the analysis is also impressive - r^2 rises from 0.04 to 0.47. Again, the repercussion of removal on the range of the x-variable can be held responsible for the change. But due to overlapping ranges,[1] the repercussion effect this time is relatively muted.

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[1] £53-401,000 in the case of MLHs 261-499; £56-1,242,000 in the case of the Order III MLHs.

Interestingly, when one considers the Order III MLHs in isolation, the degree of correlation is reasonably high. The same applies to the Order X MLHs. We can therefore conclude from the foregoing as a whole that the relationship between transport and communication costs in 1963 was generally both positive and meaningful. The positive aspect is not surprising. But the relatively high degree of meaningfulness was not expected. Indeed, these findings suggest that transport and communication costs can usefully be added for certain purposes and considered simply as distance costs as was done for example, but on conceptual grounds, in Table 8.12. On the other hand, they contradict the results of the analogous ratio analysis in ch. 8. Thus we repeated the exercise represented by Table 9.12 using CCNO and TCNO ratios (from Table 9.14) instead of the actual communication and transport cost figures to see whether the 1963 NI experience truly differed from its UK analogue or whether the apparent difference simply reflected the dissimilar computational procedures. Our results appear in Table 9.13. From the r^2 column, it is clear that they corroborate our UK rather than our previous NI findings. It would seem then that communication and transport cost data correlate more closely than cognate CCNO and TCNO ratios, at least in NI. This outcome was not anticipated since we had assumed previously that the ratios faithfully mirrored the underlying cost data. In fact, this assumption led us to conclude in ch. 8 that communication and transport costs were not closely related. Obviously more research is required

Table 9.13 Linear Correlation Coefficients & Coefficients of Determination: CCNO Ratios (y) & TCNO Ratios (x), Selected Industry Groupings, Larger Manufacturers, NI, 1963.

1958 SIC Orders	N	r	r^2
III - XVI	10	0.04	0.00
IV - XVI	9	0.27	0.07
MLHs			
211 - 499	31	-0.05	-0.00
261 - 499	24	0.14	0.02
211 - 240 (III)	7	0.63	0.40
411 - 429.1 (X)	9	0.44	0.19

Source: Table 9.14.

into the true nature of the relationship between these two variables. In the meanwhile, our previous conclusion must stand suspended. We

would hazard the guess, however, on the ground of logic that it will not be found seriously misleading.

TCNO & CCNO Ratios: NI Relative to the UK

Classical location theory suggests that manufacturing plants are located so as to minimise transport costs, ceteris paribus. To the extent that the theory is indicative of actual behaviour, we would expect manufacturing activities in NI, a peripheral area, to be either local market-oriented or transport cost insensitive. More recently, as noted earlier, it has become widely accepted that many firms are quite prepared to trade off transport against other costs with a view to minimizing total outlays or to securing a satisfactory rate of return upon capital (or some other profit goal).[1] Such firms are not apt to locate in NI in the absence of a strong regional policy because of the limited opportunities there for saving on non-transport costs or otherwise achieving company objectives. This conclusion loses cogency, however, once regional policy is introduced into the calculus. It then becomes quite conceivable that even transport-cost-sensitive firms can be attracted to the area.

Bearing this general discussion in mind, we turn now to an examination of the 1963 TCNO and CCNO ratios for manufacturing industries in NI, especially the size of these ratios relative to their UK equivalents. Table 9.14 sets out the 'raw material' for the analysis. The UK data have been adjusted by grouping or deletion as required to increase their comparability with the NI ratios. The result is reasonably comparable statistics for 10 Orders or Order groupings and for 28 MLHs or MLH groupings.

The TCNO Ratios

Manufacturing in NI proved to be slightly more transport-intensive in 1963 than manufacturing in the UK as a whole. In the former instance, the TCNO ratio was 6.2%; in the latter, it was 5.8%. The ratio of the two TCNO ratios was 1.07:1. Not all Orders contributed

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[1] E.g., some U.S. electronics firms have found it more economical overall to transport parts to Singapore for assembly than to assemble them in the U.S. Peter W. Bocock, "The Impact of Development: Progress for People Through Industrial Revolution - Singapore," Finance and Development, VII (September 1970), 31.

to this result. Indeed, in six out of the 10 cases the reverse occurred, i.e., the NI TCNO ratio was less than the UK equivalent. The four 'exceptions' were textiles, leather plus other industries, clothing and footwear, and paper, printing and publishing.

The UK Order-level data were more widely dispersed than the NI figures. The relative ranges and coefficients of variation were as follows:

	Range %	Coefficient of Variation %
NI	2.5 - 12.5	54.7
UK	2.5 - 15.6	65.1

Because of the disclosure problem mentioned earlier, meaningful coefficients of variation could be calculated only for two groups of NI MLHs, viz., food, drink & tobacco and textiles. In both cases, the v-values were rather high - 50.5% and 65.4% respectively - indicating a lack of representativeness in the corresponding Order-level TCNO ratios. Of course, we cannot tell to what extent this conclusion applies to the province's other manufacturing Orders. Surprisingly, the two NI MLH-level v-values were considerably higher than the equivalent UK figures (35.8% and 40.5% respectively). Given NI's peripheral situation and the Order-level v-values noted above, one would have expected the reverse.

The relative rankings of the SIC Orders in NI and the UK are illustrated in Table 9.15 listing the Order with the highest TCNO ratio in NI first.

Table 9.14 TCNO & CCNO Ratios by Order & MLH, Larger Manufacturing Firms, NI and the UK, 1963.

1958 SIC Order	MLH	Industry	TC/NO			CC/NO		
			NI £	UK £	NI as % of UK	NI £	UK £	NI as % of UK
III	211-15,217-19, 229.2-40	Food, drink & tobacco	12.5	13.5	93	0.4	0.5	80
	211,219	Grain milling, animal feed	14.2	15.8	90	0.6	0.6	100
	212,213	Bread, biscuits	16.5	21.1	78	0.3	0.5	60
	214	Pigmeat, etc.	28.0	13.2	212	0.8	0.9	89
	215	Milk products	30.3	27.7	109	0.5	0.6	83
	216	Fruit & veg. products	10.5	13.4	78	0.6	0.8	75
	239.2/3	Soft drinks, wine & cider	26.7	23.4	114	0.6	0.7	86
	217,229.2,231, 239.1,240	Other[a]	3.4	8.2	41	0.1	0.4	25
IV	261,271-77	Chemicals	4.2	7.2	58	0.5	0.7	71
V,VII-IX	313,370-91, 393-95,399	Iron castings, shipbuilding & marine engineering, vehicles, metal goods n.e.s.	2.5	3.1	81	0.4	0.5	80
VI	331-49,361-69	Engineering & electrical goods	2.5	2.8	89	0.5	0.8	63
	331-49	Mechanical engineering	2.4	2.9	83	0.5	0.8	63
	361-69	Electrical engineering	2.6	2.7	96	0.4	0.7	57
X	411-29.1[b]	Textiles	4.4	3.3	133	0.7	0.6	117
	412	Spinning & doubling	3.2	2.5	128	0.4	0.4	100
	413	Weaving	2.2	2.7	81	0.4	0.5	80
	414	Woollen & worsted	4.2	3.9	108	0.5	0.6	83
	417	Hosiery & other knitted goods	4.2	2.2	191	0.9	0.6	150
	419	Carpets	6.9	4.5	153	0.6	0.7	86
	422.1[b]	House.tex. & handkerchiefs	5.9	4.8	123	1.7	1.1	155
	422.2	Canvas goods & sacks	16.0	9.2	174	1.1	1.3	85
	423	Textile finishing	5.6	4.4	127	0.5	0.5	100
	411,415-16,418, 421,429.1	Other[c]	4.5	3.0	150	0.4	0.5	80
XI,XVI	451-33,491-99	Leather, other industries	7.1	4.5	158	1.8	0.8	225
XII	441-50	Clothing & footwear	3.1	2.5	124	0.9	0.7	129
	441-44	Outerwear & menswear	3.4	2.5	136	0.9	0.7	129
	445	Dresses, lingerie, infants' wear	2.4	2.8	86	0.9	1.0	90
	446-50	Hats, bras, umbrellas, shoes	2.6	2.3	113	0.7	0.7	100
XIII	461-69	Bricks, pottery, glass, cement	11.6	15.6	74	0.6	0.6	100
	461-69.1	Bricks, etc. & abrasives	7.9	12.4	64	0.7	0.5	140
	469.2	Misc. bldg. materials	17.9	23.6	76	0.5	0.9	56
XIV	471-79	Timber, furniture, etc.	8.4	9.3	90	0.7	0.8	85
	473,475,479	Sawmilling, doors, crates, etc.	8.1	11.7	69	0.6	0.9	67
	472-74	Furn., mattresses, office fittings	9.0	7.4	122	0.8	0.8	100

1958 SIC Order	MLH	Industry	TC/NO NI %	TC/NO UK %	TC/NO NI as % of UK	CC/NO NI %	CC/NO UK %	CC/NO NI as % of UK
XV	481-89	Paper, printing & publishing	6.8	6.0	113	1.7	1.5	113
	481-83	Paper, bags, stationery, etc.	9.8	7.9	124	0.8	0.6	133
	486	Printing & publ. newspapers & periodicals	6.5	6.3	103	3.0	2.6	115
	489	General printing, bookbinding	3.5	3.1	113	1.2	1.5	80
III-XVI	211-499	Total manufacturing	6.2	5.8	107	0.6	0.7	86

[a] 217 = cocoa, chocolate & sugar confectionery, 229.2 = starch & misc. food, 251 = brewing & malting, 239.1 = spirit distilling & compounding, & 240 = tobacco.

[b] Includes part of MLH 810.4 (wholesale distribution of clothing, textiles, etc.)

[c] 411 = production of man-made fibres, 415 = jute, 416 = rope, twine & net, 418 = lace, 421 = narrow fabrics, & 429.1 = asbestos textiles.

Sources: Derived from NI and UK censuses of production, 1963.

Table 9.15 SIC Orders in NI and the UK Ranked by the Value of the NI TC/NO Ratios, 1963.

1958 SIC Order	Industry Group	Rank NI	Rank UK
III	Food, drink & tobacco	1	2
XIII	Bricks, pottery, glass, cement, etc.	2	1
XIV	Timber, furniture, etc.	3	3
XI,XVI	Leather, other industries	4	6
XV	Paper, printing & publishing	5	5
X	Textiles	6	7
IV	Chemicals & allied industries	7	4
XII	Clothing & footwear	8	10
VI	Engineering & electrical goods	9.5	9
V,VII-IX	Iron castings, shipbuilding & marine engineering, vehicles, metal goods n.e.s.	9.5	8

Source: Derived from Table 9.14.

Although the rank correlation coefficient for the two sets of data is quite high ($r = 0.86$)[1], some interesting dissimilarities can be observed. For example, whereas Order III was Ulster's most transport-intensive group of industries, in the UK as a whole Order XIII was first. Several factors may have contributed to this result but certainly one

[1] Unadjusted for the tied observations in the NI ranking.

of the more important was relative market distributions. Table 9.3 showed that 3/4ths of the sales by NI Order XIII producers during the early 1960s were confined to the local market. In contrast, 70% of the sales by NI Order III producers were outwith the area. While comparable UK figures are unavailable, it is inconceivable that they would be so disparate. In other words, it is not suprising on the basis of the market factor alone that Order III industries in NI during 1963 were more transport-intensive than Order XIII industries.

But the 'mix' of MLHs in NI and the UK may also be an important determinant of the relative rankings of Orders III and XIII. It was found in chapter 8 that both Orders were highly heterogeneous at the UK level as measured by the coefficient of variation. Whereas some of the component MLHs had very high TCNO ratios, in other instances the ratios were relatively low. It could be that the latter group of MLHs was particularly prominent in NI. In fact, available evidence for Order III suggests that this was indeed the case. Two high-TCNO-ratio Order III MLHs, viz., sugar and margarine, were entirely absent from the area's industrial structure in 1963.[1] The UK data in Table 9.14 have been adjusted to take these 'gaps' into account. Despite this adjustment and the large proportion of non-NI sales by NI Order III firms, the Order-level TCNO ratio for NI was still only 93% of the UK figure. In the case of Order XIII, on the other hand,

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[1] Both of these industries would appear to benefit considerably from internal economies of scale and to exemplify the transport/other cost trade-off mentioned earlier. Also, they display relatively low value added/gross output ratios indicating limited scope for taking advantage of the types of potential cost saving such as lower wage rates that NI may have to offer in compensation for her locational disadvantages. Thus the likelihood of sugar and margarine firms setting up plants in NI would appear to be negligible. Relevant net output per establishment and value added/gross output ratio data from the 1963 UK Census of Production are as follows:

Industry	Net Output per Establishment £	Value Added/ Gross Output %
Sugar	979,395	16.2
Margarine	792,333	13.6
Total manufacturing	285,907	38.7

MLH mix appears to have had little to do with the fact that the NI TCNO ratio was less than 3/4ths the UK equivalent. While MLH data are generally scanty for NI, it can be determined from the Census of Production that net output by MLH 469.2, a high-TCNO-ratio industry, was more important relative to total Order XIII net output in NI than in the UK!

It might be argued that the fastest-growing Orders in NI will be those with the lowest TCNO ratios on three interrelated grounds. First, migrant companies are the most likely source of significant growth. Second, migrant companies are generally footloose. Third, footloose industries by definition are transport cost insensitive. To test this hypothesis, we need a measure of growth. Available alternatives from the NI Census of Production are: 1) value of net output, 2) volume of output, 3) employment. Volume of output is the most useful measure for our purposes since it is free from price and productivity influences. According to the index of physical production published in the 1965 Census of Production report,[1] the fastest-growing manufacturing Orders between 1949 and 1965 in rank order were (IV, XI, XVI), XIII, XV, III, XII, X, V-IX and XIV. A quick comparison of this ranking with its counterpart in Table 9.15 suggests that the fastest-growing industries were not particularly transport cost insensitive, i.e., the evidence does not seem to support the hypothesis being tested. This superficial impression is borne out by a more rigorous analysis. Spearman's coefficient of rank correlation for the two sets of ranked figures is a very low 0.333. Granted the validity of our assumptions about migrant companies and growth, it can be concluded that the relatively high TCNO ratios characteristic generally of NI manufacturing industry are not an important impediment to growth.

It might also be argued that transport-cost-sensitive industries, i.e., industries with above-average TCNO ratios, if present in NI at all, will either be local market-oriented or less concentrated than one would expect on the basis of NI's share of total national net output, i.e., they will have a location quotient ≤ 1.0. We examine each of

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[1] Op.cit., p.3.

these points in turn.

Industries Absent from NI in 1963. Twelve MLHs were not represented in NI in 1963 according to the Census of Production, viz.:

Industry	MLH	Order
*Sugar	216	III
*Margarine	229.1	III
Mineral oil refining	262	IV
*Lubricating oils and greases	263	IV
*Iron & steel (general)	311	V
*Steel tubes	312	V
Non-ferrous metals	321,322	V
Scientific, surgical & photographic instruments	351	VI
Watches & clocks	352	VI
Cutlery	392	IX
Jewellery, plate & precious metal refining	396	IX
*Miscellaneous textile industries	429.2	X

Half of these industries were transport cost sensitive as defined, taking the TCNO ratio for all UK manufacturing industries (5.6%) as average. They are marked above with an asterisk. Of course, transport considerations per se may not be the only reason for their non-representation in NI. We saw earlier, for example, that economies of scale were very important to sugar and margarine firms. The same would appear to apply to three other transport-cost-sensitive industries, viz., MLHs 263, 311 and 312. Indeed, the sole exception to this seeming rule was MLH 429.2. In addition, each of the six transport-cost-sensitive industries displayed a below-average value added/gross output ratio, a fact making for heightened transport cost sensitivity, ceteris paribus.

Of the six seemingly transport-cost-insensitive industries, five were either above-average in terms of typical establishment size (as measured by net output per establishment) and therefore, prima facie, subject to considerable economies of scale, and/or below-average in terms of their value added/gross output ratio. The exception was MLH 351. There were 568 UK establishments employing $\geq$ 25 persons in this industry during 1963. Transport costs were extremely low (the TCNO ratio was 1.7%), the average establishment size was below-average (£247,333 vs. £285,907) and the value added/gross output ratio was considerably above-average (57.6% vs. 38.7%). Seen in this light the complete absence of the industry from NI was highly puzzling. Thus, we investigated further using as source

material the list of government-sponsored industry underlying Appendix B.

This Appendix shows that four postwar migrant firms belong to MLH 351. Their products include surgical supports and appliances, hypodermic syringes, optical components, spectacle lenses and scientific instruments, i.e., there is little doubt concerning the accuracy of our MLH assignations. One of the firms was not yet in production as of July 1969. Two more began operations in October 1966 and September 1967 respectively. The fourth firm, however, i.e., UK Optical, commenced production in May 1945. By 1969, its factory area was in excess of 250,000 sq. ft. One can reasonably assume, using the rule of thumb that 1,000 sq. ft. of floor space equals three jobs,[1] that UK Optical should have been included in the 1963 Census of Production since it almost certainly employed $\geq$ 25 persons at the time the census was taken. And indeed it was included; the published census reports simply failed to record the fact.[2]

In summary, we determined that six seemingly transport-cost-insensitive industries were not represented in NI in 1963. Plausible explanations were found in five instances. Non-representation was not readily explicable, however, in the sixth case (MLH 351). Investigating further we discovered that the published Census results, and not our logic, were in error. Our a priori reasoning was further confirmed by the establishment of three additional firms in the surgical and scientific instruments industry in NI during the post-1963 period.

Given these results we checked to see if any of the other 'missing' industries was represented in the list of government-sponsored industry. In the event, there were two, viz., 262 and 392. One firm was found in each. British Petroleum opened NI's first oil refinery in April 1964. Presumably, the plant is local market-oriented. The 1962 Hall Report concluded that oil was the optimum fuel for the province in view of the lack of indigenous fuel, the relatively high

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[1] UK Delegation, "Industrial Estates in Great Britain," in Regional Policy in EFTA: Industrial Estates, by European Free Trade Association (Geneva: EFTA, 1970), p.55.

[2] Private communication from Mr. J. Martin of MinCom, 29 Jun 70.

transport costs associated with coal imports from GB, the lack of any significant transport cost penalty on oil imports to NI as opposed to GB, the cost of the coal subsidy to industrial users of coal in effect since 1953, and the uneven and somewhat ineffective impact of this subsidy. Oneida Silversmiths, a cutlery producer, opened its NI factory in June 1961. Being of considerable size, its apparent exclusion from the 1963 Census of Production was inexplicable. Thus, we raised the matter with MinCom. Oneida proved to be another UK Optical.[1]

We can conclude, first, that while six of the 10 manufacturing industries absent from NI in 1963 were transport cost sensitive (as defined), transport considerations per se probably explain the absence of only one of them, viz., MLH 429.2. In the remaining five cases, non-transport and transport factors were almost certainly of more or less equal importance. Second, the 1963 Census of Production overstated the number of MLHs not represented in NI. At least (cf. ch. 11) one-sixth of the 12 alleged absentees were in fact present. Third, the number of non-represented industries has been reduced still further since 1963. From April 1964, it was down to nine.

Local Market-Oriented Industries. As noted earlier, census market data for manufacturing industries in NI are available only at the Order level. At least three Orders could be considered as local market-oriented during the period, 1960-65, viz., building materials and mineral products (XIII), timber and furniture (XIV), and paper, printing and publishing (XV). All three were transport-cost-sensitive.

Non-Local-Market-Oriented, Transport-Cost-Sensitive Industries. Two Orders fall into this category. The first - food, drink and tobacco (III) - had a location quotient of 2.0 in 1963 despite the fact that its TCWO ratio was more than twice the average for all NI manufacturing. Furthermore, the value of its LQ increased between

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[1] Ibid.

1950 and 1963 (cf. Table 9.16). These findings clearly contradict the hypothesis being tested that non-local-market-oriented, transport-cost-sensitive industries will for the most part avoid NI as a production centre because of its peripheral location. Thus, they will no doubt be of considerable satisfaction to MinCom's Industrial Development Unit. On the other hand, they reflect in considerable measure the ready availability in NI for many years of cheap imported grain and feedstuffs, a situation which is now coming to an end as described in chapter 6. Nonetheless, the Order III results indicated above demonstrate that even a serious transport cost handicap can be overcome by Ulster producers, given the right circumstances.

The other non-local-market-oriented, transport-sensitive 'Order' is actually three Orders - IV, XI and XVI - combined for reasons of disclosure in the Census tables relating to market areas but otherwise disaggregated into two components, IV and XI + XVI. Order IV comprises the chemical and allied trades. Order XI encompasses the leather and fur industries. Order XVI includes all industries not classified elsewhere and conforms to no explicit principle of classification such as similar raw materials or common technology. The LQ for Order IV in 1963 was 0.35. For Orders XI and XVI, it was an even lower 0.28.[1] Since both figures are completely in keeping with the hypothesis under review, it may be that Order III is (or has been) a special case.

To sum up, we have been testing the general hypothesis that industries which are transport cost sensitive according to UK figures will either be entirely absent from NI or, if present there, they will either be local market-oriented or characterised by an LQ < 1.0. We found first that while six (or 60%) of the 10 industrial absentees in 1963 were indeed transport cost sensitive, only one of them seemed to be decisively so. On the other hand, non-transport considerations were not necessarily paramount in the other five cases. Secondly, each of the three Ulster market-oriented manufacturing Orders was transport cost sensitive. Third, only one of the two non-Ulster-

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[1] The leather industry (Order XI) depends very largely on imported skins. Assuming that the bulk of its output is 'exported', it is scarcely surprising that the industry is transport-cost-sensitive, and that it has a low LQ. See Isles & Cuthbert (1957), pp. 65-66.

market-oriented but transport-cost-sensitive manufacturing Orders had a 1963 LQ > 1.0. It follows that our hypothesis seems to be much more valid than invalid although the corroborative evidence cited is not overwhelmingly cogent.

In Table 9.16, we present comparable NI LQs for 1958 and 1963 based upon net output data from the census of production for each of the industries or industry groupings shown in Table 9.14. Various correlation analyses were carried out to see whether the equivalent LQ values and TCNO ratios were related. Surprisingly, they were not, at least in any significant way. For example, we assumed that the MLH-level LQs > 1.0 (N = 17) should correlate rather closely with the comparable NI TCNO ratios expressed as a percentage of their UK analogues (e.g., when x = 2.59, y = 90). In fact, the resulting r^2-value was 0.00008. Leaving x the same but changing y to the actual NI TCNO ratios (e.g., when x = 2.59, y = 14.2), r^2 became -0.002. Similarly, the Order-level LQ and NI TCNO ratio data correlated very poorly. The LQs of a number of industries or industry groupings increased in value between 1958 and 1963 despite sometimes substantial transport cost handicaps (e.g., MLH 422.2). Other evidence could be cited. But enough has already been said to establish conclusively that the transport cost sensitivity of an industry in Ulster is a poor guide to its location quotient.

The CCNO Ratios

As indicated by Table 9.14, communication costs on the whole in NI's manufacturing sector during 1963 were much like their UK counterparts relative to net output with the notable exceptions of MLH 469.2 and three MLH groupings, 217 + 229.2 + 231 + 239.1 + 240, 361-69 and 431-33 + 491-99. Why these industries should deviate so markedly from the norm, however, is by no means obvious. In chapter 8, we established that CCNO ratios are not very significant for our purposes. Accordingly, we have not attempted any thorough analysis of the NI data.

Table 9.16: NI Location Quotients by Order & MLH, Larger Manufacturing Firms, 1958 and 1963

1958 SIC Order	MLH	Location Quotients 1958	1963
III	211-15,217-19,229.2-40	1.91	2.00
	211,219	2.34	2.59
	212,213	2.16	1.78
	214	2.93	2.43
	215	4.36	5.47
	218	0.39	0.33
	239.2/3	1.16	0.88
	217,229.2,231,239.1,240	1.62	1.98
IV	261,271-77	0.12	0.35
V,VII-IX	313,370-91,393-95,399	0.93	0.54
VI	331-49,361-69	0.56	0.79
	331-49	0.60	0.85
	361-69	0.51	0.71
X	411-29.1	2.55	2.72
	412	4.65	5.88
	413	3.05	3.21
	414	0.45	0.56
	417	1.36	1.47
	419	1.11	1.69
	422.1	31.69	28.38
	422.2	1.99	2.48
	423	3.09	2.98
	411,415-16,418,421,429.1	1.43	2.55
XI,XVI	431-33,491-99	0.36	0.28
XII	441-50	2.11	2.12
	441-44	2.89	2.74
	445	2.85	3.01
	446-50	0.84	1.06
XIII	461-69	0.62	0.74
	461-69.1	0.55	0.65
	469.2	0.79	0.97
XIV	471-79	0.74	0.72
	471,475,479	0.95	1.11
	472-74	0.58	0.41
XV	481-89	0.41	0.40
	481-83	0.35	0.36
	486	0.53	0.46
	489	0.38	0.38

Source: Computed from 1963 NI & UK census of production reports.

Summary and Conclusions

NI is the UK's most peripheral region and the only one to conduct its own census of production. Its census reports are published annually with a 2-3 year time lag between the date of publication and the year mentioned in the title. Unlike their Whitehall counterparts, the Stormont statisticians have collected transport payment data from larger firms every year since 1951 resulting in some unique time series and providing an unparalleled opportunity for trend analyses. However, our primary objective in this chapter has not been to investigate historical developments but to compute TCNO and CCNO ratios comparable to the 1963 UK ratios in chapter 8 for as many NI manufacturing industries as the data would allow. In practice, this meant only 31 MLHs or MLH groupings in sharp contrast to the 119 MLHs distinguished at the national level. Part of this disparity was caused by the relative narrowness of Ulster's industrial base; the province had 10 fewer types of manufacturing industry than the kingdom in 1963. But much more important was the danger of disclosure. A majority of Ulster's manufacturing industries had too few establishments to permit publication of separate industry figures. In the event, transport costs relative to net output were slightly higher in NI than the UK overall and communication costs were slightly lower. These aggregate results were broadly echoed at the Order and MLH levels although there were the inevitable exceptions.

A second but subsidiary objective in this chapter has been to make use of the published historical data on transport payments by NI manufacturers to determine whether or not transport costs as an industrial cost item have altered in importance over time. We found for manufacturing as a whole that transport payments relative to net output increased between 1951 and 1955 but then began to fall; this decline continued until 1965, the end of the period for which we had data (more recent figures have since become available). Transport payments, however, do not equal total transport outlays and an official total is available only for 1963. Thus we had to construct our own total transport cost time series. Expressing the results of this exercise as a proportion of net output, we determined that NI's total transport cost/net manufacturing output ratio rose steadily between

1953 and 1965, i.e., expenditures on own-account transport rose faster than transport payments declined. This finding runs contrary to the conventional wisdom which holds that transport costs have been declining over time relative to manufacturing output. Thus it is clearly of major significance, especially since the 1968 Transport Act promises to boost the relative importance of transport outlays as an industrial cost item even further. At the Order level, we were able to construct meaningful estimates of total transport cost trends only for the textile industry. They revealed a more or less continuous decline in the total transport cost/net textile output ratio.

Despite the foregoing, none of the findings in this chapter contradicts our earlier conclusions concerning Ulster in chapter 6. It was suggested there, for example, that transport costs are not an important constraint on the development of many manufacturing industries in NI. We found here that even relatively high TCNO ratios have not seriously impeded the growth of the industries to which they apply, that there is no general relationship between an industry's transport cost sensitivity and its location quotient and that four of the 10 industries entirely absent from NI in 1963 were transport cost insensitive. It was also suggested in chapter 6 that transport costs are very important to some types of industry. Again, we produced further evidence here in support of this conclusion.

We concluded in chapter 8 on the basis of an analysis involving UK TCNO and CCNO ratios rather than the underlying cost data per se that communication and transport costs seemed to correlate poorly. Since our statistical findings were fully corroborated by logic, we did not pursue the matter further at the UK level. A similar statistical analysis using NI ratios as inputs also corroborated our initial conclusion. But an analogous enquiry involving the actual transport and communication cost data for NI revealed a relatively, indeed a disconcertingly, high correlation between the two variables. In light of this unexpected difference in the results of the ratio and cost analyses, it is clear that until more research has been undertaken the question as to whether transport and communication costs are closely related or otherwise cannot be resolved conclusively. In the meantime,

it remains difficult on *a priori* grounds to believe that any apparent relationship can be other than either tenuous or spurious.

A final point worth noting is that own-account transport was considerably more important in NI than the UK during 1963, partly because of the Ulster Transport Authority's near-monopoly of inter-urban for-hire road haulage as explained in chapter 6 and partly due to a difference in the overall market structure of producers in the two areas. Indeed, it would appear from our evidence that market structure has become the prime determinant of the own-account/purchased transport mix in NI industry with the abrogation of the UTA's privileged position in 1966. Local market-oriented firms prefer to operate their own road vehicles; non-local-market-oriented companies make use predominantly of purchased transport. We turn now to look at transport and communication expenditures by Scottish manufacturers.

CHAPTER 10

MANUFACTURING IN SCOTLAND: TRANSPORT AND COMMUNICATION COSTS, 1963

Introduction

In chapter 7, we suggested that distance has been an important constraint on the flow of British interregional migrants to Scotland during most of the postwar period. Although the problem would now seem to be easing somewhat, it has by no means disappeared. In this chapter, we set out the facts, as determined by the Census of Production, concerning distance costs in the Scottish manufacturing sector and compare our findings with analogous data for NI and the UK. The analysis is cross-sectional, relating only to 1963, for reasons developed earlier. Census figures, of course, tell one nothing about psychological distance, a point which should be borne in mind when assessing our statistical findings.

The 1963 Census of Production collected detailed distance cost data from Scottish firms but published (Part 133, Table 47) only the payments to other organisations for transport. It did not publish any statistics on own-account transport outlays or communication costs. Furthermore, the published material related to all firms whereas our UK and NI analyses relate entirely to ('larger') firms employing 25 or more persons. In addition, the 'smaller' census respondents were exempted from all questions concerning transport and communication costs. These problems were overcome only with the active assistance of the Board of Trade's Business Statistics Office which made available:

a) aggregate transport cost data for larger firms by Order and MLH

b) similar information on communication costs

c) the grossing factors used for converting the larger-firm census results into all-firm data.

Thus, it became possible to deflate the published net output statistics and to compute larger-firm TCNO and CCNO ratios for all manufacturing

industries in Scotland with the exception of a number dominated by one or, at most, a handful of establishments and therefore subject to the disclosure provisions of the census. These provisions, of course, are designed to protect the commercial interests of individual companies and mean that otherwise publishable census information is treated as confidential. In fact, disclosure affected 22 MLHs in Scotland, or 18.5% of the number for which published information in available at the UK level, illustrating vividly yet again one of the frustrations involved in working with regional data.

Despite the BOT's help, one difficulty remained in the way of bringing about comparability between the Scottish transport cost statistics and those for the UK and NI. It will be recalled that the latter sets of figures were disaggregated into own-account outlays and payments to others. The own-account data were then multiplied by 109% to compensate for certain census omissions. Unfortunately, it proved impossible to make this adjustment to the Scottish figures since we were unable to effect a meaningful disaggregation of the total transport cost information. On the one hand, the BOT was prevented by time, cost and disclosure constraints from providing the desired breakdown. On the other, an attempt at reconciling the published payments data with the unpublished total transport cost information proved abortive because the former were rounded to the nearest one hundred thousand pounds while the latter were rounded to the nearest thousand. Owing to the relatively small sums involved in many cases, this discrepancy turned out to be critical. Consider MLH 261 for instance. Transport expenditures in 1963 by the larger Scottish manufacturers in this industry totalled £19,000. Transport payments as a proportion of total transport costs at the UK level equalled 97.5%, i.e., own-account outlays were minuscule. But a payments figure could not be published for Scotland because the smallest possible publishable number was £100,000, a sum five times the total costs incurred. Thus, in the case of Scotland, we had to forego the own-account transport cost adjustment carried out on the UK and NI data. However, the practical consequences of this situation are not that important in aggregate terms. At the UK level, the adjustment raised total transport costs by £20,485,000 or 3.6%. In NI, total transport costs were raised by £423,000 or 4.4%.

It is unlikely in view of the historical propensity towards own-account transport in Ulster that any conceivable Scottish percentage increase would exceed 4.4. Even in the case of individual MLHs, the own-account adjustment could not raise total transport costs, to take an extreme example, by more than 9%. With the possible exception of MLH 212 (cf. App. C), this situation would be most unlikely to be even approximated in reality. We can therefore conclude that the Scottish transport cost data are reasonably comparable with those for the UK and NI.

TCNO and CCNO Ratios

In the chapters on distance costs in the UK and NI, we devoted a great deal of attention to various background and other issues of considerable intrinsic interest but not always germane, as it turned out, to the main thrust of our argument. It is not essential, nor even possible in some instances due to lack of data, to duplicate the more valuable of the previous investigations here. A fortiori, there is no need to repeat the enquiries carried out earlier which proved to be either tangential in nature or simply abortive. This brings us to the heart of the present chapter, viz., what were the TCNO and CCNO ratios in the Scottish manufacturing sector during 1963, and how did these ratios compare to those for the UK and NI?

Table 10.1 sets out the basic facts. We can deal summarily with the CCNO ratios in the table because it was shown earlier that they are of little relevance to industrial mobility. Indeed, they are mentioned here at all mainly to round off the analysis. On the whole, the Scottish CCNO ratios were little different from their NI and UK counterparts. That is to say, they were generally low and insignificant. There was one notable exception to this generalisation, however, viz., MLH 433 (fur products). The Scottish CCNO ratio for this MLH was an astounding 6.3%; the equivalent UK ratio was only 0.7%. Prima facie this sort of discrepancy seems unbelievable. But even if it is true, the Scottish industry was extremely small in 1963 (the larger firms had an estimated 120 employees altogether). More importantly, the industry was in decline at the national level (cf. Howard, 1968, Table 9).

Turning to the TCNO ratios in Table 10.1, the aggregate results conform exactly to what one would expect from our hypothesis concerning distance costs and industrial mobility. The Scottish ratio (5.9%) was slightly higher than its UK equivalent (5.8%) but lower than the NI figure (6.2%). Taking NI to be the most peripheral UK region and discounting the likelihood of significant interregional variation in the transport cost burden borne by manufacturers, the above spread, or something close to it, is precisely what one would anticipate. It follows that the Scottish and UK TCNO ratios should correlate rather closely. We tested this assumption at the MLH level to get the maximum number of observations. As has been argued previously, Order-level correlation analyses are probably best eschewed when comparable MLH data are available.

Table 10.2 presents the MLH-level results. In general, they corroborate our argument that the Scottish and UK figures are probably closely associated with N = 93, r^2 = 0.60; this is quite a high figure, especially when it is recalled that the Scottish transport cost data are unadjusted and thus not strictly comparable to their UK counterparts. Even higher coefficients of determination are evident in the table for some limited groups of MLHs, e.g., metal goods, textiles, timber and furniture, and paper, printing and publishing. Contrarily, other groups, e.g., food and drink, chemicals, metal manufactures, engineering and electrical goods, clothing, and building materials, displayed only middling degrees of association, i.e., r-values between 0.5 and 0.7. Some of the several unspectacular results may reflect a genuine divergence from the general situation. Alternatively, they may be due to small N-values. Certainly, that would appear to be true of MLHs 491-496 (miscellaneous manufacturing).

Further support for our contention that TCNO ratios should not vary widely by region in any systematic way is provided by a linear correlation of the Scottish and NI TCNO ratios. Because of the widespread disclosure problem in NI, we could only get 15 sets of bivariate data, i.e., N = 15. Yet they yielded an r^2 -value of 0.56 which is similar to, but less than, the corresponding Scotland-UK figure (0.60). This finding is entirely reasonable since one would expect from the three aggregate TCNO ratios in Table 10.1 that the Scottish-UK figures would correlate more closely than the Scottish-NI data, but that the two correlation coefficients would not be greatly dissimilar.

Table 10.1: TCHO & CCHO Ratios by Manufacturing Order & MLH, Larger Firms: Scotland, NI and the UK, 1963

1958 SIC Order	MLH	TC/HO Scotland %	TC/HO NI %	TC/HO UK %	TC/HO Scot. as % of UK	CC/HO Scotland %	CC/HO NI %	CC/HO UK %	CC/HO Scot. as % of UK
III	211-240	11.5	12.5	13.9	83	0.5	0.4	0.5	100
	211	10.6	d	14.3	74	0.5	d	0.6	83
	212	18.9	d	25.0	76	0.4	d	0.5	80
	213	d	d	10.6	n.a.	d	d	0.6	n.a.
	214	16.8	28.0	13.2	127	1.5	0.8	0.9	167
	215	15.9	30.3	27.7	57	0.5	0.5	0.6	83
	216	27.2	n.a.	24.2	112	0.4	n.a.	0.3	133
	217	0.1	d	7.4	109	0.8	d	0.6	133
	218	17.1	10.5	13.4	128	0.7	0.6	0.8	88
	219	22.5	d	17.4	129	1.0	d	0.7	143
	229.1	16.0	n.a.	13.7	117	1.0	n.a.	0.4	250
	229.2	12.3	d	10.2	121	0.5	d	0.6	83
	231	16.0	d	11.8	136	0.3	d	0.4	75
	239.1	4.9	d	5.1	96	0.3	d	0.3	100
	239.2/3	49.9	26.7	23.4	213	0.8	0.6	0.7	114
	240	d	d	3.0	n.a.	d	d	0.3	n.a.
IV	261-277	5.5	4.2	7.0	79	0.4	0.5	0.7	57
	261	1.6	d	20.0	8	0.2	d	0.2	100
	262	d	n.a.	2.2	n.a.	d	n.a.	0.4	n.a.
	263	14.7	n.a.	12.2	120	1.0	n.a.	0.9	111
	271.1	d	d	3.1	n.a.	d	d	0.4	n.a.
	271.2	39.4	d	17.4	226	1.0	d	0.7	143
	271.3	5.8	d	7.5	77	0.4	d	0.5	80
	272.1	0.8	d	3.2	25	0.7	d	0.8	88
	272.1	d	d	3.1	n.a.	d	d	1.1	n.a.
	273	d	d	3.8	n.a.	d	d	0.4	n.a.
	274	6.3	d	6.9	91	0.9	d	1.0	90
	275.1	22.7	d	12.1	188	1.1	d	0.5	220
	275.2	6.8	d	8.4	81	0.3	d	0.7	43
	276	1.7	d	4.9	35	0.5	d	0.7	71
	277.1	n.a.	d?	6.7	n.a.	n.a.	d?	0.9	n.a.
	277.2	d	d?	11.7	n.a.	d	d?	0.8	n.a.
V	311-322	7.4	d	6.7	110	0.4	d	0.4	100
	311	7.5	n.a.	7.8	96	0.3	n.a.	0.3	100
	312	9.8	n.a.	6.5	151	0.8	n.a.	0.6	133
	313	7.4	d	6.7	110	0.5	d	0.4	125
	321,322	5.1	n.a.	4.5	113	0.3	n.a.	0.6	50

1958 SIC Order	MLH	TO/NO Scotland %	TO/NO NI %	TO/NO UK %	TO/NO Scot. as % of UK	CC/NO Scotland %	CC/NO NI %	CC/NO UK %	CC/NO Scot. as % of UK
VI	331-369	2.2	2.5	2.7	81	0.7	0.5	0.8	88
	331	3.2	d	4.5	71	1.4	d	1.0	140
	332	3.2	d	2.2	145	0.9	d	0.7	129
	333	2.7	d	1.8	150	1.3	d	0.9	144
	334	d	d	2.6	n.a.	d	d	0.9	n.a.
	335	2.0	d	2.1	95	0.8	d	0.6	133
	336	3.0	d	3.9	77	1.5	d	1.0	150
	337	3.2	d	3.1	103	0.8	d	0.8	100
	338	0.9	d	1.6	56	0.4	d	0.6	67
	339	2.3	d	3.1	74	0.6	d	0.9	67
	341	2.8	d	3.7	76	0.6	d	0.9	67
	342	d	d	1.2	n.a.	d	d	0.6	n.a.
	349	2.7	d	2.5	108	0.7	d	0.7	100
	351	1.2	d	1.7	71	0.8	d	1.1	73
	352	0.9	n.a.	1.1	82	1.1	n.a.	1.1	100
	361	3.2	d	2.6	123	0.6	d	0.8	75
	362	d	d	5.9	n.a.	d	d	0.7	n.a.
	363	d	d	1.5	n.a.	d	d	0.5	n.a.
	364	1.0	d	1.6	63	0.6	d	0.8	75
	365	2.1	d	4.0	53	0.4	d	0.8	50
	369	1.7	d	3.3	52	0.6	d	0.8	75
VII	370	1.2	d	1.2	100	0.3	d	0.3	100
VIII	381-389	1.7	d	2.2	77	0.4	d	0.5	80
	381	4.0	d	2.6	154	0.7	d	0.5	140
	382	d	d	3.9	n.a.	d	d	0.6	n.a.
	383	d	d	1.1	n.a.	d	d	0.6	n.a.
	384	0.7	d	0.9	78	0.2	d	0.2	100
	385	d	d	1.5	n.a.	d	d	0.2	n.a.
	389	21.9	d	7.7	284	1.4	d	0.9	156
IX	391-399	6.2	d	5.1	122	0.6	d	0.7	86
	391	10.2	d	3.4	300	1.1	d	0.9	122
	392	2.3	d	1.2	192	1.0	d	0.7	143
	393	4.6	d	3.5	131	0.6	d	0.6	100
	394	4.1	d	7.5	55	0.6	d	0.8	75
	395	22.2	d	11.7	190	1.0	d	0.6	167
	396	n.a.	n.a.	1.8	n.a.	n.a.	n.a.	1.0	n.a.
	399	6.5	d	5.0	130	0.6	d	0.7	86
X	411-429	3.1	4.4	3.3	94	0.6	0.7	0.6	100
	411	n.a.	d	2.1	n.a.	n.a.	d	0.2	n.a.
	412	1.6	3.2	2.5	64	0.3	0.4	0.4	75
	413	3.1	2.2	2.7	115	0.6	0.4	0.5	120
	414	2.5	4.2	3.9	64	0.6	0.5	0.6	100
	415	3.3	d	4.4	75	0.4	d	0.4	100

1958 SIC Order	MLH	TC/NO Scot-land %	NI %	UK %	Scot. as % of UK	CC/NO Scot-land %	NI %	UK %	Scot. as % of UK
	416	7.9	d	8.4	94	1.1	d	0.8	138
	417	1.8	4.2	2.2	82	0.8	0.9	0.6	133
	418	1.8	d	2.1	86	0.7	d	0.7	100
	419	3.5	6.9	4.5	78	0.6	0.6	0.7	86
	421	d	d	2.9	n.a.	d	d	0.9	n.a.
	422.1	d	5.9	4.8	n.a.	d	1.7	1.1	n.a.
	422.2	10.4	16.0	9.2	113	1.5	1.1	1.3	115
	423	6.2	5.6	4.4	141	0.7	0.5	0.5	140
	429.1	d	d	3.8	n.a.	d	d	1.1	n.a.
	429.2	11.5	n.a.	10.7	106	0.4	n.a.	1.1	36
XI	431-433	6.0	d	4.6	130	1.1	d	0.8	138
	431	5.3	d	5.1	104	0.9	d	0.7	129
	432	10.3	d	4.5	229	0.7	d	1.1	64
	433	9.4	d	2.8	336	6.3	d	0.7	900
XII	441-450	2.4	3.1	2.5	96	0.7	0.9	0.7	100
	441	3.3	d	2.4	138	0.9	d	0.7	129
	442	1.8	d	2.0	90	0.4	d	0.6	67
	443	3.4	d	3.0	113	0.5	d	0.7	71
	444	3.0	d	3.3	91	0.7	d	1.0	70
	445	2.8	2.4	2.8	100	0.8	0.9	1.0	80
	446	d	d	3.2	n.a.	d	d	0.8	n.a.
	449.1/3/4	2.2	d	2.1	105	1.1	d	1.1	100
	449.2	d	d	3.1	n.a.	d	d	1.0	n.a.
	450	1.1	d	2.2	50	0.5	d	0.5	100
XIII	461-469	17.8	11.6	15.6	114	0.6	0.6	0.6	100
	461	19.7	d	22.3	88	0.6	d	0.5	120
	462	8.5	d	4.0	213	0.9	d	0.8	113
	463	12.1	d	9.5	127	0.4	d	0.5	80
	464	24.1	d	12.6	191	0.4	d	0.4	100
	469.1	n.a.	d	3.5	n.a.	n.a.	d	0.8	n.a.
	469.2	10.7	17.9	23.6	79	0.7	0.5	0.9	78
XIV	471-479	10.5	8.4	9.3	113	0.7	0.7	0.8	88
	471	14.4	d	12.2	118	0.8	d	0.9	89
	472	8.0	d	7.9	101	0.8	d	0.7	114
	473	10.1	d	10.8	94	1.6	d	1.2	133
	474	4.9	d	4.5	109	0.7	d	0.7	100
	475	9.1	d	11.4	80	0.4	d	0.7	57
	479	5.5	d	8.7	63	0.9	d	0.9	100
XV	481-489	7.3	6.8	6.0	122	1.4	1.7	1.5	93
	481	10.6	d	8.5	125	0.5	d	0.4	125
	482	7.5	d	8.1	93	0.7	d	0.7	100
	483	8.3	d	6.7	124	1.5	d	1.0	150

1958 SIC Order	MLH	TC/NO Scotland %	TC/NO NI %	TC/NO UK %	TC/NO Scot. as % of UK	CC/NO Scotland %	CC/NO NI %	CC/NO UK %	CC/NO Scot. as % of UK
	486	6.7	6.5	6.3	106	2.1	3.0	2.6	81
	489	3.1	3.5	3.1	100	2.0	1.2	1.5	133
XVI	491-499	6.3	d	4.5	140	0.0	d	0.7	100
	491	5.1	d	4.6	111	0.5	d	0.7	71
	492	8.6	d	5.6	154	1.1	d	0.7	157
	493	d	d	5.3	n.a.	d	d	0.9	n.a.
	494	3.7	d	5.2	71	1.6	d	1.0	160
	495	d	d	2.9	n.a.	d	d	1.7	n.a.
	496	9.1	d	4.3	212	1.0	d	1.0	100
	499	d	d	3.0	n.a.	d	d	0.7	n.a.
III-XVI	211-499	5.9	6.2	5.8	102	0.6	0.6	0.7	86

Note: d = confidential due to risk of disclosure.
d? = ambiguous as to whether d or n.a.

Sources: Chs. 8 & 9 and unpublished data from the 1963 Census of Production.

We have established then that all three sets of TCNO ratios in Table 10.1 - the Scottish, the NI and the UK figures - correlate closely enough for one to conclude that they are basically similar. But there are some pronounced disparities in the TCNO ratios for individual MLHs. Consider for instance MLHs 215 and 239.2/3 in the food and drink group. MLH 215 refers to milk products. Whereas the NI and UK ratios for this industry are both of unequalled size relative to the other NI and UK ratios, the Scottish ratio, while large per se, is relatively diminutive. Probably the industry in Scotland is local market-oriented. In contrast, the NI industry is likely geared to the GB market. The high UK ratio may reflect the existence of significant internal economies of scale making it worth while for enormous English plants to incur heavy transport costs in order to reap these economies. T. Wall & Son's ice cream operations are a case in point (cf. App. A). MLH 239.2/3 largely refers to soft drinks, a classic 'residentiary' industry to use P.S. Florence's terminology. The Scottish TCNO ratio is an incredible 49.9%, or roughly twice the NI and UK figures, suggesting that the market area served by the average plant in Scotland (there were approximately 76 'larger' establishments in the region during 1963) is generally larger than elsewhere in the kingdom.

A number of conspicuous disparities are evident among the chemicals group. The Scottish coke oven industry (MLH 261), for instance, displayed an extremely low TCNO ratio in 1963 relative to the UK as a whole (20.0%). A partial explanation for this phenomenon was the absence of manufactured fuel plants in Scotland (Scottish Rexco as noted in a detailed case study below, did not open till the end of 1963). Manufactured fuel producers incur much higher transport costs than coke oven operators being consumer- rather than producer-oriented, contrary to the situation further south. Two very important conclusions follow from the divergency between the Scottish and UK ratios. First, a low ratio does not necessarily denote transport cost insensitivity. As in the example of MLH 261 (in Scotland), it may simply reflect the adaptation of a transport-cost-sensitive industry to the economic facts of life together with the continued viability of small plants serving limited markets or forming part of vertically integrated structures. Secondly, the size of a TCNO ratio is a function not only of the economic characteristics common to the firms comprising the industry concerned, but also of the degree of heterogeneity in the industry. Where diversity is the norm rather than the exception, then ratio values become extremely vulnerable to the nature of the establishment mixes underlying them. This being the case, it would be most useful if, as part of future census publications, there could be included information on the range of selected variables in addition to the usual totals and averages.

The Scottish fertiliser industry (MLH 271.2) was characterised by an extremely large TCNO ratio (39.4%) in 1963. Only the soft drink producers faced a greater transport cost burden. Since the Scottish figure was over twice its UK equivalent, and since the industry generally is renowned for its small plants and strong local market orientation, one much conclude that the market in Scotland was less concentrated spatially than elsewhere and therefore more costly to service. Unfortunately, the risk of disclosure prevented the publication of comparable NI data. It would be surprising, however, if the NI ratio was as high as that for Scotland.

MLH 272.1 (pharmaceutical preparations) was almost transport-cost free in Scotland during 1963 relative to the UK generally. The minuscule Scottish TCNO ratio (0.8%) suggests either a pronounced orientation towards the local market, or, more likely, a heavy reliance on the post for distribution purposes. In contrast to MLH 272.1, MLH 275.1 (vegetable and animal oils and fats) exhibited a high degree of sensitivity to transport costs both in Scotland and the kingdom at large, but the Scottish TCNO ratio (22.7%) was almost twice that for the UK. Not surprisingly, the Scottish industry was characterised by a large number of small plants and very low value added relative to gross output. Both average plant size and the value added/gross output ratio were higher at the national level of aggregation. Finally, one might mention MLH 276 (synthetic resins and plastics materials). The low Scottish TCNO ratio for this industry (both absolutely and relatively) probably reflected the highly-integrated character of much of the region's sole petrochemical complex at Grangemouth (but compare the BXL case study below).

Steel tube production (MLH 312) in Scotland displayed a considerable degree of transport cost sensitivity during 1963, both in absolute terms and relative to the national picture, suggesting that while basic steel production might be economic in the region (cf. MLH 311), steel processing might better be carried out closer to major markets (cf. the discussion of the Scottish steel industry in ch. 11). Much more encouraging for Scots are the TCNO ratios pertaining to the key engineering and electrical goods sector (Order VI). Not only are these ratios generally low, but they are frequently lower than comparable national averages. In part, this situation reflects firms' pricing policies as explained for example in our case study below of IBM Greenock. It may also mirror the strong export orientation of many Order VI establishments in Scotland.

Table 10.1 shows that both motor vehicle (MLH 381) and pram and hand-truck (389) manufacturers were at a considerable transport cost disadvantage in Scotland during 1963. In fact, this disadvantage would likely have proved decisive with Rootes and Leyland at the beginning of the 1960s had not the government intervened in their expansion decisions. It will be noted that Vauxhall and Ford have no Scottish production facilities. Scotland's adverse transport

cost differential probably also explains the diminutive size of MLH 389 in the region; this industry in 1963 consisted of only eight establishments (6 of them 'larger') and 200 employees.

Three metal goods industries - tools and implements (MLH 391), cutlery (392) and metal containers (395) - suffered from an above-average transport cost burden in Scotland during 1963 relative to other parts of the kingdom. The metal container industry has already been discussed at length in chapters 5 and 6 where it was shown that transport costs played a major role in plant location decisions, and that the market area of most plants was restricted to quite a small radius. Appendix B contains a note on cutlery production. Transport costs are not an important consideration in this industry relative to other factors, partly because the post is one of the distribution methods used. In contrast, Scotland would appear to be at a serious transport cost disadvantage with regard to tool and implement production. This may explain why the regional industry including producers employing fewer than 25 persons was so small in 1963 (26 establishments and 300 employees).

Scotland was also at a severe transport cost disadvantage in 1963 with respect to the production of leather goods (MLH 432), fur products (433), pottery (462), cement (464) and plastics moulding and fabricating (496). However, this situation is less gloomy than it may appear prima facie since only the latter two industries were labelled by Howard (1968, Table 9) as "expanding". He was referring, of course, to the UK as a whole. But these industries have also been expanding in Scotland. Associated Portland Cement, for example, opened a 400,000-ton cement works at Dunbar in 1963 (see App. A) to supply a big chunk of the 000,000-ton regional market (as it was then) and to reduce the transport costs involved in meeting Scottish demand with cement produced in the Thames-Medway area. The plant was built so large to take at least some advantage of the substantial economies of scale inherent in cement manufacture. It is interesting to note that the decision on the Dunbar works was very much a product of its times[1]. Had it been made only a few years

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[1] Cf. Patricia Farrant, "What Shook Up APCM," Management Today, October 1970, pp. 74-01, 164, 168 & 170.

later, the outcome might have been quite different in light of new developments, particularly BR's trainload rates on cement and the 4m-ton Northfleet plant now being built on the Thames opposite Tilbury. Plastics moulding and fabricating has also expanded in Scotland recently (cf. our case study of MJB Plastics below). It is not readily apparent why the Scottish TCNO ratio for this industry was so high in 1963. A background paper dated 29 May 1963 prepared for the Lothians Regional Survey and Plan by Mr. J.T. Hughes attributed Grangemouth's relative lack of MLH 496 firms to high transport costs on finished plastics goods, but our experience suggests that, for many firms in this industry, transport costs are not an important location factor. It may well be that MLH 496 is a highly heterogeneous grouping of establishments.

The foregoing suggests that our earlier conclusion concerning the basic similarity between the Scottish, NI and UK TCNO ratio distributions needs qualification. It is clear first that there are a large number of exceptions to the general relationship. These exceptions would appear to be concentrated among the high-transport-cost industries since the 1963 r^2-values pertaining to MLHs with above-average TCNO ratios were 0.34 (N = 41) and 0.32 (N = 8) for Scotland (y) and the UK (x) and NI (y) and Scotland (x) respectively, whereas the equivalent r^2-values for all industries were 0.60 and 0.56 respectively. That is to say, the ratios for all industries correlated much more closely than the ratios for high-transport-cost MLHs only. Thus, in the case of several obviously transport-cost-sensitive industries, the Scottish TCNO ratio was either much above or much below the comparable UK or NI figure. These industries were concentrated in certain Orders thereby explaining some of the r-value disparities in Table 10.2. Secondly, dissimilarities between the TCNO ratios for industries in different areas may be more apparent than real from the viewpoint of transport cost sensitivity. This is especially true when a regional ratio is low in contradistinction to an equivalent national figure, MLH 261 being the most spectacular case in point.

Four industries are missing from the Scotland columns in Table 10.1 apart from the 22 disclosure cases, to wit, MLHs 277.1, 396, 411 and 469.1. Their names are listed below together with the relevant UK TCNO ratios. Comparable NI ratios either do not exist or are not available. The question to be answered is, can their absence be attributed to transport cost sensitivity?

MLH	Industry	UK TCNO Ratio
277.1	Polishes	6.7
396	Jewellery, plate & refining of precious metals	1.0
411	Man-made fibre production	2.1
469.1	Abrasives	3.5

Three of the industries - 277.1, 396 and 469.1 - in fact were represented in Scotland during 1963 but the 37 establishments involved all had fewer than 25 employees. MLH 411 used to have a Scottish representative in the form of North British Rayon Limited which opened its Jedburgh viscose plant in 1929. However, this firm folded in 1956, but due to inadequate scale, inadequate profitability, and inadequate capital rather than excessive transport costs or distribution problems.[1] It can be concluded then that transport cost sensitivity had little to do with the apparent lacunae in the 1963 Scottish industrial structure with the possible exception of MLH 277.1, a point corroborated by Table 7.25 in chapter 7 which shows that establishments in the other three industries under discussion were among the postwar migrants to Scotland and NI. However, since the juxtaposition of transport cost and migrant data is the subject of the following chapter, we will not pursue this topic further for the moment.

Summary and Conclusions

Our purpose in this chapter has been first to present transport and communication cost data for Scotland from the 1963 Census of Production equivalent to those shown earlier for the UK and NI. Owing to certain technical difficulties, the degree of equivalency

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[1] Cf. H.C.130 (1967-68); H.A. Silverman, ed., Studies in Industrial Organization, Nuffield College Social Reconstruction Survey, (London: Methuen & Co. Ltd., 1946), pp.302-55.

actually achieved in the case of the transport cost statistics was not exact. Nonetheless, it was sufficient to permit us to proceed with our second objective, viz., a comparison of the Scottish, NI and UK figures converted into TCNO and CCNO ratios. Unfortunately, the comparison was hampered by the disclosure provisions of the census which eliminated from individual consideration 22 Scottish industries and 93 NI ones out of a possible total of 119. However, the problem did not prove critical.

In view of their relative unimportance, little attention was devoted to the CCNO ratios beyond noting that the Scottish figures were generally low and insignificant but in accord with their UK and NI counterparts. In other words, the CCNO ratios provided very few surprises. At the aggregate level, the same thing was true of TCNO ratios. It was expected, for example, from our hypothesis concerning distance costs and industrial mobility that the TCNO ratio for Scottish manufacturers en masse (5.9%) would be higher than the comparable UK figure (5.8%) but only marginally so. A corollary was that the Scottish and UK TCNO ratios should display a relatively high degree of association. This proved to be the case in fact; the coefficient of linear correlation for all MLHs (N = 93) was 0.7752. Analogous analyses for more limited groups of MLHs generally reinforced the view that the Scottish and UK ratios should be basically similar although some of the resultant r-values were only middling in size, and one was both negative and negligible. Since the more deviant results could have been caused by any one of a number of unrelated factors, not much significance was attached to them per se. However, they proved to be an adumbration of later findings.

It was also expected from our hypothesis: 1) that the aggregate Scottish TCNO ratio would be less than its NI equivalent, 2) while the spread between these ratios would be greater than the minuscule discrepancy between the Scottish and UK figures, it would still be relatively modest, and 3) that the linear correlation coefficient for all Scottish and NI TCNO ratios (N = 15) would be relatively high but less than the corresponding Scotland-UK r-value. Again, expectations were corroborated by the facts (5.9%, 6.2% and 0.7505).

Needless to say, these aggregate findings did not always apply to individual MLHs. Otherwise, the r-values at the aggregate level would have been even higher. Nonetheless, the number of pronounced disparities between nominally similar Scottish, NI and UK ratios was so considerable that we felt it necessary to probe deeper into the matter. A correlation analysis confined to Scottish and UK industries with above-average TCNO ratios yielded an r^2-value of only 0.34 (N = 41). A similar analysis using Scottish and NI data produced an r^2-value of only 0.32 (N = 8). Since both these results were much below the equivalent all-industry r^2-values (0.60 and 0.56 respectively), it followed that the exceptions to our aggregate findings were concentrated amongst the industries most sensitive to transport costs. This conclusion helped to explain some of the r-value disparities in Table 10.2. It also suggested that many high-transport-cost industries in Scotland and NI were characterised by local market-oriented production units in line with Alchian's idea that the firm must adapt in order to maximize the probability of adoption by its environment,[1] or alternatively Boulding's homeostatic theory which visualizes a firm's behaviour as an equilibrating reaction to changes in the composition of its balance-sheet.[2] Available census data, of course, neither corroborated nor refuted this conjecture.

It would appear then that a high TCNO ratio at the national level may not necessarily be paralleled by a high ratio in Scotland or NI because firms in these peripheral regions may have taken adaptive action aimed at reducing the transport cost incubus. Ceteris paribus, the need for adaptive measures will vary inversely with an industry's sensitivity to transport costs. It is small wonder, therefore, that the TCNO ratios for transport-cost-insensitive industries in various areas correlate better than the ratios for more vulnerable MLHs. We return to this general topic in the

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[1] Armen A. Alchian, "Uncertainty, Evolution, and Economic Theory," Journal of Political Economy, LVIII(June 1950), 211-21.

[2] K.E. Boulding, "Implications for General Economics of More Realistic Theories of the Firm," Issues in Methodology, American Economic Review, XLII(May 1952), 35-44.

following chapter. Two further points should be noted here however. First, a low Scottish or NI ratio need not imply lack of sensitivity to transport costs; indeed, paradoxically, the reverse may sometimes be true, especially when a low regional figure coincides with a high national one. Thus, a Scottish or NI ratio should never be taken at its face value. MLH 261 is a dramatic illustration of this verity. Secondly, individual firms contemplating a move to Scotland or NI should remember that any regional TCNO ratio derived from census data is an average, the value of which reflects not only the nature of the industry concerned, but also the degree of heterogeneity amongst the establishments contributing to the average, and the extent to which they have displayed adaptive behaviour. An average, of course, may or may not have relevance to one's own circumstances. There is a case for reducing the uncertainty implicit in this argument by publishing as part of future censuses of production the range of relevant variables, i.e., the two polar values, in addition to the traditional types of census information.

In the penultimate section of this chapter, we examined the four gaps in Scotland's industrial structure evident in Table 10.1 with a view to determining whether or not they were attributable to a sensitivity on the part of the industries concerned to transport costs. It was found first that the lacunae were more apparent than real, and secondly, that transport cost sensitivity was of little causal significance with the possible exception of MLH 277.1. We only touched on the cognate subject of the relationship between industrial migration and transport cost sensitivity but it is discussed at length in the next chapter.

CHAPTER 11

DISTANCE COSTS AND INTERREGIONAL INDUSTRIAL MIGRATION

One of our working hypotheses, it will be recalled, reads as follows:-

> private transport and communication (or collectively, distance) costs are not an important constraint on interregional industrial mobility within the UK for most types of manufacturing industry.

We have already shown the communication cost side of this argument to be true with the exception of small firms. However, this exception can reasonably be ignored for the remainder of this chapter without doing intolerable damage to our main argument, especially since much of its validity derives from the inclusion of executive travel as a relevant cost variable. Since communication costs do not vary significantly with distance, it follows that they should not pose any more of a threat to successful interregional industrial migration than any other locational consideration. Indeed, they will likely receive little or no attention during the location decision-making process in most migrant firms. This argument need not apply to communication networks, channels or problems, each or all of which may be of very great concern to migrants. But we have been referring solely to communication costs, i.e., direct outlays on the post and telecommunications. Regardless of a firm's domestic market pattern, interregional communication cost differentials should generally be negligible.

This assertion may appear *prima facie* to conflict with the evidence in Tables 9.13 and 10.1 where CCNO ratios by MLH for NI and Scotland respectively are expressed as percentages of the equivalent UK figure. These tables show that regional CCNO ratios frequently differ from the relevant national average, sometimes considerably as exemplified *par excellence* by MLH 433 in Scotland. But it is our contention that these differences reflect a lack of uniformity in the

cost structure of individual establishments, and the obviously different establishment mixes prevailing in Scotland, NI and the UK as a whole, rather than any intrinsic interregional communication cost differences. In other words, whereas the 1963 Scottish census respondents belonging to MLH 433 (fur products) indicated an average CCNO ratio of 6.3%, it does not follow that subsequent Scottish fur product manufacturers should automatically expect to be confronted with the same cost burden. Indeed, they could conceivably find themselves with a CCNO ratio close to the national average of 0.7%.

Transport costs on the other hand do vary significantly with distance though not directly due to rate tapering and the fixed nature of terminal costs as will be patent to all familiar with the economics of transport. There is also substantial evidence to suggest that historic interregional transport cost differentials are being eroded by the spread of average cost pricing in the manufacturing sector and by the container revolution which has led some shipping companies (cf. our case study of Model Toys below) to introduce flat rate, intra-GB transport charges on export consignments via Tilbury regardless of the location of the consignor. It remains true nonetheless that interregional transport cost differentials still persist in many industries. But they are often inconsequential as illustrated for example by our case studies of BKL, HJB Plastics, IBM and Model Toys (chs. 13-16). In addition to these studies and to analogous material adduced earlier such as our examination of Courtaulds's Carrickfergus plant, three circumstantial pieces of evidence might be cited.

The first pertains to the carpet industry in NI which, as we have seen, suffers from a TCNO ratio (6.9% in 1963) equal to 153% and 209% of the equivalent UK and Scottish ratios respectively. Despite this handicap, the Ulster industry's 1963 location quotient was 1.69. Part of the reason for this unexpectedly high LQ was Cyril Lord's decision in 1954 to build at Donaghadee what became the world's largest tufted carpet factory. It cost £2.8m and was opened late in 1956 (cf. entry 41, App. B). Lord originally intended to set up his carpet plant in Lancashire but was drawn to NI by three things:

1) his favourable wartime experience in NI,

2) Stormont's cooperative attitude (the Government put up the cash for the factory),

3) labour's amenability including a willingness to work around the clock.[1]

Together, these factors more than compensated for the adverse transport cost differential which he faced in Ulster.

Secondly, Ford of Europe has five main car assembly plants: Dagenham, Cologne, Halewood, Genk (Belgium) and Saarlouis (W. Germany). Each of the latter three is located in a depressed area, 'attracted' there by government pressures and inducements as well as an ample supply of labour. Not only does Ford of Britain supply the Continental plants with certain components, it also markets completed cars in Holland, Sweden, etc. Many observers have concluded that transport costs are no longer a serious problem for the car-makers.[2]

Thirdly, Nicholas Kaldor, in a recent polemic against Britain's application to join the EEC, observed parenthetically that transport costs "in themselves" could not be a very important barrier to the economic integration of the Common Market countries.[3]

It can be argued, on the other hand, that interregional transport cost differentials are not always inconsequential to the makers of industrial location decisions: indeed, they can sometimes prove decisive. Our case studies below of Plyglass and Scottish Rexco (chs. 17 & 18) illustrate the veracity of this predication as do various items mentioned in previous chapters, e.g., Metal Box's open top can factory location policy. Five other contemporary corroborative examples can be outlined here.

The first pertains to Revertex Holdings Ltd., a Harlow-based producer of synthetic latex (MLH 271.3). It was reported recently[4] that the firm is moving its Harlow compounding plant to Yorkshire

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[1]See Stephen Aris and Brian Moynihan, "The Rise and Fall of Cyril Lord: Millionaire in a Hurry," Sunday Times, 11 May 69, pp. 49-50.

[2]Cf. Keith Richardson, "Why Ford Wants to Back Britain," Sunday Times, 21 Mar 71, p.57.

[3]Nicholas Kaldor, "The Truth About the 'Dynamic Effects' - The Price of Europe: 3," New Statesman, 12 Mar 71, p.338.

[4]The Times, 25 Mar 71, p.24.

because of spiralling transport costs. The carpet industry in the Yorkshire area is a major Revertex customer (latex foam is used as a backing material). "Owing mainly to the way road transport costs have risen (about 40 per cent in the last two years in the United Kingdom) and will presumably continue to rise," it has become increasingly difficult to service this customer from Essex. Though the precise location of the new plant was not given, the move probably involves a distance of close to 200 miles (Leeds-London is 190 miles). Revertex (entry 191 in App. A) opened a compounding plant in East Kilbride during 1967, presumably to supply the Scottish carpet industry, i.e., the plant is almost certainly local market-oriented. One can reasonably infer from the above that transport costs were the decisive location factor.

As a corollary point, it will be noted from Table 10.1 that the Scottish TCNO ratio for MLH 271.3 in 1963 was lower than the UK ratio. From the foregoing, this relationship could be construed as indicating local market orientation on the part of the Scottish industry, especially since the UK ratio (7.5%) was quite high, being above the average for all manufacturing firms (5.8%). Indeed, one might generalize this speculation by suggesting that a UK TCNO ratio significantly greater than the corresponding Scottish or NI ratio is prima facie evidence of local market orientation on the part of the relevant Scottish or NI industry and therefore of transport cost sensitivity. This inference could be drawn regardless of the absolute size of the UK ratio. That is to say, whether it was above or below the average for all manufacturing industry would be immaterial. A preliminary test of this hypothesis against the known facts suggests that it has considerable validity. However, there are large gaps in our information. Furthermore, the hypothesis is sometimes misleading as in the case of important export industries such as MLH 239.1. In addition, it fails to identify a number of important local market-oriented industries, e.g., MLHs 239.2/3, 271.2 and 395. Nonetheless, it would seem to warrant further research.

Our second example concerns oil refining. British oil refineries generally have low TCNO ratios. The industry-wide figure from the 1963 Census of Production (MLH 262) was only 2.2%, a figure much below the average for all manufacturing industry. But the Census ignored deep-sea tanker costs, an important qualification as will be evident from ch. 8 above and from a reading of Case 97 in Luttrell (II, 1962).

Recently, the Occidental Petroleum Corporation rejected Tees-side, Merseyside and Milford Haven (South Wales) as possible refinery sites in favour of Canvey Island (Essex) on three grounds: 1) higher land transport costs in connection with deliveries to UK market points, 2) insufficient deepwater facilities to handle super-tankers, and 3) lesser accessibility to Continental markets.[1] Unfortunately, it was not reported which of the three rejection criteria was the most important. It is clear nonetheless, as has been argued before, that a low TCNO ratio computed from Census returns need not imply indifference to transport costs.

A third example relates to petrochemicals (MLH 271.3 and 276). Milford Haven, with its superb harbour, is the centre of the Welsh oil refining industry. When the town's current boom began during the late 1950s, many expected the new refineries to spawn contiguous petrochemical operations. With the exception of a relatively limited Gulf Oil development, however, they have not done so. Instead, petrochemical complexes have emerged at Baglan Bay and Barry, 60 and 93 miles respectively to the east. According to Rhys David, Industrial Editor of the Western Mail, this situation reflects Milford Haven's isolation from major markets and the prohibitive transport costs on shipments of petrochemicals from the area. Early in 1971, over 90% of the output from the Milford Haven refineries was being distributed by sea. Esso, Gulf and Texaco are now proposing to build a joint 150-mile refined products pipeline from the area to the key Midlands-Manchester market.[2]

Fourthly, there is the example of the Scottish iron and steel industry (MLH 311). As argued recently by the Economist, "Steel is the basic product on which the whole complex of Scottish engineering industries depends . . . all Scotland's hopes for a prosperous engineering future turn on persuading someone . . . to put down a major new steel complex." But the regional market is too small to absorb

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[1] Cf. Clive Callow, "Occidental and ENI Plan Essex Refineries," The Times, 17 Feb 70, p.17.

[2] "Wales: A Special Report," The Times, 4 Mar 71, p.III.

the output from such a complex, rail transport costs would likely handicap sales to English buyers, sea transport costs would probably preclude exports to Western Europe, and Scottish steel could not compete in the U.S. market with the Japanese product.[1] In other words, the future of the Scottish steel industry does not look particularly rosecate due largely to transport costs. In contradistinction, the Scottish Council holds that the cost effects of shipping iron ore and coal in bulk point to Hunterston, Ayrshire as the optimum site for a giant new British steel complex. Hunterston has unique natural deepwater facilities enabling it to accommodate larger carriers than any other potentially viable location on the island. By importing key inputs in bulk, the ex-works price of Scottish steel could be cut by 12%. This saving would be more than sufficient to compensate for the added transport costs involved in supplying the national market from Scotland.[2] Without taking sides on the issue sketched above, it is obvious that transport costs will play a key role in whatever decision is ultimately made concerning Hunterston's and therefore Scotland's long-term viability as a steel centre.

Finally, one can mention the recent[3] decision by Smedley's, a member of the Imperial Tobacco Group, to cease frozen vegetable production (MLH 218) at Dundee and Blairgowrie, Perthshire. In the face of a slack national market, this multi-plant firm selected its Scottish facilities for closure because they were burdened by the highest (outbound) transport costs. Some production will be switched to England.

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[1] "Where 22 Men Are After Every Job," Economist, 19 Jun 71, p.76.

[2] Cf. Ian Lurie, "Steel Industry's Future Hinges on Hunterston," Glasgow Herald, 26 Mar 71, pp. 1 & 24. There is little doubt concerning the reality of bulk carriage economies. One study estimates that over a distance of 3,000 miles, for example, the use of a 210,000 d.w.t. ship rather than a 150,000 d.w.t. vessel could lead to a cost saving of 5¢ per ton of cargo; this saving would rise to 7¢ in the case of a 210,000 d.w.t./30,000 d.w.t. size spread. Over a distance of 12,000 miles, comparable cost savings would be 16¢ and 32¢ respectively. See Metra Consulting Group Ltd., Deep Water Harbour Study, Atlantic Development Board Economic Opportunity Series (Ottawa: Atlantic Development Board, 1969), p.16.

[3] December 1970. See "Scottish EFU Protest at Smedley's Closures," Financial Times, 29 Dec 70, p.4; Roger Vielvoye, "Meiller to Lay Off Workers in Dundee," The Times, 6 Jan 71, p.13.

We have established then that interregional transport cost differentials are still great enough to play a critical part in location decisions by firms in at least some industries. But this fact does not necessarily conflict with our opening hypothesis which pertains to 'most' rather than all types of manufacturing activity. It would have to be shown that transport cost sensitivity extended to a large number of industries before our hypothesis could be rejected. Conversely, to validate it, we must show that transport cost insensitivity is widespread. One approach to this end is to demonstrate that postwar interregional industrial migration to Scotland and NI has not been confined to an unduly narrow range of MLHs bearing in mind that some industries have generated very few, if any, migrants for reasons having little to do with transport costs.

From the 1963 Census of Production, we can distinguish 119 MLHs. All but one (MLH 411) were represented in Scotland during 1963 and, as has been argued previously, its absence can be explained on non-transport cost grounds. In fact, three MLH 411 plants opened in the region between 1966 and 1968. All but 10 MLHs were represented in NI during 1963; from 1964 this number fell to nine. Six of the absentees (MLHs 216, 229.1, 263, 311, 312 and 429.2) had above-average TCNO ratios and would thus appear to be transport cost sensitive although not so much so, it will be noted, that they were unable to operate in Scotland. Indeed, applying the local market orientation test suggested earlier, it would appear that only MLH 311 was primarily geared to the Scottish market. The other five industries presumably had wider sales areas. The remaining absentees from NI (MLHs 321-22, 352 and 396) cannot be accounted for on transport cost grounds. In fact, the latter two displayed very low TCNO ratios at the UK level. It is not unlikely in view of our Scottish findings in ch. 10 that some small MLH 396 establishments actually existed in NI. Unfortunately, this speculation can neither be confirmed nor denied on the basis of the published NI census reports. To sum up, it would seem from the 1963 industrial distributions in Scotland and NI that not a single MLH was unrepresented in both regions simultaneously. Scotland had one absentee; NI had nine. In four cases (1 Scotland, 3 NI), non-transport cost considerations probably predominated. In six cases, all NI, the reverse may have applied. These findings are not only quite compatible with our hypothesis, they positively support it.

From Table 7.25, we can derive the following information concerning postwar industrial migration to Scotland and NI:

	Scotland		NI	
Total MLHs	119	(100%)	119	(100%)
Total postwar migrants	376		192	
No. of migrants per MLH	3.2		1.6	
No. of MLHs generating one or more migrants	81	(68.1%)	73	(61.3%)
No. " " " an above-average no. of migrants	34	(28.5%)	41	(34.5%)
No. of MLHs generating no migrants	38	(31.9%)	46	(38.6%)

Obviously, the migrant flow to NI was more concentrated in MLH terms than the flow to Scotland. This shows up in two ways. First, fewer MLHs generated migrants to NI. Secondly, more MLHs in NI were characterised by an above-average number of migrants. Also interesting are the large numbers of MLHs generating no migrants; the proportion of total MLHs falling into this category ranged from a 'low' of almost one-third in the case of Scotland to nearly two-fifths in the case of NI. Thus, two questions arise: 1) why was the industrial make-up of the postwar migrant flow to NI more selective than the make-up of the flow to Scotland? 2) why did so many MLHs generate no migrants? In both cases, transport cost differentials undoubtedly provide part of the answer. But how big a part? - to shed light on this question we undertook a comparative analysis of Tables 7.25 and 10.1.

Our first objective was to determine what proportion of the MLHs generating no migrants to Scotland and NI respectively had an above-average TCNO ratio and to compare our findings with the equivalent proportions for all MLHs. From our working hypothesis, we would expect to find that the two sets of proportions were roughly similar. Table 11.1 presents our results. Unfortunately, the latter part of our objective had to be abandoned in the face of the severe disclosure problem afflicting the data, a problem incidentally which may well be related to transport cost sensitivity. Indeed, the NI situation entirely defied analysis. But from the Scottish material, it would appear that a majority of the 25 non-generating MLHs for which information was available were in fact transport cost sensitive.

Table 11.1: The Transport Cost Sensitivity of MLHs Generating No Industrial Migrants to Scotland (1945-January 1970) and NI (1945-July 1969)

Scotland			NI		
Sensitive MLHs(a)	Insensitive MLHs(b)	Indeterminate or Not Applicable	Sensitive MLHs(a)	Insensitive MLHs(b)	Indeterminate or Not Applicable
211*	370*	262*			211 335
212	384*	271.1			212 336
215	412*	277.1			213 342
216	415*	277.2			216 352
217*	418*	382*			217 370
229.1	419	385*			229.1 382
231	474	421*			231 384
239.2/3		422.1*			239.1 385
263*		429.1			261 389
271.2		446*			263 393
275.1*		449.2*			271.2 396
391		469.1			272.2 415
416*		493*			273 416
422.2*					274 429.1
429.2					275.1 429.2
433*					275.2 431
462*					276 449.2
492*					277.1 463
					311 473
					312 475
					313 479
					321-22 492
					332 495
16 (9*)	7 (5*)	13 (8*)			46

Notes: a) MLHs with an above-average TCNO ratio.
b) MLHs with a below-average TCNO ratio.
* Contracting industries according to Howard (1968).

Sources: Tables 7.25 and 10.1.

That is to say, 16 or 72% had an above-average TCNO ratio. It might reasonably be argued, however, that this finding lacks conclusiveness since it does not distinguish between growing and contracting industries. Non-generation in the latter case may have borne little relationship to transport cost sensitivity. Thus we removed from consideration those industries which underwent decline between 1953 and 1966 at the UK level according to Howard (1968). They are marked in the table with an asterisk. Howard's findings do not extend to the 4-digit level of industry identification (e.g., MLH 229.1) but we assume that this minor discrepancy is of no particular significance. It can be seen that the removal of contracting industries invalidates our preliminary conclusion since, of the 25 industries concerned, no less than 14 or over half were affected. On the other hand, the so-called insensitive MLHs were affected more seriously than the sensitive ones, losing 71% of their number as opposed to 50% in the latter instance. It would seem then that of the expanding MLHs which generated no postwar industrial migrants to Scotland, a clear majority were transport cost sensitive as defined. Indeed, none of this majority had a TCNO ratio of less than 10.2% according to the Scottish figures in Table 10.1.

In sum, whereas perhaps half or more of the 38 non-generating MLHs in the case of Scotland were seemingly sensitive to transport costs, 22 were also contracting during the postwar period. Of the remainder, nine were sensitive (as defined) to transport costs, two were insensitive, and five were either indeterminate or not relevant. Thus it can be concluded that while transport cost sensitivity was an important factor in the non-generation of migrants to Scotland, for a majority of the total number of industries concerned, it was probably not a dominant factor. But for the expanding non-generators, it may well have been a dominant consideration, a possibility that does not bode well for our hypothesis. With regard to NI, we can conclude nothing from the evidence.

A second objective in analysing jointly Tables 7.25 and 10.1 was to discover the extent to which the MLHs generating an above-average number of migrants were transport cost sensitive. One would expect on the basis of our hypothesis to find at some high-TCNO-ratio but non-local-market-oriented industries among this group.

Table 11.2 sets forth the evidence.

Table 11.2: The Transport Cost Sensitivity of MLHs Generating an Above-Average No. of Migrants to Scotland (1945-January 1970) and NI (1945-July 1969).

Scotland			NI		
Sensitive MLHs(a)	Insensitive MLHs(b)	Indeterminate	Sensitive MLHs(a)	Insensitive MLHs(b)	Indeterminate
214	239.1	499	214	412*	219 411
274	271.3		218	413*	229.2 421
311	272.1		469.2	414*	271.3 432
399	321-22			417	333 441
469.2	332			422.1*	337 442
482	333			445*	339 444
496	337			489	341 449.1/3/4
	339				349 450
	341				351 461
	349				362 462
	351				364 472
	361				365 482
	364				381 483
	369				383 491
	301				399 494
	393				496
	414*				
	417				
	442*				
	444*				
	445*				
	449.1/3/4*				
	450*				
	489				
	491				
	494				
7	26 (6*)	1	3	7 (5*)	31

Notes: a) MLHs with an above-average TCNO ratio.
b) MLHs with a below-average TCNO ratio.
* Contracting industries according to Howard (1968).

Sources: Tables 7.25 and 10.1.

Seven or 20.6% of the above-average generators of migrants to Scotland were transport cost sensitive as defined in the table, 76.5% were insensitive, and 2.9% were indeterminate. In the case of NI, 7.3% of the above-average generators were transport cost sensitive, 17.1% were insensitive, and 75.6% were indeterminate. The migrants in some of the high-TCNO-ratio industries were almost certainly local market-oriented, e.g., MLHs 311, 469.2 and 482. But in other cases the reverse probably applied, e.g., MLHs 214, 399 and 496. It can be concluded therefore that pronounced sensitivity to transport costs did not invariably preclude non-local-market-oriented migration; indeed, in some relevant instances, migrant flows were relatively heavy. Interestingly, a number of the above-average migrant-generators were in decline at the national level; all were transport cost insensitive and all belonged to either Order X (textiles) or XII (clothing and footwear).

A third objective of our comparative analysis was to determine whether or not transport-cost-sensitive MLHs differed significantly from their transport-cost-insensitive counterparts as migrant-generators. Ceteris paribus, according to our working hypothesis, the two groups should have displayed roughly similar migrant-generating records. In Table 11.3, we have divided both Scotland's and NI's transport-cost-sensitive MLHs into three groups: a) above-average generators, b) below-average generators and c) no migrants. In Table 11.4, we have done the same thing for each region's transport-cost-insensitive MLHs. Far from supporting our hypothesis, the results of this exercise contradict it. Table 11.3 shows that relatively few of the 45 transport-cost-sensitive MLHs in Scotland during 1963 were above-average generators of migrants. The relative proportions were above-average (15.6%), below-average (44.4%) and no migrants (40.0%). Furthermore, four out of the seven above-average generators were probably local market-oriented. An analogous situation prevailed in NI although it is difficult to read very much into the Ulster figures because of the possibly distorting effects of the province's severe disclosure problem. It might be argued on the basis of the foregoing alone that while transport cost sensitivity usually precluded above-average migrant generation with the exception of local market-oriented industries such as miscellaneous building materials (469.2),

Table 11.3: The Migrant-Generating Record of the Transport-Cost-Sensitive MLHs(a) in Scotland (1945-January 1970) and NI (1945-July 1969).

Scotland			NI		
Above-Average Generators(b)	Below-Average Generators	No Migrants	Above-Average Generators(c)	Below-Average Generators	No Migrants
214	218	211*	214	215	
X274	X219	X212	218	239.2/3	
X311	229.2	X215	469.2	419	
399	275.2*	216		422.2*	
469.2	312	217*		486	
X482	313*	229.1			
X496	389*	231			
	X395	X239.2/3			
	423*	263*			
	432*	X271.2			
	461*	275.1*			
	X463	391			
	X464	416*			
	471*	422.2*			
	472*	429.2			
	473*	433*			
	475*	462*			
	481	492*			
	483				
	486				
7	20	18	3	5	0
(X4)	(10*)	(9*)		(1*)	
	(X4)	(X4)			

Notes: a) MLHs with an above-average TONO ratio.
b) " generating more than 5.2 migrants.
c) " " " " 1.6 " .
* Contracting industries according to Howard (1960).
X Industries which appear definitely to be local market-oriented.

Sources: Tables 7.25 and 10.1.

Table 11.4: The Migrant-Generating Record of the Transport-Cost-Insensitive Mills(a) in Scotland (1945-January 1970) and NI (1945-July 1969)

Scotland			NI		
Above-Average Generators(b)	Below-Average Generators	No Migrants	Above-Average Generators(c)	Below-Average Generators	No Migrants
259.1	261*	370*	412*	423*	
X271.3	276	384*	413*		
X272.1	331*	412*	414*		
321-22	335*	415*	417		
332	336	418*	422.1*		
333	338	419	445*		
337	352	474	489		
339	365				
341	392				
349	394				
351	413*				
361	431*				
364	441*				
369	445*				
381	479*				
393					
414*					
417					
442*					
444*					
445*					
449.1/3/4*					
450*					
489					
491					
494					
26	15	7	7	1	0
(6*)	(0*)	(5*)	(5*)	(1*)	
(X2)					

Notes: a) Mills with a below-average EGIO ratio.
b) " generating more than 3.2 migrants.
c) " " " 1.6 " .
* Contracting industries according to Howard (1960).
X Industries which appear definitely to be local market-oriented.

Sources: Tables 7.25 and 10.1.

transport-cost-sensitive industries were in reality no different from the transport-cost-insensitive type in migrant-generating terms. The merit of this case is its reconcilableness with our hypothesis. But unfortunately it conflicts with the evidence.

Table 11.4 shows clearly that transport-cost-insensitive MLHs were predominantly above-average generators of migrants between 1945 and 1969/70, both in Scotland and NI. The Scottish proportions (48 industries) were above-average (54.2%), below-average (31.2%) and no migrants (14.6%). Equivalent NI figures (8 industries) were 87.5%, 12.5% and 0%. In other words, transport cost insensitivity was associated quite closely with above-average migrant-generating power; transport cost sensitivity was not. Since transport-cost-sensitive industries were almost as numerous in Scotland as the insensitive type (indicating a relative lack of skewness in the region's TCNO ratio distribution), it would seem to follow that private transport costs constrained interregional industrial migration to the area over a rather wide range of industry, a range much wider than contemplated by our hypothesis. One can conclude therefore that the hypothesis does not apply to Scotland. Similarly, it does not appear to apply to NI.

It might be argued that these conclusions reflect faulty methodology or inaccurate facts rather than reality. Some of our SIC codings may have been erroneous, our definitions of transport cost sensitivity and above-average generators might have been misleading, the census and/or migrant data could have been biased, and so on. Obviously, the theoretical scope for this sort of criticism is considerable, but in practice we are confident that our factual inputs and approach will not be found seriously wanting. For example, we recalculated the Scottish totals in Tables 11.3 and 11.4 excluding industries in decline during the postwar period - they are denoted in the tables by an asterisk - to ascertain whether or not this refinement affected our previous findings. As indicated by the relative proportions shown below, it did not. Indeed, if anything, it strengthened them.

	Above-Average Generators %	Below-Average Generators %	No Migrants %	Totals % (No.)
All Transport-Cost-Sensitive MLHs (Table 11.3)	15.6	44.4	40.0	100.0(45)
All Transport-Cost-Insensitive MLHs (Table 11.4)	54.2	31.2	14.6	100.0(48)
Expanding, Transport-Cost-Sensitive MLHs	26.9	38.5	34.6	100.0(26)
Expanding, Transport-Cost-Insensitive MLHs	69.0	24.1	6.9	100.0(29)

We next subtracted from the revised Scottish totals those industries which were almost certainly local market-oriented in 1963. They are prefaced in the tables by an 'X'. Because of the fragmentary published information available on the market areas served by various Scottish industries, we have probably not succeeded in identifying every local market-oriented MLH. But at least 14 industries would appear to fall into this category, 12 in Table 11.3 and two in Table 11.4, with the following implications:

	Above-Average Generators %	Below-Average Generators %	No Migrants %	Totals % (No.)
Expanding, Non-Local-Market-Oriented, Transport-Cost-Sensitive MLHs	21.4	42.9	35.7	100.0(14)
Expanding, Non-Local-Market-Oriented, Transport-Cost-Insensitive MLHs	66.7	25.9	7.4	100.0(27)

Again, these results corroborate our initial findings.

Finally, we investigated the extent to which the TCNO ratios for the unmarked MLHs pertaining to Scotland in the tables were clustered around the average TCNO ratio (5.9%) for all Scottish manufacturing industry. The closest figures were 6.7% and 5.1%, a very wide spread in the circumstances, suggesting that the several percentage distributions presented above have not been biased by our definition of transport cost sensitivity.

In sum, from the available evidence, our conclusions would appear to be incontrovertible.

In light of the foregoing, it seemed worthwhile examining the TCNO ratios of the numerous MLHs that generated migrants to Scotland between 1945 and 1969/70 but not to NI with a view to determining the extent to which this discrepancy between the experiences of the two regions was a function of transport cost sensitivity. In fact, there were 26 such industries. They are listed in Table 11.5 together with the relevant number of postwar migrants to Scotland and the appropriate Scottish and NI TCNO ratios. Above-average figures are marked by an asterisk.

Table 11.5: MLHs Generating Migrants to Scotland But Not to NI Between 1945 & 1969/70: No. of Migrants and 1963 TCNO Ratios

MLH	No. of Migrants to Scotland	1963 TCNO Ratios	
		Scotland	NI
213	1	d	d
239.1	4*	4.9	d
261	1	1.6	d
272.2	3	d	d
273	1	d	d
274	4*	6.3*	d
275.2	1	6.6*	d
276	3	1.7	d
311	6*	7.5*	n.a.
312	1	9.6*	n.a.
313	1	7.4*	d
321-22	6*	5.1	n.a.
332	5*	3.2	d
335	3	2.0	d
336	2	3.0	d
342	1	d	d
352	3	0.9	n.a.
389	1	21.9*	d
393	4*	4.6	d
396	2	n.a.	n.a.
431	1	5.3	d
465	3	12.1*	d
472	2	10.1*	d
475	3	9.1*	d
479	1	5.5	d
495	1	d	d

*Above-average. Sources: Tables 7.25 & 10.1.

No very clear pattern emerges. Of the six above-average generators of migrants to Scotland, four were not transport cost sensitive according to our definition. While the remaining two were transport cost sensitive, they were also probably local market-oriented.

One of these two was iron and steel, an industry entirely absent from NI. Its continuing absence should occasion no great surprise. But the other was paint and printing ink. The failure of this industry to generate any postwar migrants to Ulster is not so readily understandable. One can surmise, however, that either the Ulster market was dominated by one or two local monopolists, or local competition was so strong that there was no room for new corporate blood. In total, only nine or 34.6% of the MLHs shown in the table were transport cost sensitive according to the Scottish data. Other explanations, such as a lack of indigenous coal in the case of MLH 261, must be found to account for the failure of the majority of MLHs listed to generate any migrants to NI.

Summary and Conclusions

Since communication costs do not vary much with distance, interregional communication cost differentials are generally negligible. Consequently, they do not pose an important constraint upon interregional industrial mobility. But what about transport costs which do vary appreciably with distance despite various mitigating factors? Do the resultant interregional cost differentials serve simply as a mild and easily surmountable nuisance to most migrants, or do they frequently act as a serious mobility barrier? We have hypothesised that the former view is the correct one; the purpose of this chapter has been to confront our hypothesis with the facts pertaining to Scotland and NI.

We established first that certain specified industries such as synthetic latex compounding are extremely sensitive to transport costs. However, a limited number of such cases is quite compatible with our hypothesis.

It was shown next that each of the 119 industries distinguished by the 1963 Census of Production was represented in Scotland by one or more producing establishments at some point during the 1960s; 110 industries were so represented in NI. Of the nine NI absentees, probably six were transport cost sensitive. But none of these industries was so vulnerable to transport costs that it could not operate in Scotland. Indeed, in no case was non-representation in 1963 common to both regions. Clearly, these results, while indirect, can be taken as helping to corroborate our hypothesis.

But an analysis of the migrant data in Table 7.25 revealed that the postwar flow to NI was more concentrated than the flow to Scotland in two ways: 1) fewer MLHs generated migrants to the province (73 NI, 81 Scotland), 2) more industries in NI could claim an above-average number of migrants (41 NI, 34 Scotland). Noteworthy also were the large numbers of non-generating MLHs (46 NI, 38 Scotland). These findings prima facie were not very auspicious for our argument; further analysis confirmed this foreboding. It was determined first of all that a majority of the expanding but non-generating MLHs in the case of Scotland were transport cost sensitive, a fact mitigated but not entirely assuaged by evidence of decline in over half of the total number of industries concerned. From the cognate NI data, nothing could be determined, one way or the other, due to technical difficulties although, it is interesting to speculate, these may have arisen in part precisely because of a widespread sensitivity to transport costs in the province's industrial sector. Secondly, a distinct minority of the MLHs generating an above-average number of migrants to Scotland and NI proved to be transport cost sensitive; a mere handful were both sensitive and (so far as can be determined) non-local-market-oriented. Thirdly, only 15.6% of the 45 transport-cost-sensitive MLHs in Scotland were also above-average generators of migrants, while 40.0% generated no migrants at all. In contrast, 54.2% of the 48 transport-cost-insensitive MLHs in Scotland had an above-average migrant-generating record; only 14.6% were unable to claim any migrants. These impressive results were not greatly affected by the removal of declining and local market-oriented industries from the underlying sums. The NI experience was comparable to the Scottish one but less impressive due to the small number of MLHs for which transport cost information was available. The cumulative effect of this evidence is too overwhelming to be denied. Our hypothesis clearly does not apply to Scotland. Less clearly, but with almost equal certainty, it does not apply to NI. That is to say, private transport costs during the years, 1945-1969/70, did constrain interregional industrial migration to Scotland and NI over a wide range of industry.

One might object that this finding does not necessarily apply to other parts of the UK, that it may not be relevant to the future, and that it does not preclude high-transport-cost industries from flourishing in Scotland and NI. All these points are true. Nonetheless, the conclusion that our hypothesis must be rejected remains valid for the regions and the time period selected for investigation.

It would be desirable to extend this analysis, not only in geographic terms, but also, for example, to encompass the role of transport costs in migrant mortality. Migrant mortality rates are not generally known. A comparison of relevant information in Appendix A and Howard (1968) would shed some light on the topic. One could relate the resultant mortality figures to our Scottish TCMO ratio data. Keeble (1968), in one of the very few published studies to quote specific migrant mortality rates, found that long-distance migrants from NW London had a closure rate of 1 in 5.1. It is interesting to speculate on whether or not the comparable rate for transport-cost-sensitive migrants was any greater than this already high figure. A priori, one would expect it to be. Official mortality data seem to be non-existent at the moment, probably for political reasons. It would be surprising, however, if they were genuinely forbidden fruit, even within the civil service, given their intrinsic interest to regional policymakers. Perhaps the official position will be relaxed before very long in light of the virtual certainty that all factory closures receive at least limited press coverage enabling keen analysts to ascertain MLMs and closure dates with reasonable accuracy and to compare their findings with migrant lists of the type which we have assembled.

Much more work needs to be done on the subject of migrant-generating potential which, apart from Howard (1968), has received remarkably little attention in the literature from an industry point of view. Obviously, the migrant-generating potential of various industries differs widely. Furthermore, a specified industry's potential will alter over time. In part, potential is a function of transport cost sensitivity but to what degree can only be surmised from available evidence.

It was suggested earlier in the chapter that the occurrence of a low Scottish or NI TCNO ratio together with a significantly higher national one was often an indication of local market orientation on the part of the regional industry in question. Since local market orientation is a not uncommon though disputed motive in industrial migration,[1] since it is closely related to transport cost sensitivity, and since there is a lack of consensus as to the number of predominantly local market-oriented industries in the UK, it would be desirable to expose our suggestion to a more detailed scrutiny with a view to determining the extent to which it is valid and therefore useful.

Mention might be made finally of the possibility that our conclusions concerning transport costs and industrial migration to Scotland and NI may not apply with equal force to both domestic and foreign migrants. This possibility clearly warrants testing, especially since we have argued previously that British migrants appear to be more distance cost sensitive than migrants originating overseas. But such a test would have to be confined to Scotland because the NI data are too limited for the purpose. Furthermore, the outcome may be inconclusive since few overseas migrants are Scottish market-oriented thereby eliminating (possibly) a number of otherwise relevant transport-cost-sensitive MIDs from consideration and thus weakening the meaningfulness of any comparison. In addition, before proceeding with a test, the definitional problem raised in the 'Place of Origin' section of Appendix A should be tackled. It is suggested there that a number of seemingly British migrants are in fact non-British in ownership terms and the question arises, to what extent does ownership affect corporate attitudes? Until this issue is satisfactorily resolved, any comparison between British and overseas migrants may produce misleading results.[2]

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[1] Whereas Luttrell (I, 1962, p.42) argued that "market-orientated units are very much the exception in the factory industries of this country," Cameron & Clark (1966, pp. 77-82) found that 24% of their migrant sample moved to an "assisted area" for market reasons. The 17 companies represented by this percentage were distributed over 10 SIC Orders. As noted in ch. 6, 17% of the postwar migrants to Ulster surveyed by McGovern (1965) were local market-oriented.

[2] Needless to say, this possibility should be borne in mind when interpreting some of our findings and conclusions in chapter 7.

CHAPTER 12

SIX CASE STUDIES: BACKGROUND AND MAIN FINDINGS

Introduction

Our third and final hypothesis holds that:

> the quality of intra-firm communications and organisational flexibility can often be more critical to the long-term viability of industrial migrants than distance costs.

Its origins are outlined in chapter 1. As a testing device, we have used detailed case studies. In this chapter, we discuss our case study methodology and main findings. In subsequent chapters (13-18) we present the individual case studies in full. As will become apparent, not only do they enable us to come to a definite conclusion with regard to the above hypothesis, but they shed valuable light on its two companions.

Informational Requirements

Our objectives demanded the procurement of two sorts of information from each migrant selected for investigation. There was a need first for the compilation of what might be called a traditional type of factual dossier comprising origin, ownership, organisational status, main location factor(s), date of movement, employment, inputs, input sources, products, markets, turnover and transport costs. But we also required more unusual detail, some of it factual, some of it attitudinal, pertaining to the nature of the functions carried out at the migrant plant, the degree of real autonomy involved, lines of authority, the effect of time on the initial corporate arrangements, the reasons for any changes, communication methods and frequencies both intra- and extra-firm, the reasons for the selection of specific methods of communication and the extent to which they had proved satisfactory, expectations concerning the usefulness of the new Confraphone, Confravision, and Datel services being introduced by the Post Office[1] which will be

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[1] Cf. R.J. Beale, "Conference by Telephone," Post Office Telecommunications Journal, XXI (Autumn 1969), 6-7; "GPO Launches TV Boardroom," Sunday Times, 5 Jul 70, p.37. Leaflets on each of the several Datel services are readily available from the PO's local telephone managers. The first service, Datel 100, was introduced in March 1965. In total, there were 7,012 Datel terminals operating in the UK as of 31 Dec 69, 217 of them in Scotland. Private communication from Mr Roger Gadd, PO Telecommunications HQs 10 Feb 70.

of significance primarily with respect to intra-firm communications, travel habits, the reasons for any modal preferences, the degree to which existing travel facilities met requirements, travel and communication costs, and generally, Scotland's suitability as an industrial location from a communications (broadly defined) point of view.

Initial Questionnaire Design

From the beginning, it seemed clear that our informational requirements could only be obtained in part by mail questionnaire. Plant visits would also be necessary. Thus the question arose, was it better to employ both of these collection techniques or to rely on the latter only. We decided to eschew mail questionnaires entirely.[1]

For inspiration on how to proceed next we looked at some of the relevant literature on the workings of the modern business corporation and related theory,[2] communications theory and research,[3]

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[1] Cf. Fritz Machlup, "Marginal Analysis and Empirical Research", American Economic Review, XXXVI (September 1946), 537 : "A set formulation of questions will hardly fit any large number of business men in different fields and, hence, questionnaires to be filled out by them will rarely yield useful results." (Underlining added).

[2] E.g., Barnard (1966); Gordon (1961); Papandreou (1952); Simon (1957) and (1959); Alfred D. Chandler, Jnr., Strategy and Structure: Chapters in the History of the Business Enterprise, M.I.T. Press Research Monograph (Cambridge, Mass.: M.I.T. Press, 1962); Penrose (1963); H. Igor Ansoff, Corporate Strategy (Harmondsworth, Mddx.: Penguin Books, 1968); Adrian M. McDonough, Information Economics and Management Systems, McGraw-Hill Series in Management, International Student Edition (Tokyo: Kogakusha Company Ltd., 1963); J.K. Galbraith, The New Industrial State (London, 1968); Economist Intelligence Unit, The Growth and Spread of Multinational Companies, Quarterly Economic Review Special No. 5 (London: Economist Intelligence Unit Ltd., 1969); A.C. Spence, Management Communication: Its Process and Practice (London: Macmillan, 1969); F. Newton Parks, "Survival of the European Headquarters: The Malaise That Led to the Collapse of So Many European Offices Is Not Inevitable," Harvard Business Review, March-April 1969, pp. 79-84; Sadler (1969); Donald Schon, "The Evolution of the Business Firm," Listener, 3 Dec. 70, pp. 772-76.

[3] J.R. Pierce, Symbols, Signals and Noise: The Nature and Process of Communication, Hutchinson Science Library (London : Hutchinson & Co. (Publishers) Ltd., 1961); Keith Davis, "A Method of Studying Communication Patterns in Organizations," Personnel Psychology, VI (Autumn 1953), 301-12; J. Marschak, "Elements for a Theory of Teams," Management Science, I (January 1955), 127-37; Albert H. Rubenstein, "Problems in the Measurement of Interpersonal Communication in an Ongoing Situation," Sociometry, XVI (February 1953), 78-100.

contact studies[1] and survey techniques.[2] A rather eclectic and lengthy questionnaire was designed, featuring mainly open-ended queries, for use as a non-rigid interview-structuring device. Interviews, of course, are widely held to be the quintessence of social science methodology.[3] In-depth interviewing usually evokes better-quality responses than more rapid but less flexible interview techniques, and it was judged to be the most appropriate type for our purposes. On the other hand, it has the defect of being very time-consuming. Not only does information-gathering by this method require a relatively lengthy interview session or sessions, but the subsequent analysis stage can be even more prolonged. In-depth interviewing demands both "creative skill and sensitivity of the interviewer" (Madge,1953, p.177). Consequently, specific interview programs are best handled entirely by one person.

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[1] Maurice Wright, "Provincial Office Development," Urban Studies, IV (November 1967), 218-57; GB, Location of Offices Bureau, Offices in a Regional Centre: Follow-up Studies on Infrastructure and Linkages, by M.J. Croft, L.O.B. Research Paper No. 3 (London : LOB, 1969); Gunnar Tornqvist, Contact Systems and Regional Development, Lund Studies in Geography, Ser.B, Human Geography No. 35(Lund: CWK Gleerup, 1970); Olof Warneryd, Interdependence in Urban Systems, Meddelanden fran Goteborgs Universitets Geografiska Institutioner, Ser. B,No.1 (Goteborg: Regionkonsult Aktiebolag, 1968); Bertil Thorngren, "Regional Economic Interaction and Flows of Information," paper presented to the Polish-Scandinavian Regional Science Seminar, Copenhagen, August 1967 (roneoed), and "How Do Contact Systems Affect Regional Development?" Environment and Planning, II (1970), 409-27; Folke Kristensson, People, Firms and Regions: A Structural Economic Analysis (Stockholm : Economic Research Institute at the Stockholm School of Economics, 1967).

[2] Maurice Duverger, Introduction to the Social Sciences, Minerva Series of Students' Handbooks, No.10 (London: George Allen & Unwin Ltd., 1964); John Madge, The Tools of Social Science (London: Longmans,1953); E. Brewer and J.W.C. Tomlinson, "The Manager's Working Day," Journal of Industrial Economics,XII (June 1964),191-97; Machlup (1946); George Katona, Psychological Analysis of Economic Behavior (New York: McGraw-Hill Book Company Inc.,1951); George Katona and James N.Morgan, "The Quantitative Study of Factors Determining Business Decisions," Quarterly Journal of Economics, LXVI (February 1952), 67-90.

[3] "The interview - and its half-brother,the questionnaire - is popularly regarded as the method par excellence of social science." Madge (1953), p.150. Cf.the discussion of interviews in Bengt Stymne, Values and Processes: A Systems Study of Effectiveness in Three Organizations (Lund: Studentlitteratur, 1970).

But this means that the achievment of statistically significant results is usually out of the question. It was anticipated that focussed interviews might be necessary, and indeed desirable, with more than one person in each migrant company and that the precise number of interviews per firm would be a function of the migrant plant's size and nature, the knowledgeability and helpfulness of the initial interviewee, and the quality and scope of the firm's internal record-keeping system. In other words, interviews alone were expected to entail the spending of a considerable amount of time on each migrant's premises. Thus, an open mind was kept on the possibility of complementing this survey technique with some sort of contact-measuring program such as the maintenance of contact diaries or one of the methods reported by Davis (1953, pp. 302-04) until a pilot case study had been completed.

Pilot Study.

We tested our initial questionnaire on the firm of William Collins, Sons & Co. Ltd., Glasgow. Appendix H presents the detailed results of this pilot study. Collins was selected on three grounds. First, its characteristics seemed ideal. It is of impressive longevity and considerable size, markets worldwide, has a number of subsidiaries, generates a large volume of communications, is a member of an industry (MLH 489) with an above-average CCNO ratio (2.0% in Scotland, 1.5% in the UK), is vitally dependent upon good communications links between Glasgow and London, maintains its corporate records in Glasgow, and is profitable. In short, despite its unusually heavy dependence upon a good communications network, it has found Scotland to be a congenial business location. Secondly, it was prepared to be interviewed with very little advance warning and to make certain communications records available for analysis. Thirdly, it is not a migrant company; thus we were able to avoid any bias which might have resulted from basing our ultimate questionnaire design upon an interview with a migrant. Also, we did not have to 'use up', as it were, any of our stock of migrant companies whilst finalising our interview approach.

Our pilot study was highly useful in several ways. First, it confirmed that the wording of our questionnaire was generally unambiguous while pointing up the need for certain minor modifications.

These have been incorporated in the version which appears as Appendix I.

Secondly, the pilot study suggested that our questionnaire was probably too long. To complete it proved extremely time-consuming. Since it was designed to encourage a certain amount of wandering on the part of the interviewee, and since, as anticipated seemingly by Machlup (1946), not all the questions were relevant in every interview situation, it could neither readily nor fruitfully be left behind for completion at the interviewee's convenience should the initial session (as seemed increasingly probable) prove insufficient. This raised the danger either that interviews would remain incomplete or that it might not prove possible to schedule one or more follow-up sessions as required without the lapse of a considerable length of time. Accordingly, a new subsidiary questionnaire was developed (Appendix J) for use whenever it seemed impossible to get through the main one. Its purpose was to capture the essence of its progenitor's communications and travel sections while remaining capable of completion either on the spot, literally within a minute or two, or later, if that appeared preferable, at a more convenient moment for the interviewee. It was an entirely self-contained document and filling it up was easily done on one's own. As used in practice, it occupied only a single sheet.

Thirdly, the pilot study illustrated both the possibilities and problems involved in trying to secure quantititative information from companies for private research purposes. As intimated previously, the information sought took two forms: a) turnover and selected cost data, b) contact measures. Being a public company, Collins had a great deal of the former type of statistic at its corporate fingertips. But it took four months before we were able to obtain the special TCGO and CCGO tabulations set forth in Appendix H. This revelation is not intended in any way as a criticism of the firm. On the contrary, it was most helpful. The fact remains, however, that companies are in business to make profits, not to supply information to outsiders. Any conflict between these two goals will usually be resolved in favour of the former. It was pure chance that Collins had available certain long-distance

telephone contact data. (In Appendix H we demonstrate various ways in which such information might be utilized.) But even given the ready availability of this raw material, it still took us almost a week to convert it into a directly usable form. Furthermore, viewed as a measure of the total interaction between Collins and its environment and between various parts of the Collins empire, the telephone data were both partial and not necessarily representative. Yet a comprehensive communications analysis, which we did not attempt, could have taken an indefinite amount of time. Overall, our experience at Collins led us to lower our quantitative sights drastically, not least because the company's records were immediately at hand, so to speak, in Glasgow whereas most migrant companies in NI and Scotland, being branches or other types of offshoot of firms having their HQs and main records firth of these regions, were expected to be relatively impoverished in terms of data availability.

The Sample Selection Process

Given our intention of interviewing in depth and a certain amount of uncertainty as to the length of time this would entail per firm, we decided to attempt no more than six case studies in total (and possibly fewer depending on developments) and to confine our interviews to Scotland. Thus, our original sampling frame became the 376- entry list of postwar migrants to Scotland set out in Appendix A.

The possibility of random sampling was entertained briefly but then discarded. Several considerations were involved in this decision. First, we were not really interested in those migrants located outside the Central Belt, mainly due to a feeling that their views on the subject of communications might prove to be atypical. Second, a number of the companies in Appendix A had either closed, not yet begun operations, or been in business too short a time to have developed meaningful views on some of the items under investigation. Third, we decided to eschew firms in the Glasgow and Edinburgh conurbations on the assumption that they would be the least likely to have experienced communications problems. This assumption reflected the generally excellent air, rail, road and telecommunications links between these two centres and the major

UK markets in the Midlands and the South-East. Fourth, we wanted to ensure that our cases were dissimilar in terms of main market(s), origin, and organisational setup. Specifically, we sought: (i) a national or export market-oriented transfer,(ii) a local market-oriented branch or subsidiary of a UK firm,(iii) a national/export market-oriented branch/division/subsidiary of a UK firm with limited autonomy, (iv) a migrant having the characteristics described in (iii) but with a great deal of autonomy, and (v) a non-local market-oriented branch/subsidiary owned in the US, the major source of postwar foreign investment in Scotland (and indeed in the UK generally). In addition, we hoped that at least one branch/division/subsidiary would duplicate the product range of its parent while another would produce completely separate goods. A fifth objective was to select migrants utilizing different types of production, e.g., batch or continuous process, and making products have disparate unit values. Finally, we wanted to draw our cases from a variety of MLHs while confining them to growth industries. These various requirements were such as to preclude not only random but stratified sampling, not least because the size of some of the categories was completely unknown. In other words, we made no attempt at selecting a representative sample in any scientific sense.

Of immense help as a starting point in the sample selection process was the Min Tech list of postwar migrants to Scotland showing their name, Scottish address, product(s), origin and opening date. We converted the product information into MLHs and then proceeded by trial and error(c.f.App.K). Colleagues at the University of Glasgow with a knowledge of Scottish industry were of considerable help at this juncture. Through them five possibilities emerged as serious candidates: IBM Greenock, Arkana, Scottish Mechanical Light Industries, Starch Products and Triplex Safety Glass. However, only IBM proved suitable ultimately. Arkana, a branch plant, was approached but it declined to participate in our study because "for the time being, our processes and activities are classified."[1] Scottish Mechanical, a transfer, was also approached

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[1]Private communication, September 1970, from the General Works Manager in Falkirk.

but it was either unable or unwilling to grant sufficient interview time. Starch Products, another branch plant, was of interest temporarily because of its alleged local market orientation but it turned out to be owned in Holland rather than England;[1] thus it was not approached. Neither did we approach Triplex, a second local market-oriented branch, because Plyglass, which belonged to the same MLH, and Scottish Rexco, which was also local market-oriented, both looked more interesting and, when they replied positively to our enquiries, the need to contact Triplex no longer existed. In addition to the companies already mentioned, we contacted six others, this time entirely on our own initiative.[2] Each agreed to be interviewed in depth meaning that we had one company too many (taking IBM into account). Since two of them, SOM Plastics and HJB Plastics, belonged to the same MLH, the decision concerning which to drop was relatively easy. It was made on the ground of expediency; HJB was selected as our sixth case because to arrange appointments with SOM promised to be exceptionally difficult.

The Sample.

Our ultimate sample comprised six companies distributed over five Central Belt locations:

Bakelite Xylonite Limited, Grangemouth, Stirlingshire.
HJB Plastics Limited, Grangemouth, Stirlingshire.
IBM United Kingdom Limited, Greenock, Renfrewshire.
Model Toys Limited, Shotts, Lanarkshire.
Plyglass Limited, Irvine, Ayrshire.
Scottish Rexco Limited, Oakley, Fife.

Only one of the locations, Irvine, is a New Town. The firms are all roughly 400 miles from London (the range is 389-416 miles). Their proximity to Glasgow and Edinburgh is indicated below.

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[1] Cf. 'Place of Origin' section in the introductory notes to Appendix A.

[2] The Scottish Council was asked if it could provide any help but proved to be generally disinterested. In contrast, the Scottish Office of the CBI and the Scottish Correspondent of the Financial Times displayed considerable interest in our work although neither mentioned any of the firms eventually approached.

Company	Mileage to Glasgow	Edinburgh
BXL	26	25
HJB Plastics	26	25
IBM	24	66
Model Toys	20	28
Plyglass	27	69
Scottish Rexco	36	22

It will be noted that none of the companies is particularly remote; all are within an hour's drive of the heart of Glasgow, a major airport (Abbotsinch, Prestwick or Turnhouse) and a port facility (on the Clyde or Forth).

Each company belongs to a growth industry. The validity of this assertion will be apparent from the products being made in Scotland as shown in the following table. Also shown are the firms' MLHs and types of production; the latter display considerable diversity while the former are all different.

Company	MLH (1958 SIC)	Principal Products	Type of Production
BXL	276	polyethylene	continuous process
HJB Plastics	496	PVC stationery	batch
IBM	364	computers & related peripherals	bespoke & mass assembly
Model Toys	494	plastic toys	mass assembly
Plyglass	463	double glazing units	bespoke
Scottish Rexco	261	premium smokeless fuel	batch

IBM, of course, is American-owned. BXL is owned jointly (50-50) in Britain and the U.S. The remaining firms are entirely British.

Market patterns at the time of the interviews were diverse. IBM and Model Toys were heavily export-oriented. In contrast, Scottish Rexco marketed entirely in Scotland. Plyglass supplied customers in Scotland, Ireland and Northern England from its plant in Irvine. HJB Plastics sold nationwide but did not export. While BXL was mainly national market-oriented, exports were commonplace.

Considerable diversity is also evident in the organisational status of our cases. There were two divisions (BXL and HJB Plastics), two branches (IBM and Plyglass), one subsidiary(Scottish

Rexco) and one transfer (Model Toys). Of the five non-transfers, only two (Plyglass and Scottish Rexco) produced duplicate goods in the sense that identical products were made elsewhere in Britain by plants under common ownership.

A comparison between the above-mentioned characteristics of the firm in our sample and the various desiderata mentioned in the previous section shows that we were largely successful in our search for suitable interviewees. We turn now to a more detailed comparative examination of the salient features in the case studies.

Interviews.

The positionsof those interviewed, including Collins, were as follows:

BXL :(1) General Sales Manager, Polyethylene Division.
(2) Sales Planning Manager, PE Division.
(3) Production Control Room Manager, PE Division.

Collins: (1) Executive Director-Distribution and Management Services.
(2) Assistant Accountant.
(3) Chief Switchboard Operator.
(4) Assistant Personnel Officer.

HJB Plastics: (1) General Manager, PVC Division.

IBM Greenock: (1) Personnel Manager.
(2) Order Control Services Manager.
(3) Administrative Services Manager.
(4) Statistician, Order Control Services Department.
(5) Telephone Supervisor

Model Toys : (1) Commercial Manager.
(2) Buyer.
(3) Switchboard Operator.

Plyglass: (1) Works Manager, Irvine Branch.
(2) Despatch Manager, Irvine Branch.

Scottish Rexco: (1) General Manager.
(2) Assistant Works Manager.

Normally, approval to conduct interviews was obtained from a senior employee by letter. Specific appointments were then arranged. The interviews took place over the period July 1970 - April 1971, the bulk of them during the autumn. They varied enormously in length from a few minutes to several hours. The longest period of time was spent at Collins where it took approximately a week to conduct the interviews, to raise follow-up queries and to collect the primary telephone contact data mentioned earlier. In no case was less than 4-5 hours expended on the premises of the Scottish factory, and the

average length of time expended was about the equivalent of a working day. In five cases, more than one visit was necessary due to the length of the interview questionnaire and the subsequent difficulty of getting through it at one sitting. In the event, the need to make one or more return visits had the effect of improving the accuracy and fullness of the case studies, sometimes considerably, because there was usually (Collins excepted) sufficient time between visits to write up previous results, i.e., the notes taken during the initial interviews, and to mail them to the interviewees for checking. These time intervals also meant that gaps in the facts and opinions received were readily discernible. In the two instances where return visits were not necessary, the initial interview write-ups were still mailed to the interviewees; any follow-up questions were dealt with by mail and/or telephone.

Two examples of the value of the return visit preceded by a mailing of draft notes can be cited. The first involves a relatively minor point but is nonetheless illuminative. An interviewee had been asked to what extent his company had expanded its floor space during the time it had been operating in Scotland. He replied quickly, but obviously without a firm grasp of the facts, for when he later saw his answer in typewritten form and was requested, because of the impressive magnitude involved, to confirm its veracity, he suddenly realized that it was considerably exaggerated. This example suggests that single interviews without follow-ups such as those underlying Townroe (1970) are peculiarly subject to misinterpretation and error due to interviewee inadvertence.

A second and much more sobering example concerns an interviewee who referred our draft case study to a superior for checking and approval. Not surprisingly, this superior was in possession of information either unknown to his subordinate or so delicate that the latter did not feel free to confide it to an outsider without permission. As a result of the referral, our case study underwent substantial revision and elaboration. Inter alia, the account of the location factors behind the company's decision to begin manufacturing in Scotland was altered significantly. This example illustrates some of the pitfalls awaiting the interviewer who directs his questions to the 'wrong' person.

Location Factors.

We examine here the main factors influencing the six companies in our migrant sample to locate manufacturing units in Scotland. Attention is focussed particularly on the part played by transport and communications considerations.

It is useful first to categorize the companies by type, utilizing the classification schemes advanced by Luttrell (1962) and Cameron and Clark (1966). Luttrell distinguished six types of migrant company (one of which had two variants) on empirical grounds: (A) small, highly dependent branches with minimal autonomy, (B) medium-sized, semi-independent branches, (C1) self-contained, virtually independent branches producing duplicate goods, (C2) similar to (C1) but producing separate goods, (D) main works, (E) local market-oriented branches, and (F) complete transfers. Four of them including both C-variants are represented by our small sample as indicated below:

Type of Company	Our Sample of Migrant Firms
A	0
B	0
C1	1 (Flyglass)
C2	2 (BXL, HJB Plastics)
D	1 (IBM)
E	1 (Scottish Rexco)
F	1 (Model Toys)

The failure normally of type-A and type-B migrants to move long distances from their parents largely explains both their absence above and their general paucity in Scotland.[1] This raises the question - how far did each of the migrants in our sample move? In fact, all qualify as long-distance movers. IBM and BXL both originated in the U.S. Three migrants - Model Toys, Flyglass and Scottish Rexco - were conceived in the London area. HJB Plastics moved the shortest distance; its HQs in Leicester are 300 miles from Grangemouth.

Luttrell's classification, with the exception of category E, does not tell us very much about the why of migration but it does suggest, together with the foregoing, that many, perhaps most, firms

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[1] And NI - cf. Law (1964), pp. 149-50.

moving long distances try to minimize the need for intra-firm communications by making their new plants as self-sufficient as possible. In other words, companies for whom intra-firm communications are very important, either objectively or subjectively, are much less likely to set up production units in distant locations than companies for whom intra-firm communications are not so critical. In fact, this point emerges time and again in both Luttrell (1962) and Cameron & Clark (1966). Thus the question arises - how does one identify the communications-insensitive firm? Some tentative observations can be made. Small companies with limited management capabilities, for example, will be less able to mount distant ventures than large firms because of their need to refer most decisions of any consequence to one or two typically overworked top executives. Multi-product firms will be better placed to set up relatively autonomous units than single-product companies. However, a fuller answer awaits further research. Organization theory would appear to represent a much more promising avenue of pursuit in this regard than communication cost data from the Census of Production. Perhaps the necessary research has already been done and because of the specialist's tendency towards introspection has either not yet come to the attention of regional analysts or they have been unable to adapt it to their purposes.

Cameron & Clark employed a tripartite classificatory system in their study: market, free-choice and second-best. The 'market' category was synonymous with Luttrell's type-E. 'Free-choice' migrants were essentially pulled towards their new location while 'second-best' migrants were pushed. Applying this rather arbitrary schema to our sample, we get the following results:

Market migrants	Scottish Rexco (1)
Free-choice migrants	HJB Plastics, IBM, Model Toys (3)
Second-best migrants	BXL, Plyglass (2)

While it is probably accurate, the above categorisation should not be taken too seriously because the Cameron-Clark system is sometimes difficult to apply in practice. Especially troublesome is the distinction between free-choice and second-best. Normally, migrants are both pushed and pulled and the analyst must determine which set of forces predominated. It will be evident to anyone

with even a fragmentary knowledge of the literature that location decision-makers' motives are seldom clearcut. Nor are decision-makers' thought processes necessarily linear. It follows that any system like that developed by Cameron & Clark is peculiarly vulnerable to error, sometimes seriously so depending on the nature of the cases being examined. This point can be illustrated by reference to our three free-choice migrants. None of them obviously belongs in the free-choice category. HJB Plastics initially moved its PVC operations from Leicester to Norfolk. It was only because of subsequent problems there that a further move was made to Grangemouth. That is to say, in a very real sense, Grangemouth was clearly second-best. We assumed that IBM was relatively indifferent concerning the location of its first UK manufacturing unit but were unable to validate this assumption. It could be that the firm's initial preference was for a SE location and that it was only pushed to Scotland by government pressure. Model Toys may well have preferred to remain in the London area but was unable to do so owing to inadequate premises and, possibly, labour supply problems. On the other hand, the co-owners may have decided right from the beginning of their search for new premises that the firm's future lay in a Development District. Which interpretation is the correct one? It is not easy to answer this question, particularly 6-7 years after the event and on the basis of interviews with a non-participant in the decision-making process. It might be argued that Cameron & Clark had better information than we do and therefore were able to avoid the problem we have raised. In fact, they did not. Indeed, they acknowledged that their classification system was not infallible. Nonetheless, they proceeded to erect a sizeable intellectual edifice on this sand-like foundation.

The foregoing sets the stage as it were for a discussion of transport and communications as factors in the location decisions by members of our sample. Dealing first with transport, one would expect from its local market orientation that Scottish Rexco was especially interested in this subject. And indeed it was. The high transport costs involved in supplying the Scottish market from the South was one of the main factors in the firm's location decision. Transport cost considerations also played a large part in the decision to site the Scottish plant immediately adjacent to Comrie Colliery, initially its sole raw material source.

Plyglass was less local market-oriented than Scottish Rexco and its initial preference when the need for additional production space became evident was to extend its works at Harlow. However, the high rentals involved in this course of action diverted the firm's attention to the Development Districts, especially those in the NE and Scotland where distribution difficulties had previously almost precluded sales. Thus a decision was taken to build a branch plant. Plyglass was more or less indifferent as to where in the North the branch was actually sited. Irvine was selected without prolonged enquiry because it offered both premises ready for immediate occupancy and room to expand. Indicative of the relative lack of interest taken in transport costs was the fact that Irvine's proximity to the Ardrossan ferry link with NI was not realised until sometime after the 'new' plant had been occupied, despite the company's plan to use the branch as a means of entering the Irish market in force. This plan initially involved the utilisation of the much less convenient Stranraer-Larne route. In conclusion, while Plyglass was aware in a general way of the very real importance of distribution costs for its business, it did not investigate the subject in any detail as part of its search for a new location, and no attempt was made to site its branch so as to minimise this cost item. Classical location theorists would find this situation inexplicable, and indeed it is not entirely comprehensible even if one is prepared to accept the conventional wisdom that few migrants conduct rigorous pre-move searches, particularly since Plyglass maintains excellent cost accounts and therefore probably finds that its transport costs are relatively easy to determine. In other words, while one can accept that new site searches are frequently based on intuition and judgment rather than a comparative evaluation of relevant factual information and even understand this phenomenon in many instances, there will be times when the facts surpass understanding. The Plyglass case represents just such a time.

BXL's Grangemouth plant is an example of a highly raw material-oriented manufacturing operation. Ethylene gas is the main input. Union Carbide, which built the Grangemouth works, preferred initially to locate adjacent to the Esso refinery at Fawley in order to be relatively close to main markets. This preference was overcome,

however, by an offer of cheaper ethylene from British Hydrocarbon Chemicals in Grangemouth.

Transport considerations did not play an important role in the location decisions by HJB Plastics, IBM and Model Toys.

We can conclude then that two firms in our sample were attracted to Scotland by the promise of transport cost savings.[1] A third firm was induced to consider the region as a potential location inter alia because of the severe difficulties involved in supplying northern markets from the South. The other three firms were generally insensitive to transport costs.

Communications considerations appear to have played very little part in the location decisions by the six firms under discussion here. None of them gave any serious attention to the topic so far as can be determined, not even the transfer, Model Toys. Thus it was rather surprising to discover during the course of our fieldwork that five of the migrants had experienced significant communications problems, i.e., problems critical enough to induce a re-allocation of functions and/or to affect expansion plans since they began operations in Scotland. Our surprise would have been greater had Luttrell(1962) and McGovern(1965 - see ch.6 above) not led us to expect something along these lines. Luttrell argued, for example, that migrant-generators "tended to underrate the problems of establishing a new branch and to make false economies in the early preparation and organization - not necessarily by intent" (I,p.151). Our findings with regard to communications are discussed in greater detail below.

Transport Costs : The Empirical Evidence.

In general, it proved difficult to obtain accurate transport cost data from the migrants comparable to analogous figures in the Census of Production. Either the information did not exist at the factory in Scotland because the requisite records were kept elsewhere, or it was not readily available in a suitable form and lack of time precluded lengthy remedial sessions with accounting personnel. Thus, the TCGO ratios in Column 1 below should be taken as indicating rough orders of magnitude rather than precise situations. In some instances they are little more than informed guesses.

[1] This sentence refers, of course, to Scottish Rexco and BXL. In the former case, our reasoning is more or less obvious but in the latter some additional explanation may be helpful. BXL is regarded here as being transport cost-sensitive because of its strong raw material orientation, a phenomenon which reflects the relatively high cost of transporting ethylene any distance and ethylene loss during the polyethylene production process.

	(1)	(2)	(3)	(4)
		TCGO Ratios		
Company	MLH	Scottish factory %	Scotland %	UK %	NI %
BXL	276	4.0+	0.7	1.9	n/a
HJB Plastics	496	2.5	4.0	2.1	n/a
IBM	364	0.25	0.7	0.9	n/a
Model Toys	494	1.9	1.9	2.8	n/a
Plyglass	463	5.9+	7.1	5.2	n/a
Scottish Rexco	261	13.8	0.2	2.9	n/a

Note : n/a = not available.

Sources: Col. 1 : interviews during 1970-71.
Cols.2-4 : 1963 Census of Production.

Noteworthy first is the wide variation among the percentages in Column 1 and the way in which it mirrors the variation in the migrants' markets. For instance, IBM and Model Toys are heavily export-oriented, as mentioned earlier, and have very low TCGO ratios. In contrast, SRL has an extremely high TCGO ratio and is local market-oriented. BXL and HJB Plastics market nationwide and have middling ratios. Plyglass, with a medium-high ratio, is neither local nor national market-oriented but falls between these two poles. While it would be presumptuous to conclude that the size of a firm's TCGO ratio varies inversely with the width of the firm's market area irrespective of product or pricing policies, the evidence to this effect apparent here is nonetheless striking; indeed it corroborates earlier evidence that the traditional view on the role of transport costs in industrial location is not quite so passée as some critics would have us believe.

It will be noted secondly that the TCGO ratios for Scotland from the 1963 Census of Production have only limited value as predictors of the migrants' TCGO ratios. In two cases, Model Toys and Plyglass, the ratio values happen to be very close.[1] But in the remainder, i.e., in 2/3rds of the cases, even the most charitable observer would have difficulty discerning any similarity between the two sets of figures. Some might argue that this situation largely reflects the time difference involved; why, they might say, should we assume that 1970-71 data bear any close resemblance to their 1963 counterparts?

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[1] Although the Plyglass figure is an acknowledged understatement of reality at the Irvine plant. Cf. the Plyglass case study.

Undoubtedly, this temporal argument is not without merit although we have been unable to probe it in any depth.[1] However, there is no obvious reason why TCGO ratios generally should fluctuate significantly from year to year. There will be trends, on the other hand, but they are likely to be gradual. That is to say, trend values are unlikely to change very much within 7-8 years. While the 1968 Transport Act may have a pronounced effect upon TCGO ratio values over the longer run, any such effect would still have been incipient in 1970. Available evidence for that year suggests that companies had only just begun to adjust to the new legislation. A much more important reason for the several major discrepancies between the migrant and census TCGO ratios in our opinion is the fact that the census figures are averages. It would appear that some of these averages are not particularly representative but this supposition cannot be verified in the absence of measures of dispersion; the published census, of course, does not include such measures. The lack of representativeness is particularly evident in the case of Scottish Rexco, partly because, as noted previously, this company only began operations at the end of 1963, i.e., it is unlikely to have been enumerated for the Census of Production until 1964 at the earliest. Almost certainly, the 1963 census figure for Scotland of 0.2% would have been higher had SRL been in production earlier and the discrepancy between the SRL and census figures would have been correspondingly less.

Noteworthy thirdly is the almost complete lack of similarity between the migrants' TCGO ratios and the analogous percentages for the UK. Not surprisingly in view of the foregoing, the national data would appear to be rather poor guides to equivalent values for individual plants. It should be noted finally that not a single comparable figure was available for Northern Ireland in 1963 due to the danger of disclosure emphasising yet again the relative narrowness of the province's industrial base.

With the exception of Plyglass, we did not try to obtain TCNO ratio estimates as part of our case studies because of the difficulties involved. The 1970 TCNO ratio for the Plyglass company (as opposed to the Scottish plant) was about 8.0%. Comparable figures for the

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[1] A comparison of the 1963 and 1968 Census of Production results would be of value in this regard.

UK and Scotland from the 1963 Census were 9.5% and 12.1% respectively. Again, it is evident that the census averages were not particularly good predictors, at least from a Plyglass viewpoint.

Identifiable inbound transport costs were either nil or trifling in five out of our six case studies. Scottish Rexco was the sole exception. In three instances - BXL, HJB Plastics and Model Toys - no inbound transport costs could be readily identified by our interviewees. In the case of Plyglass, a higher price was paid by the Scottish branch for a particular quality of imported glass than was paid at the parent works in Harlow, and the difference was attributed entirely to transport costs. However, this input formed only a tiny fraction of total inputs to the Scottish plant. Since input prices were otherwise the same at both works, the effect of identifiable inbound transport costs on the total cost structure of the branch in Scotland was negligible. IBM Greenock spends a considerable amount of money on inbound transport in absolute terms and indeed is deliberately making, and paying directly, for more and more of the inbound transport arrangements affecting its operations as part of a sophisticated strategy designed to cut other, more important, costs, but its expenditure on inbound transport appears trifling in relation to turnover because the typical output unit has a very high sales value. Scottish Rexco also spends a great deal on inbound transport but, in contrast to IBM, its product value is extremely low. Consequently, inbound transport costs alone account for some 5.5% of turnover. Collectively, those findings are most important. Two points stand out. First, because of the prevalence of average cost pricing in British industry, many, perhaps most, potential migrant firms need have little fear that a Scottish location will raise their supply costs. One would like to be more precise on this point and specify the whole range of products for which average cost pricing is commonplace - such information, needless to say, would be invaluable to those making or interested in industrial location decisions - but the necessary research has not yet been done. Secondly, the significance of transport costs is heavily dependent on the unit value of output. BXL is an excellent illustration of this assertion. Its product has undergone a major decline in value since 1959 and its TCNO ratio has risen accordingly more or less pari passu to the point where it now seems worthwhile to the management for the first time taking an

active interest in distribution policy. Even IBM's sizable outlays on air freight pale into insignificance when set against the average price of electronic computers. Again, average output values by industry have never been catalogued systematically in Britain despite the obvious need for this type of research. While the above points are not particularly novel, they have seldom emerged so poignantly; more importantly, their implications deserve very careful attention.

We have assembled product values of varying degrees of accuracy in connection with our case studies. In spite of their strict lack of comparability, it is interesting, in view of the foregoing, to relate these values to analogous TCGO ratios as has been done in the following correlation table.

Company	Product Value per Ton £	TCGO Ratio %
IBM	1,000+	0.25
Model Toys	1,018	1.9
HJB Plastics	1,000+	2.5
Plyglass	381	5.9+
BXL	125	4.0+
Scottish Rexco	10.65	13.8

Clearly, the correlation between the two sets of data is fairly strong although the absence of precise product values per ton for IBM and HJB Plastics precludes more rigorous analysis.

It remains to be asked whether transport costs proved to be more onerous than anticipated at the time the various decisions were taken to locate in Scotland. In general, the answer must be 'no'. HJB Plastics, IBM and Model Toys were and remain insensitive to transport costs although this does not mean that they are transport-cost-indifferent. IBM, for instance, is very cost-conscious. But is quite prepared deliberately to substitute transport for other costs where necessary since they represent such a minute fraction of turnover. BXL and Scottish Rexco located in Scotland in order to save transport costs and have not been disappointed in this objective. Plyglass has had some trouble keeping delivery costs under control but the problem has never gotten out of hand. Moreover, it should be seen in perspective. The firm began making profits in its new location within an exceptionally short time of the date production commenced.

Communication Costs.

Luttrell, in his monumental study of industrial movement completed in 1962, found that head offices rarely allocated a realistic share of corporate communication outlays to branch plants; almost invariably, too large a proportion was assigned to the HQs.[1] It would appear to follow that, for most firms, communication costs are unimportant. In general, this was Luttrell's conclusion. Our findings, however, corroborate this proposition only in part. While Model Toys displayed little concern over communication costs, IBM took a very great interest in the subject. Between these two extremes were the other interviewees. Plyglass was close to the IBM pole; the remainder were not much more interested in communication costs than was Model Toys. In other words, for 1/3rd of our sample, communication costs were critical enough to warrant considerable accounting effort and management attention. Yet in no case did they represent (so far as can be determined) as much as 1% of turnover. Why then did IBM and Plyglass indicate that communication costs were an important cost variable? The answer lies partly in the excellence of their cost accounts; they knew how much was being spent on communications and their information was up-to-date. Perhaps one or two of the other interviewees had equally good accounts - we made no comparative checks - but if they did, it was by no means obvious. In addition to its excellent cost records, IBM Greenock spent a great deal of money on telecommunications, its total communications bill excluding travel appeared to be higher than its outlay on transport, there was some evidence of wasteful expenditure on communications, and telecommunications charges rose significantly on 1 July 1970. At Plyglass, communication costs were seen as an important overhead item; they were, therefore, the subject of constant scrutiny. But a majority of our interviewees agreed in effect with Luttrell that communication costs were not of any great significance, apart perhaps from periodic flurries of concern.

Thus, the question arises - do our findings differ somewhat from Luttrell's because of the nature of our respective samples and interests, or has there been a temporal shift in the importance of communication costs?

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[1] Indeed, this tendency extended to transport costs. Luttrell, I (1962), pp. 377 & 381.

Little research exists on the latter possibility; it warrants investigation. Until the necessary work has been done, our question must remain unanswered.

Marketing and Pricing Policies.

Only one of our migrant sample, Model Toys, uses price as the primary element in its marketing strategy. The remainder stress either product quality including design (HJB Plastics and Scottish Rexco) or delivery, product range and service considerations (BXL, IBM and Plyglass). However, none of these items is entirely neglected for obvious reasons. Furthermore, their relative importance can vary over time. For example, Plyglass during the early 1960s stressed product quality above all else. By mid-decade, this variable had been superseded by price. More recently, quick delivery has assumed paramountcy.

Four of the firms generally deliver carriage paid, the exceptions being IBM and Model Toys. All IBM Greenock sales are effectively ex-works; the only buyers are other parts of the IBM complex. Model Toys delivers carriage paid within the UK but on foreign orders, which comprise the bulk of its business, it only pays transport charges up to the point of export. In no case can the pricing policy employed be interpreted as a specific response to the Scottish environment. That is to say, none of the migrants has had to alter established pricing procedures as a direct consequence of having located in Scotland.

Non-Cost Transport Considerations

As has been argued before, low TCGO ratios do not necessarily mean that the companies to which they apply will be disinterested in transport. Indeed, it is a truism to say that transport is essential to all manufacturing enterprises. But truisms do not take one very far. What we are interested in here is the extent to which our interviewees stressed the importance of good transport facilities. IBM Greenock was most vociferous in this regard in large part probably because of the enormous inter-plant competition within the IBM set-up for the right to produce more and more sophisticated products. 'Successful' IBM plants invariably have a punctual delivery record. The reciprocal of punctual deliveries, of course, is punctual inputs. We have already noted IBM Greenock's exceptionally keen concern over inbound transport arrangements and its willingness to incur extra

transport costs in order to ensure punctuality on the input side.[1] Paradoxically, the only other of our migrant companies to take an unusually pronounced interest in its transport arrangements was Model Toys which, like IBM, had a very low TC&C ratio. The Model Toys situation is attributable almost entirely to the influence of one manager who has been able to retain a professional interest in shipping and forwarding while exercising more widespread powers within the firm. None of our migrants claimed to have been handicapped in any way by the goods transport facilities available to Scottish manufacturers. Distribution methods varied widely from a complete reliance on purchased transport by IBM and Scottish Rexco to Plyglass's heavy dependence on own-account transport. In between were HJB Plastics with one small van, Model Toys with three lorries and BXL with a sizable fleet of road vehicles.

Non-Cost Communications Considerations

As mentioned previously, five out of the six firms in our migrant sample experienced communications problems serious enough to induce them to make important alterations in the organisational structure which they had originally set up in Scotland and/or to affect their expansion plans. These problems were mostly intra-firm in nature. Scottish Rexco presented the most extreme example. De jure, it has always been a subsidiary of the National Carbonising Co. but in practice it began life late in 1965 with a status akin to that of an integrated division rather than a separate entity. This status necessitated a large volume of communications between Oakley and NCC HQs in England. Indeed the Scottish company had so little independence that its very viability was threatened. Fortunately, this cause and effect relationship was perceived early enough for remedial action to be taken, i.e., additional responsibilities were devolved bit by bit from the NCC to Scottish Rexco until by early 1969 the subsidiary was virtually autonomous except for two functions, accounting and finance.

In the case of Plyglass too, it proved necessary due to communications difficulties for the parent company in Harlow to devolve more and more responsibility upon the Irvine branch in order to maximize

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[1] For greater insight into IBM's passion for punctuality, cf. Richard L. Meier, A Communications Theory of Urban Growth (Cambridge, Mass.: M.I.T. Press, 1962), p.58.

the latter's efficiency. The HJB Plastics bud in Grangemouth opened up fully only when it became a separate and largely autonomous profit centre at the beginning of 1970. Earlier, it had been tied hand and foot to corporate HQs in Leicester. The communications problems implicit in this situation made it almost impossible to generate real enthusiasm amongst the Scottish staff and their performance was correspondingly lacklustre. More important, Scotland seemed so remote to the company's English management cadre that considerable difficulty was experienced recruiting adequate talent for the Grangemouth plant. BXL found it necessary to move its staff responsible for polyethylene sales from corporate HQs in London to the production site in Grangemouth for communications reasons even though the move resulted in a heavy staff attrition rate. Under the pre-move arrangements, chronic difficulties were experienced coordinating sales with production and distribution.

IBM Greenock generates an enormous volume of telecommunications traffic. The Gourock Telephone Exchange, which serves the Spango Valley plant, has never, according to IBM, had sufficient capacity since 1951, the year the company opened in Scotland, making it almost impossible during peak periods for anyone to phone into or out of the works. There is some evidence to indicate that this situation may have contributed to IBM's decision during the mid-1960s not to twin the Spango Valley factory but to locate its additional UK manufacturing requirements instead at Havant.[1] IBM was not the only company which we studied to complain about the adequacy of the telecommunications infrastructure in Scotland. Both Collins and HJB Plastics raised the same point. But neither was affected as adversely as IBM. Also, both felt that the worst was now over, whereas IBM did not.

In contrast to the foregoing, Model Toys has had no particular communications problems since it moved to Scotland, probably for two reasons: 1) it was a transfer contrary to our other five migrants,

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[1] As Webber(1964, p.98) has remarked: "Where channel capacities are inadequate to the communication or transportation loads and when relief is not in sight, locational adjustments inevitably follow." Melvin M. Webber, "The Urban Place and the Nonplace Urban Realm," in Explorations into Urban Structure by Webber, et al., City Planning Series (Philadelphia : University of Pennsylvania Press,1964).

2) while it generates a lot of communications traffic, its demands on the communications system are nowhere near those of IBM. But the Model Toys experience obviously does not invalidate our hypothesis relating to intra-firm communications and organisational flexibility. Indeed, from the material presented in this chapter so far, it would appear that our postulate is substantially correct to the extent that our six case studies are representative of the inter-regional migrant universe at large. We cannot claim, of course, that they are a scientific cross-section. On the other hand, there is no reason to think that they are not reasonably typical given our selection procedure as outlined earlier. We return to the subject of our hypothesis in the concluding section.

External Contacts

Contact information of one sort or another was provided by five of our migrants, the exception being IBM. 'External' relates to the Scottish factory, not to the company as a whole. Thus, in the case of the non-transfers, it encompasses both intra-firm and extra-firm contacts. Relatively complete external contact profiles were obtained for the managerial cadres in Model Toys, Plyglass and Scottish Rexco but BXL and HJB Plastics yielded only partial results.

Our purpose in collecting contact information was to shed light on our first and third hypotheses, not to add to the burgeoning contact study literature per se. Nonetheless, our findings will be of interest to contact specialists. But to elaborate on this theme is beyond our scope here.

Four general conclusions emerge from an analysis of our external contact data. First, a manager's title is not always a good guide to either the frequency of his external contacts or the main contact methods used. On the other hand, title and contact frequency appear to be more closely associated than title and preferred contact method. Secondly, frequency of contact varies widely depending on the nature of the person being contacted. To take an obvious example, customers are invariably contacted more often than suppliers of capital equipment. Thirdly, contact frequency and main contact method do not necessary correlate closely although there would appear to be certain tendencies in this regard. For instance, whereas a daily contact pattern involves the telephone or telex more often than the

post, daily postal contact is not uncommon. Finally, main contact method is related to the nature of the person being contacted but less so than contact frequency.

Contact records were maintained by only one of our interviewees, viz., IBM Greenock, on a continuing basis. At the end of 1970, it was monitoring both telex and international telephone traffic. It also wanted to monitor long-distance domestic telephone traffic but lacked the necessary equipment. BXL, HJB Plastics and Plyglass have all made ad hoc use of contact measures but have not seen any need for permanent surveys. Model Toys and Scottish Rexco appear to have ignored the subject entirely.

With the almost certain exception of IBM Greenock from whom we did not solicit specific opinions concerning Confraphone, Confravision and Datel due to the nature of our interviews, we encountered relatively little interest in and even less knowledge of these new communications devices.[1] On the face of it, these findings do not greatly corroborate the high hopes held out by the Scottish Council for the incipient revolution in electronic communications, (cf. ch.3), a conclusion strengthened by our pilot study at Collins and by analogous inferences in Tornqvist (1970, pp. 29-30), Thorngren (1967, p.180), and Meier (1962, ch.IV). On the other hand, it is still early days. Furthermore, our evidence is obviously patchy. For companies like IBM, it is highly probable that technological innovations of the type mentioned are of immense significance. Witness for example IBM's internal European Telecommunications System as described in our case study of IBM Greenock. Perhaps what the Scottish Council is really saying is that Scotland's future depends on the multinational companies rather than better communications per se !

Travel

Travel information was solicited from our interviewees for two reasons: 1) as in the case of the external contact material, to shed light on our first and third hypotheses, 2) because of the importance attached to good travel facilities by the Scottish Council (cf. ch.3). Rather surprisingly, we elicited only one complaint. It

[1] One is reminded of a recent 4-page advertisement in the Economist (27 Feb.71, pp.9-12) by PO Telecommunications which begins: " When did someone last give some thought to your business communications? The chances are that no one ever has ....."

came from IBM which decried the lack of direct air services between Scotland and the Continent. Whether the firm was echoing the Scottish Council or vice versa is not clear. It would seem, however, that this deficiency in Scotland's communications network may well have contributed to the decision by IBM noted previously to build at Havant rather than expand at Spango Valley, a possibility heightened by the excellence of IBM's travel records. None of our other migrants found fault with the business travel arrangements available to Scots but then none generated anything like the volume of air traffic originating with IBM Greenock nor did any appear to keep careful travel tallies. Particularly interesting in this regard is Model Toys, a firm heavily committed to Continental markets, but one whose managers seem to travel very little. It could be, of course, that our case study is misleading on this point, inasmuch as the company's Sales Director is resident in Switzerland. His presence there may obviate much of the need for travel by the Scottish executives.

Summary and Conclusions

The primary purpose of this chapter has been to test our hypothesis that distance costs are frequently less critical to the success of interregional industrial migrants than the quality of intra-firm communications and a preparedness to alter organisational arrangements as required. As a secondary objective, we have tried to illuminate further our hypotheses concerning the importance of a good interregional communications network and the relative unimportance of private distance costs. The means to these ends were six detailed case studies of postwar migrants to Scotland. One firm was selected for investigation specifically because of its local market orientation and probable sensitivity to transport costs. But the remainder were assumed to be reasonably representative of non-local-market-oriented interregional industrial migrants although our selection criteria expressly provided that they had to belong to different growth industries and to be located within the Central Belt outside the Glasgow and Edinburgh conurbations. Yet these requirements were not expected to bias our results in favour of the hypothesis being tested; indeed, if anything, the reverse was true.

We found first that three firms in our sample were entirely footloose with respect to transport costs at the time of their decision to locate in Scotland, one was relatively so, one was highly raw material-oriented but otherwise insensitive to transport costs, and one was predominantly local market-oriented. All things considered, these facts are quite compatible with our hypothesis about the general (but not universal) relative unimportance of private distance costs as a constraint on interregional mobility. This conclusion is corroborated by the experience of our migrants once they began operating in their new location. None found distance costs to be any more burdensome than anticipated. Apart from IBM which was critical of Scotland's air links with the Continent, none had any serious complaints to make concerning the physical adequacy of the transport network serving the region. On the other hand, none was indifferent to the need for good transport facilities although some seemed to have assumed the existence of adequate infrastructure instead of taking time to investigate the matter.

Secondly, with the obvious exception of the sole transfer in our sample, each of our interviewees, following the commencement of operations in Scotland, experienced some sort of unforeseen intra-firm communications problem serious enough to affect the employment outlook at the regional factory. In four cases, additional functions were thereupon devolved to the Scottish works resulting in more jobs, greater efficiency, heightened morale and (in at least two instances) better survival prospects. That is to say, ill-conceived organisational arrangements were the cause of the communications problems and organisational flexibility was the remedy. But in the fifth case, the problem was a deficiency in the telecommunications infrastructure. Inadequate remedial action by the Post Office contributed to a decision by the company involved, a heavy user of telecommunications, not to locate a major new production facility in Scotland. Overall, one can conclude that the evidence corroborates our hypothesis concerning the quality of intra-firm communications, organisational suppleness and distance costs; the latter variable is indeed frequently less critical to the long-term success of industrial migrants than the former two. Yet none of the migrants in our sample attached any discernible significance to communications considerations

at the time of its decision to start manufacturing in Scotland. While this finding is not terribly surprising given the relative inexperience of most firms in location decision-making, it does suggest a need for a certain amount of discreet propagandising by regional development officials designed to induce future migrant-generators to pay more attention to the efficacy of their internal organisational arrangements right from the beginning.

From our findings, it would appear that the likelihood of an intra-firm communications problem arising does not vary significantly with a migrant's organisational status. Problems can develop irrespective of whether the migrant is a branch, a division or a subsidiary. What does seem to matter, as has been pointed out by others, is the degree of effective autonomy granted to the migrant and therefore the need for intra-firm communications. Since these two variables are inversely related, it follows that by maximizing the autonomy of a migrant, one minimizes the danger of an intra-firm communications problem developing; to that extent, one increases the likelihood of a migrant's survival. Luttrell (1962) suggested that small migrant-generators were more likely to encounter communications difficulties than large ones;[1] our evidence provides some support for this assertion but only up to a point. BXL, for example, can hardly be considered a small firm. On the other hand, we would fully concur in Luttrell's stress on the need for good management in migrant factories. (I, 1962, p.155).

A number of worthwhile future research topics have been identified in this chapter. For instance, more work is necessary on the question of which types of potential migrant-generator are best able to set up reasonably autonomous plants at a distance. Organisation theory rather than regional research is probably the most fruitful source of answers to this problem. The incidence of spatially-uniform pricing by British industry again appears as a

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[1] "the smaller firms tried to run a branch with the minimum management and organization, whereas larger firms considered a fuller staffing to be necessary." Luttrell, I (1962), p.152.

subject worthy of comprehensive enquiry. While there is little doubt that this form of pricing is widespread, one would like far greater precision on the matter than is available at the moment. We have uncovered fairly strong inverse correlations between 1) the per ton product values and 2) the market areas of specific industries and their TCGO ratios. But our evidence is fragmentary compared with what should be assembled on these points. Have communication costs increased in importance over time?; we have suggested that this question is worthy of investigation. Contact studies and the implications for regional development of the new communications technologies coming onto the market are interesting new avenues for research;[1] we have only been able to scratch the surface of these matters. Finally, our case study methodology could profitably be both refined and extended to other migrant companies, not only in Scotland but in other peripheral regions as well.

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[1] Work on these topics is currently (1971) underway inter loci at the Joint Unit for Planning Research, London and the Economic Research Institute at the Stockholm School of Economics.

CHAPTER 13

BAKELITE XYLONITE LIMITED - A CASE STUDY

Summary

Location of Scottish factory: Inchyra Rd., Grangemouth, Stirlingshire.

Approximate distances: Glasgow (26 miles), Edinburgh (25), London (398).

Order & MLH: IV-276 (1958 SIC); V-276 (1968 SIC).

Commencement of production: 1958

Capital employed (1970): c. £13m.

1970 employment: 290 (total employment in the PE Division was 355).

1970 turnover: c. £8.5m.

Product and production capacity: 175m lbs. (80,000 metric tons) a year of low-density polyethylene granules.

Product value: £336 a ton in 1959; £125 a ton in 1970.

Type of production: continuous process.

Main market: England.

Organisational status and ownership: the Polyethylene (PE) Division of Bakelite Xylonite Limited, London.

Assessment of transport factor: the Grangemouth plant is raw material-oriented and inbound transport costs are negligible. Outbound costs however equal 4% of turnover. Despite this relatively high percentage, distribution policy has only recently come under critical review. A combination of own-account and for-hire transport is used. BXL is predisposed towards the former.

Assessment of communications factor: efficient and rapid communications are essential to the PE Division. This need was instrumental in bringing about the recent move of the Division's Sales Department from London to Grangemouth. Costs, while not unimportant, are very much secondary to speed. It has not been possible to compute a CCGO ratio for the PE Division.

Corporate Background

Bakelite Xylonite Ltd.(BXL), London came into being officially at the beginning of 1963. A few weeks earlier on 4 October 1962 Distillers Co. Ltd.(DCL), Edinburgh and Union Carbide Corporation(UCC), New York had announced their intention of bringing into joint (50-50) ownership "certain" of their UK interests in the field of plastics, to wit, the low-density polyethylene(PE) operations of Union Carbide Ltd.(UCL)[1], UCL's 52% interest in Bakelite Ltd., DCL's 100% interest in the British Xylonite Co. Ltd., and the subsidiaries and associated companies of

[1] A UK subsidiary of UCC.

Bakelite and British Xylonite (and thus the Dundee plant of B.X. Plastics Ltd., the only other Scottish manufacturing operation in the deal). Shortly thereafter the minority shares of Bakelite were acquired by the new company, the name of which, BXL, was designed according to a contemporary press release[1] to incorporate "the names of two of the oldest and best known companies in the plastics industry". The latest published figures for BXL show turnover at £43.4m, capital employed at £34.7m, net profits before interest and tax at £3.0m (£2.85m the previous year), a return on capital of 9.0% (10.3% the previous year), a profit/sales ratio of 6.8%, UK employment at 11,000 and exports at £4.6m. Some seemingly comparable[2] figures for DCL are turnover, £382.4m; return on capital, 17.0%; and profit/sales ratio, 13.9%.[3] Clearly, BXL is currently less profitable than the other DCL interests.

UCL's low-density PE operations at the time of the formation of BXL were concentrated in Grangemouth. The original plant was completed late in 1957 and brought into commercial production early in 1958. Initially, it was operated by the General Metallurgical & Chemical Company (Gemec), an arms-length division of UCL[4], but this situation lasted only for about two years when the Gemec appellation was dropped in favour of simply Union Carbide Ltd. UCL had many non-plastics interests in 1962-63 such as alloys, chemicals and electronic components. They were not part of the BXL deal. The latest published figures for UCL show turnover at £27.8m, capital employed at £19.7m, net profits before interest and tax at £2.6m (£2.7m the previous year), a return on capital of 14.0% (15.5% the previous year), a profit/sales ratio of 9.3%, employment at 2,000 and exports at £2.4m.[5] It can readily

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[1] Supplied by DCL in a private communication, Sep.70.

[2] Inasmuch as they come from the same source.

[3] The Times 1000: Leading Companies in Britain and Overseas, 1970-71 (London: Times Newspapers Ltd., 1970), pp.16-17 & 24-25.

[4] John H. Dunning in his comprehensive study, American Investment in British Manufacturing Industry (London: George Allen & Unwin Ltd., 1958) refers to Gemec as a division of UCL but categorizes it as an Anglo-American-financed firm with 25% or more of its equity capital owned in the U.S. Our interviews elicited the view that Gemec began life as a UCC-owned trading company, importing chemicals from its parent in America, and that it was selected to inaugurate the Grangemouth plant for tax reasons, but this line of inquiry was not pursued. In any event, the name made little substantive difference to the way in which the works was in fact controlled and run.

[5] Times 1000, pp.30-31.

be seen that while UCL is smaller than BXL today in terms of turnover and net assets, it is both more capital-intensive and more profitable.

Bakelite had roots in both the U.S. and the UK. The name derives from that of the inventor of 'Bakelite' Dr Leo Baekeland, a Belgian chemist working in the U.S. He filed his initial patent in February 1907. Bakelite, a plastic resin formed from the reaction between phenol and formaldehyde, was an exceptionally important discovery being both the first thermosetting resin and the first truly synthetic plastic. Bakelite Corp. was formed in the U.S. to exploit the find. Sir James Swinburne was working along the same lines as Baekeland but in London. He actually filed a patent application similar to Baekeland's but a day later! His company, Fireproof Celluloid Syndicate Ltd., was formed in 1904. It became the Damard Lacquer Co. Ltd. in 1910 and moved its production facilities to Birmingham. Bakelite Corp. set up a UK subsidiary, Bakelite Ltd., in 1926 with HQs in London. This subsidiary purchased Damard at the beginning of 1927. Its main works, Tyseley(Birmingham), was opened in 1931 at the nadir of the Great Depression. The Ware, Herts. works was bought in 1940. Production began at Aycliffe(Co. Durham) on a temporary basis in May 1946 on a 38-acre site previously used for ordnance manufacture. These three factories were Bakelite's production units as of the spring of 1957.[1] Today they form part of BXL.

British Xylonite had its origins in the experiments of Alexander Parkes, a Birmingham inventor, during the 1850s and 1860s and in contemporary work in the U.S. by John Wesley Hyatt which resulted during the 1870s in the commercial production of Xylonite (as it was known in the UK) or Celluloid(U.S.); the first and only plastic till 1897. A thermoplastic, Xylonite is still used as a substitute for ivory, tortoiseshell and similar natural rarities and appears (or did at one time) in such diverse final forms as 'ivory' knife handles, 'tortoiseshell' spectacle frames, toothbrush handles, etc. As we have seen, the British firm was eventually purchased outright by DCL. Earlier, it had shared

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[1] This paragraph draws heavily on T.J. Fielding, History of Bakelite Limited(London: Bakelite Limited /1948/) covering the period, 1904-47; see also Edwards and Townsend, Business Enterprise, pp.150-51.

with Distillers the ownership of B.X. Plastics, a large-scale producer of plastics goods (in contrast to their principal input, plastics materials). DCL became sole owner of this joint venture, of course, when it acquired British Xylonite. B.X. Plastics lost its separate identity upon the formation of BXL. A short time later its Dundee plant, a small calendering operation set up during the immediate postwar period, was closed owing to lack of profitability; the production therefrom was transferred to the old B.X. Plastics HQs in Brantham, Suffolk. Shortly before the creation of BXL, Cascelloid Ltd., Leicester, a British Xylonite subsidiary, had been induced by regional policy considerations to open a branch plant for the manufacture of blow-moulded plastic bottles in Haltwhistle, a mining town and employment 'black spot' in an out-of-the-way corner of Northumberland near the Cumberland border. A key location factor was the proximity of Haltwhistle to Proctor & Gamble's detergent works in Newcastle-upon-Tyne. Unilever in the Manchester area is another important customer. The Haltwhistle plant purchases its low-density PE requirements from BXL's Grangemouth works.[1]

Behind the association between Distillers and Union Carbide lay a desire on the part of both giants[2] to safeguard through vertical integration and expansion their heavy and growing investment in petrochemicals. The timing of the deal would appear to have been dictated to some extent by the likelihood during the latter half of 1962 of British membership in the EEC and the concomitant threat of increased competition. DCL's main contribution to the partnership was commercial expertise while UCC provided technical know-how. The result was the creation of one of

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[1] Sources for this paragraph include E.G. Cousens and V.E. Yarsley, Plastics in the Modern World, 2nd rev. ed., Pelican Book A1016(Harmondsworth, Mddx.: Penguin Books, 1968); J.H. Dunning and C.J. Thomas, British Industry: Change and Development in the Twentieth Century(London: Hutchinson, 1961); W.B. Reddaway, "The Chemical Industry," in The Structure of British Industry: A Symposium, Vol. I, ed. by Duncan Burn, National Institute of Economic and Social Research, Economic and Social Study No. XV(Cambridge: Cambridge University Press, 1958); Trevor I. Williams, The Chemical Industry: Past and Present, Pelican Books, No. A282(Harmondsworth, Mddx.: Penguin Books, 1953); interviews with BXL staff.

[2] Distillers in early 1965 for example was by far the biggest Scotch whisky manufacturer in the UK and second only to Imperial Chemical Industries Ltd. in chemicals. It had interests in or controlled some 25% of the UK plastics market. Pretax profits alone in 1964-65 were £42m; See "Scotch Plus Test Tubes," Sunday Times, 14 Feb 65, p.31; DCL, Report and Accounts, Year Ended 31st March 1970, p.32. UCC is the 3rd-largest chemical company in the world after Du Pont and ICI in terms of group sales. See Andrew Knight, "The Big League - Petrochemicals: A Survey," Economist, 3 Oct 70, p.xxii.

the largest plastics groups in Europe with some 30 separate business activities and 10,000 employees; its output included several plastics materials, i.e., low-density PE, PVC, polystyrene, various phenolics and nitro-cellulose, together with a heterogeneous assortment of industrial and consumer products such as laminates and toothbrushes.

Describing the nascent "Carstillers" as a "very mixed bag," the Economist[1] suggested that part of the firm's product range was uneconomic and/or inapposite. It also wondered about the future of DCL's unaffected but now somewhat anomalous interests in two competitors of the new BXL, British Geon Ltd.[2] and Distrene Ltd.,[3] and in British Hydrocarbon Chemicals Ltd., the largest high-density PE manufacturer in the UK at the time and the supplier of ethylene to BXL's Grangemouth plant. These reservations were reiterated on the occasion of the offer by BP at the beginning of 1967 to purchase the bulk of the assets of DCL's Chemicals and Plastics Group including the half-share in BXL.[4] Indeed,

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[1] "Plastics: Carstillers?" Economist, 6 Oct 62, pp.73-74.

[2] A PVC producer whose output in 1962 was about 50,000 tons. Owned 55% by DCL and 45% by B.F. Goodrich Chemical Co.(an American firm) until purchased by British Petroleum in 1967. Bakelite at the time of the DCL-UCC deal was making about 5,000 tons a year of PVC. By early 1972, BXL will have a PVC capacity, at Ayoliffe, of 27,000 tons a year.

[3] A polystyrene producer. Owned 50-50 by DCL and Dow International until January 1968 when Dow purchased DCL's interest. A year earlier DCL had offered its interest in Distrene to BP but Dow vetoed the sale on antipathetic grounds. Private communications with BP Chemicals (UK) Ltd., Sep-Oct.70; "Chemicals: Thwarting BP," Economist, 27 Jan 68, p.54. BXL no longer manufactures polystyrene and has sold its production facilities because of inadequate profitability.

[4] In essence, BP wanted into chemicals; DCL wanted out. However, the decision by the two companies to do a deal was by no means precipitate. As reported by the Economist, talks had been "skirting the subject off and on for years; the last of the series - mainly about money (Scottish accountants eyeball to eyeball) - took nine months." "BP - Headlong into Chemicals," Economist, 7 Jan 67, p.63. See also "Distillers/BP: Just Courting," Economist, 24 Dec 66, p.1346. Postwar migrant companies to Scotland on MinTech's January 1970 list (see Appendix A) and affected by BP's offer were BXL and British Hydrocarbon Chemicals (merged with BP Chemicals (UK) Ltd. from 1 Oct 67). Not on the MinTech list but seemingly eligible for inclusion and affected by the offer was Border Chemicals Ltd., a producer of acrylonitrile in Grangemouth, whose ownership originally had been divided equally between DCL, BP and ICI. Based in part on private communications with BP, Sep-Oct.70.

the Economist went so far as to suggest that BP might want to eschew any ownership stake in BXL, rather invidiously described as a "ragbag of wildly assorted interests," despite the patent advantages of a corporate link with UCC.[1] In the event, it was BP that was spurned. One of the terms of the partnership joining DCL and UCC in BXL stipulated that neither party could sell its assets to a third party without the consent of the other. UCC vetoed the sale of DCL's investment in BXL to BP in large part one suspects because of a very American aversion to having anything to do with a company such as BP in which a government is the largest single shareholder.[2] On the other hand, UCC has refrained from 100% ownership of BXL.[3] There the matter rests for the moment. However, the ownership situation with regard to BXL would not appear to be a stable one.

Location Factors

UCL located its PE plant in Grangemouth because feedstock (ethylene gas) was available more cheaply there from British Hydrocarbon Chemicals Ltd. (BHC) than from Esso at Fawley, near Southampton. Ceteris paribus, Fawley was UCL's first location choice because it was closer to main markets. Since Shell had no ethylene unit at the time, a Manchester area site was not considered. UCL did not build its own ethylene unit because the minimum economic size was larger than the minimum economic size of PE plant and the company had no market for the resulting ethylene surplus.

Ethylene is derived from naphtha which in turn is obtained from oil. Representative proportions might be 1, 4 and 16, i.e., 16 tons of crude oil can ultimately be made to yield one ton of ethylene. Imported crude oil has been refined at Grangemouth since 1924 (except during W.W.II) although on a small scale until the decision by the

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[1] Ibid., 7 Jan 67.

[2] Her Majesty's UK Government owned 48.0% of the ordinary £1 stock units issued by BP as of 31 Dec 69. BP, Annual Report and Accounts for 1969, p.30. As support for the supposition, see Knight, "Petrochemicals," pp.xxxi-xxxii and George Soloveytchik, "Reflections on Italy," Lloyds Bank Review, No. 98(October 1970), p.50; Union Carbide pulled out of a joint olefins venture with Edison in Italy because of persistent government interference culminating eventually in control of the Montecatini-Edison Group by IRI and ENI, the state-owned holding and oil companies respectively.

[3] There seems little doubt that DCL would be prepared to sell given a suitable offer. UCC is the active partner.

government in 1948 to stimulate deliberately oil refining and the manufacture of petrochemicals in the UK. Grangemouth has been one of the prime beneficiaries of this policy. As explained by Burn, a student of the oil industry:

> The /postwar/ choice of refinery sites in the United Kingdom was influenced by the pattern of pre-war distribution, when the major ports were naturally the main centres of distribution; the use of readily available sites adjacent or close to existing importing facilities, with some storage capacity, some dock facilities, and power supplies, made it easier to get off the mark quickly.[1]

British Petroleum Chemicals Ltd., as it was known until 1956 when the name was changed to BHC, was set up jointly (50-50) by DCL and the Anglo-Iranian Oil Co. Ltd. (the name was later changed to British Petroleum Co. Ltd.) in 1947. Its first plant facilities were located in Grangemouth next to its main supplier, the newly-expanded Anglo-Iranian refinery. Both the refinery and the BHC have experienced enormous growth since the completion of the latter's initial investment programme in 1951.[2] For example, BHC commissioned its No. 2 ethylene plant in 1956, No. 3 in 1960 and No. 4 in 1968 (see below).

A number of considerations apart from the price of ethylene might be mentioned as being pertinent to the UCL/UCC location decision. First, although UCC is reputed to be the largest ethylene producer in the world, it has manufactured relatively little of this essential building block in Europe and almost none since the Italian imbroglio referred to earlier. Second, UCC was not in the oil refining business in 1957-58, its normal practice being to purchase olefins from others. Third, while ethylene gas can be transported over considerable distances, either by pipeline or in liquefied form,[3] usually ethylene buyers are located cheek-by-jowl with their main supplier. UCL/BXL is no exception to this rule; its property in Grangemouth is immediately adjacent to that occupied by BHC/BPC. Traditional location theory is

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[1] Duncan Burn, "The Oil Industry," in Structure, I, p.185.

[2] Cf. A.P. Jenkins, et al., "Pacemaker '70," Glasgow Herald, 29 Oct 70, pp.13-15.

[3] Ethylene pipeline grids are becoming increasingly common and ICI is currently shipping liquefied ethylene across the North Sea. Cf. Knight, "Petrochemicals," p.xxvii. On the other hand, it has become increasingly expensive to transport ethylene as its price has been falling while transport costs have either remained much the same or have risen. Cf. "Why Won't They Come to Britain?" Economist, 11 Jul 70, pp.55-56.

relevant in this connection. The theory holds that materials-oriented industries are characterised by products which lose weight during the production process and/or by higher transport costs per ton-mile on input than output. PE manufacture involves weight loss (see below). Also, though evidence cannot be adduced in support of the assertion, it seems likely that PE can be transported more cheaply than ethylene when capital and/or liquefying costs are taken into account. Mention might be made fourthly of the Grangemouth/Falkirk Regional Survey and Plan which propounds that the various requirements of the chemical industry are well-fulfilled within the plan area.

> These requirements include proximity to feedstock and materials, good communications to and from destinations within and without the United Kingdom, plentiful supplies of cheap water and availability of flat land.[1]

While the specified items are of varying degrees of relevancy from the viewpoint of UCL/BXL and while the plan document postdates the location decision under review by a decade, overall, the quote would still appear to be germane. Finally, UCL was not eligible for regional policy benefits in 1957-58.

Product

BXL's Polyethylene Division, which is based in Grangemouth, manufactures low-density PE granules in a variety of grades, the precise grade mix being demand-determined. Low-density or normal PE is to be distinguished from the high-density product of the same name which is not made by BXL; there are only two UK producers of the high-density material, BP at Grangemouth using the Phillips process and Shell at Carrington, near Manchester, using the Montecatini process. Since most high-density plants in the world use one or the other of these patented processes, there is currently little scope for a third UK

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[1] K.J. Allen and S.C. Orr, "Industry and Employment," in op. cit., Vol. I: Economic and Social Issues, ed. by D.J. Robertson (Edinburgh: HMSO, 1968), para. 4.70. See also Organisation for Economic Cooperation and Development, The Chemical Industry, 1968-1969 (Paris: OECD, 1970), pp.12-13. This report is precised in The Times, although with lapses in accuracy, under the heading, "Chemical Merger Problems," 20 Apr 70, p.24.

producer at the moment.[1] PE, an intermediate petrochemical, was discovered during the late 1930s by ICI. Large-scale production began in 1939.

Production Technology

As described by Couzens and Yarsley, low-density PE:

> is made commercially by subjecting the gas, ethylene, to very high pressures and high temperatures, using very small quantities of oxygen as a catalyst . . . low-density polythene is made at pressures up to 3,000 atmospheres and temperatures possibly as high as 250°C, and a continuous process is employed in tubular and tower-type reactors, producing molten polythene and unconverted ethylene, which is recycled.[2]

This description is sufficiently graphic as to require little elaboration. At BXL, ethylene efficiency (a measure of the relationship between ethylene input and PE output) is .95 ideally but .90 on average. Classified additives determine the exact PE grade mix at the output end of the production process. Their weight isminuscule relative to the weight of the main input, ethylene, comprising less than 0.5% of the final product. Thus, one can conclude with reasonable accuracy that 100 tons of input to the Grangemouth plant yields 90 tons of PE; the other 10 tons disappear. All production is subject to rigorous quality control, consistent quality being more important to many buyers than price.

PE manufacture historically has been subject to enormous economies of scale as exemplified by what petrochemical industry experts call the 'rule of 0.2' and the 'rule of 0.6'. These rules hold that a new, 'large' plant will use only 15% more labour than a plant half its size (rule of 0.2) while costing only 50% more to build (rule of 0.6).[3] The resultant savings are of course the source of the industry's

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[1] On the difference between high- and low-density PE, see Couzens and Yarsley, op. cit., pp.22-23, 78 & 123-26. BP Chemicals (UK) Ltd. is the major UK producer of high-density PE. Its 70,000-ton (44,000 tons until recently) Grangemouth plant is reputed to be the largest of its type outside the U.S. and is only slightly smaller than its neighbour, BXL's 80,000-ton low-density PE plant. It is also worth noting that 'polyethylene' and 'polythene' are the same thing, the former being the scientific (and American) name, while the latter in lexicographic phraseology is 'chiefly British'.

[2] Ibid., pp.123-24. A report prepared for the Scottish Council during the early postwar period erroneously states that the polymerisation of ethylene does not affect its weight one way or the other. Scottish Council (Development and Industry), Committee on Plastics, Final Report: Plastics in Scotland (Edinburgh: Scottish Council (Development and Industry), 1946), p.11.

[3] Knight, "Petrochemicals," p.xiv.

impressive price performance. Initial capacity at BXL's Grangemouth plant was 40m lbs. a year. This was considered at the design stage to be a competitive size. However, things have since changed drastically. A recent Canadian estimate puts the minimum size of competitive new low-density PE plant at 200m lbs. a year;[1] BXL, on the other hand, would cut this figure in half.

Markets and Marketing

Low-density PE has many uses as illustrated by the strongly upward historical trend in consumption. Market growth averaged about 17-18% a year during the late 1950s and continues to grow at a rate of 12-14%. On the other hand, the price of low-density PE has not only bottomed, it has begun to rise in the face of rising costs after a long period of decline although the Economist argues that the recent 8% price increase "will make no difference to the demand".[2] Total UK low-density PE sales in 1970 approximated £50m. UK plant capacity was about 280,000 tons a year, some 40,000 tons more than home demand; 70,000 tons were exported and 30,000 were imported. Continental producers are currently (1971) selling low-density PE for £110-15 a ton, i.e., for £10-15 less than BXL's price. However, they are probably losing money by doing so because they are selling in a buyers' market. Once the excess supply situation prevailing within the EEC at the moment disappears, prices should rise. By and large, UK producers are competitive with Continental plants, in part because they produce a more sophisticated range of products to meet the more sophisticated demands of the UK market. Nonetheless, they face a seemingly permanent disadvantage in the form of higher electricity costs; electricity is their biggest single cost item after ethylene. At least some of the difference in power costs is due to the present import tax on crude oil (imposed in 1961) of £2 a ton.[3] Another, but less serious, problem confronting UK producers

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[1] Harvey Shepherd, "Widespread Growth in Store for Plastics," Globe and Mail (Toronto), 21 Jul 70, p.B1.

[2] "Chemicals: Polyethylene Watershed," Economist, 4 Jul 70, p.66. According to BXL, this article contains a number of serious inaccuracies.

[3] During the latter part of 1970, the c.i.f. value of Persian Gulf crude landed in the UK would appear to have averaged about £6 15s. a ton. Clearly, the oil tax, if not swingeing, is far from being picayune. Cf. W.L. Newton, "Letters," Economist, 14 Nov 70, p.4. See also Clive Callow, "Cost Inflation Threat to Chemicals Industry," The Times, 13 Nov 70, p.21.

is the general inefficiency of the country's process plant engineering industry which saddles them with higher capital costs than their Continental competitors.

There are five UK producers of PE according to a recent OECD report[1] on the plastics industry: BXL in Grangemouth, BP Chemicals in Grangemouth and Barry,[2] ICI on Teesside, Shell at Carrington and Monsanto at Pawley. BP does not make low-density PE, however, and low- and high-density PE are not entirely competitive in use. In 1965, the BXL plant was reported as being the "second largest" in the UK.[3] This situation still obtains. Estimated low-density PE plant capacities in 1970 are: ICI (120-150,000 tons), BXL (80,000), Shell (40-60,000) and Monsanto (40,000).

Normally, about 36% of BXL's PE output is 'purchased' by other BXL divisions, none of which have plants in Scotland. The remainder is either sold to independents in the UK, most of whom are outwith Scotland (but not all[4]) or exported.[5] Most of the intra-company sales involve the Flexible Packaging Division[6] with plants in Liverpool and Darton (near Barnsley, Yorks.) or the Cascelloid Division with plants in Leicester and Haltwhistle (the old British Xylonite works). In contrast, the Halex (consumer products) Division, London, which was sold at the end of 1970, took very little low-density PE.[7]

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[1] OECD, Plastics, Gaps in Technology Between Member Countries Series (Paris: OECD, 1969), p.152.

[2] In fact, BP Chemicals does not make PE in Barry.

[3] "Scotch Plus."

[4] Low & Bonar Ltd., Dundee; SOM Plastics Ltd., Denny (a postwar 'migrant').

[5] Some 10,000 tons or 13% of total output were exported in 1970. Related companies were among the buyers. Related UCC interests in Europe are a low-density PE plant in Antwerp and a 50% share in Unifos, a Swedish low-density PE company owned jointly with Chemi-Nord.

[6] Initially called the Film Division. It originated in 1963 with the purchase by BXL of a large independent film producer located in Liverpool. The change of name to Flexible Packaging reflects the importance of more sophisticated products such as PE sacks.

[7] Halex had been part of the British Xylonite contributions to BXL. Its sale because of inadequate profitability was presaged by the Chairman of DCL in his statement accompanying that company's report on the year ended 31 Mar 70: "The polyethylene and flexible packaging operations made particularly good progress but the results of some other /BXL/

Pricing policy since divisionalisation on 1 January 1970 is mainly the responsibility of the PE Division's General Sales Manager although major price changes would also involve the Division's General Manager and the BXL Managing Director. Prior to divisionalisation, policy was largely in the hands of the Business Manager for PE. This post no longer exists.

Prior to 29 June 1970 when the PE Division moved the HQs of its Sales Department to Grangemouth, most sales had been effected in London. The main purpose of the move was to eliminate the communication problems seemingly intrinsic to the previous corporate setup and thus to facilitate the coordination of sales, production and deliveries. Underlying this purpose was a situation which had been building up ever since the opening of the Grangemouth works. The following paragraphs sketch this development very briefly.

BXL's PE Division, it will be recalled, began life about 1957 as part of the Gemac Co., a division of UCL. The following year, UCL's parent company, UCC, decided to centralise its U.S. sales activities. Previously, each UCC manufactory had possessed its own sales department. Many of these departments had more than one office, i.e., field or branch offices were commonplace.[1] These 'excess' offices were now to be closed in favour of one enlarged central office. At the same time, the responsibility for order-taking and day-to-day liaison with production was to be transferred from Sales to a new Orders and Distribution Department.

UCL and Bakelite in the UK followed UCC's example in November 1959 with the help of some American experts sent to Britain specifically to 'advise' on reorganisation. In each case, the sales function was concentrated at HQs in London and a new Orders and Distribution Department was set up headed by a manager and two assistant managers, one for orders and one for distribution. These departments were seen by their

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divisions were for technical and market reasons most disappointing. Further attention has been devoted to management structure and the problems of the less successful businesses are being closely studied." Op. cit., p.30. Also sold recently was the Cascelloid Division's plastic toy manufacturing unit at Leicester.

[1] A similar situation prevailed at Bakelite between 1946 and 1958. Cf. Fielding, op. cit., p.72.

protagonists as ways of coordinating orders, production, stock control and distribution. PE can be taken as a partial[1] illustration of how they worked in practice.

Following centralisation, PE customers and field sales reps normally telephoned or telexed their orders to the O & D Department in London. Because the O & D personnel were not and could not be constantly on top of the fast-changing stock situation in Grangemouth 400 miles away, and since for technical reasons out-of-stock items could not be produced according to a definite timetable, usually the receipt of an order for PE was followed immediately by a telephone call to the works to determine availability, etc. The customer was then called back and told when delivery could probably be expected. Firm orders were retransmitted to Grangemouth or to a warehouse in England. With many customers wanting quick delivery, rapid intra-firm communications were essential. However, the procedural sequence just outlined was at best rather awkward. Furthermore, the sales personnel disliked the centralisation scheme imposed by UCC and maintained constant pressure against it. There were several facets to their argument apart from the initial disruption of established ways and the need for several of their number to move to London. It was claimed for example that centralisation had made sales work more impersonal and mechanical; that the Business Manager seldom saw an order anymore reducing his job satisfaction, morale and feel for day-by-day developments; that there was no necessary liaison between Sales and the O & D Department; that the customer was being confused by having two BXL contacts, one a salesman, the other an order-taker; and that the system was potentially a source of needless friction. In short, centralisation was bad enough but centralisation plus the O & D innovation was doubly distasteful. At the very least, the sales staff wanted a more streamlined London operation, sole access to customers and the right to deal directly on a day-to-day basis with Grangemouth.

In 1967 BXL called in McKinsey & Co. Inc., the management consultancy, at the instigation of UCC[2] to recommend ways of overcoming its

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[1] PE never did fully participate in the new organisational arrangement. Some sales reps were kept in the field and the distribution function remained in Grangemouth.

[2] McKinsey had earlier examined UCC's U.S. operations.

apparent lack of cohesion and dynamism. McKinsey proposed divisionalisation but the idea was not received enthusiastically by the then Managing Director. Instead, he divided BXL into four groups: 1) plastics materials 2) industrial products 3) consumer products (Halex) and 4) automotive products. Each group was made a profit centre. PE became one of five sections in the new BXL Plastics Materials Group, the others being PVC, industrial laminates, thermosetting resins and thermosetting moulding powders.

Despite this treatment, the BXL organisation still contained anomalies. For instance, Group 1's alleged function under the new arrangement was to supply inputs of intermediate goods to Groups 2-4, but in fact Group 1 also produced 'final' goods for sale directly to other manufacturers, wholesalers or even retailers, e.g., industrial laminates and PVC sheeting. The PVC and industrial laminates sections were transferred in due course to Group 2. Even so, the anomalies inherent in the group arrangement were never entirely eliminated, in part because the concept proved in practice to have a very short life.

By 1968 or so, UCC in the U.S. had become disenchanted with its centralised sales structure and with the O & D innovation. This disaffection soon spread to BXL where it augmented the growing dissatisfaction with the organization of the company along group lines. A new managing director was appointed in 1969. One of the first results of this act was a decision to proceed with divisionalisation which, as we have seen, became effective at the beginning of 1970. Slightly before the appointment of the new chief executive, the Group O & D Departments were abolished.

While PE is not the only BXL Division to combine decentralisation with divisionalisation, it has led the way,[1] partly for prestige reasons, but more importantly because it was the most dissatisfied member of the old Plastics Materials Group and thus the most ready to move given permission to do so. The PE sales personnel could theoretically have left London as early as March 1970 but were delayed by two things: 1) the lack of immediately available office space at the Grangemouth

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[1]For example, its sales staff decentralised, as mentioned earlier, on 29 Jun 70. The sales staff of the Warerite Division did not leave London (for Ayoliffe) until 21 Sep 70. The sales staff of the PVC Division moved to Ayoliffe even later in 1970. The sales departments of the Industrial Products and Thermosetting Divisions will leave London "in due course".

works 2) the need to train some new sales staff.[1]

Most of the other BXL Divisions see PE's new sales setup as an experiment. Many sales managers hope it will fail because they do (or did) not want to leave London. In fact, at the moment (April 1971) the experiment is not working out very well. Not only has it taken longer to find and train new staff than was anticipated, but the volume of sales work was under-estimated. Communications with production and distribution personnel have improved enormously; under the old setup delays and misunderstandings were seemingly inevitable. But a new communications problem has arisen to take the old one's place, viz., it has become more difficult to maintain contact with the Division's field sales reps. Those (a majority) readily accessible to London used to drop into BXL HQs weekly on an informal basis. The resulting exchanges of information were unplanned but valuable although their true worth was perhaps unappreciated at the time. Now these men work entirely from their homes. Informal meetings are a thing of the past. Their cessation cannot be evaluated in money terms - how do you cost sales foregone through ignorance? - but the loss is nonetheless real. Another adverse consideration which the move has brought to light is the existence of economies of scale in office operations. Office employment in the Grangemouth plant generally is considered by the London expatriates to be below the minimum economic size. Labour is frequently less specialised than in London and therefore less efficient.[2] In spite of these various problems, however, it is much too soon to write off the PE Division's experiment as a failure.

Purchases and Inbound Transport Costs

Ethylene gas (IV-271.3: 1958 SIC) is by far the most important item purchased by the PE Division. BP Chemicals is the sole supplier.

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[1] In October 1970, the Sales Department in Grangemouth employed nine persons. Most of the nine were new to BXL having filled vacancies left by previous employees in London who for one reason or another decided not to transfer when the opportunity was presented to them. The PE Division has found it hard to obtain aggressive and technically-minded sales trainees in the Grangemouth area. This problem was completely unexpected since an analogous situation had never arisen in London.

[2] Despite *prima facie* appearances to the contrary, it is unlikely that this observation by an interviewee was prompted by a recent encounter with the work of Adam Smith!

The gas is made 'next door' to the PE Division in one of BPC's ethylene steam crackers.[1] BXL receives its ethylene by pipeline at a price of about £40 a ton or 4.3d. per lb.[2] Inbound transport costs are negligible. While there is a purchasing department at Grangemouth, ethylene purchases are negotiated by the BXL Managing Director in London. It will be evident that the PE Division takes about ¼ of BPC's total Grangemouth output, a relatively large proportion. Still, adequate supply should never be a problem. If anything were to endanger BPC's ability to meet the demands of the PE Division from its Grangemouth works, ethylene supplies would simply be brought in from elsewhere. This has been necessary in the past on occasion and it could happen again. Total ethylene production in the UK during 1969 was in excess of 875,000 tons. Production in all of Western Europe during 1970 was some 6m tons.

The classified additives used by the PE Division are obtained outwith Scotland, mostly in England, though some are imported. Other routine purchases include paper and PE bags for packaging some of the output, and miscellaneous engineering stores. Normally, the PE Division is quoted a delivered price and the goods arrive by road.

Distribution

Formulation of policy. Distribution policy is currently the responsibility of the PE Division's General Sales Manager. Experts on the subject are available at BXL HQs in London for consultation but they have no line duties or powers. For many years, as described earlier, policy formation was nominally assigned to the old O & D Department in London. De facto control, however, has always been in Grangemouth. With the breakup of the O & D Department about the end of 1968, the nominal responsibility for PE distribution was shifted to the Director

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[1] The latest (No. 4) is a giant with an annual capacity of 250,000 tons. No. 3's initial capacity was only 70,000 tons a year but later modifications increased this to nearly 100,000 tons. Nos. 1 (1951) and 2 (1956) have now been dismantled due to obsolescence. As is the case with PE, ethylene manufacture is subject to enormous economies of scale. BPC for instance is building a 340,000-ton cracker at Baglan Bay, Shell is constructing a 450,000-ton unit at Carrington, while ICI has already completed what was in 1970 the world's biggest steam cracker, a 450,000-tonner at Wilton. Even bigger plants are being contemplated by the petrochemists.

[2] Ethylene currently sells on the Continent for about 3.5d. a lb. Four years ago, it cost twice that amount. Knight, "Petrochemicals," p.xvii.

of Marketing Services for the Plastics Materials Group. An interesting advertisement from this period appears in the Institute of Transport Journal.[1] Inserted by BXL's PM Group, it invites applications for the position of Distribution Officer. Particularly interesting are the following excerpts from the ad:

> BXL Plastics Materials Group is expanding and will soon be spending nearly £1 million per annum on distribution. We need a Distribution Officer to plan, organise and co-ordinate the distribution of our products from our factories and warehouses in the U.K. He will have overall control over distribution expenditure and he will ensure that it is spent as effectively and economically as possible. This is a new appointment. Applicants should be in their early or mid-thirties and have a good Honours Degree. . . . The Distribution Officer will be directly responsible to our Director of Marketing Services and will be based at Ayoliffe . . .

This position was eventually filled but shortly thereafter divisionalisation was announced and the post of Group Distribution Officer was abolished. The Group Director of Marketing Services in early 1969 is now General Manager of the PE Division.

Order processing, like distribution, was part of the O & D Department in earlier times. It continues to be closely related to distribution matters today coming as it does under the immediate control of the General Sales Manager. Stock control on the other hand, another nominal function of the old O & D Department, is now the responsibility of the Production Control Room Manager who reports, not to the head of sales, but to the Plant Manager. The Plant Manager is also the immediate superior of the Warehouse and Distribution Manager (see organisation chart below).

Policy in Practice. All PE is sold on a delivered price basis with one insignificant exception, to wit, PE scrap which is sold ex-works. All distribution is by road. Three main methods are employed: 1) own-account tankers (filled by driving the tankers under elevated silos), 2) for-hire transport for PE sold in paper or PE bags, 3) for-hire transport for PE sold in metal-framed, low-density PE bins. A sizable fleet of tankers has been built up since they were first used early in 1966. Each has a payload capacity of 18 tons. Although a tractor/tanker combination today costs c. £10,000, BXL prefers to use this method of delivery wherever possible for several reasons. First,

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[1] XXXIII (March 1969), p.viii.

the company has an historical predilection for own-account transport.[1] Bakelite Ltd., for example, traditionally operated its own vehicle fleet, in part because of the small-lot nature of many of its shipments. When BXL decided in 1966 to begin distributing PE by tanker, it was a facile but largely uncosted additional step for it to decide to do the job itself. Second, it takes much less time to fill a tanker than to fill an equivalent number of bins each of which has a capacity of only one ton. This point is easily illustrated. To load 18 tons of PE into a tanker takes one manhour but to load 18 1-ton bins takes 9 manhours. Since tankers are only used for full loads, their loading advantage is of fundamental importance. It might be argued that with bins, several different grades of PE can be combined in one lorryload. However, tankers are readily divided into compartments, thereby achieving the same effect. Third, bins are frequently used by customers for storage purposes and BXL may have considerable difficulty in getting them back without a lengthy delay. Since the bins are owned by BXL and since they cost c. £85 apiece, this problem can be costly. Finally, packaging PE in bags is relatively slow and involves the loss of the packaging material.

Quantity discounts are offered in connection with distribution by bin or bag beginning at 14 tons. Lesser orders incur a surcharge. A surcharge is also levied on deliveries by bin regardless of the amount being purchased because of the turnaround problem.

A large warehouse is maintained by the PE Division immediately adjacent to its production facilities. An overflow warehouse elsewhere in Grangemouth is utilized on a for-hire basis as required. BXL as a whole (rather than specific divisions) owns a number of warehouses in England and they are available for use by any part of the company. The PE Division finds that these English depots serve two main purposes: 1) they enable it to service small-lot customers, 2) they enhance its competitive position by facilitating quick delivery. As implied earlier, quick delivery is an important competitive weapon especially

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[1] This predilection is not shared by all chemical firms. For instance, BP Chemicals and Marbon Chemical in Grangemouth apparently subcontract much of their need for transport. Shell has formed a separate transport company. The BXL PM Group Distribution Officer hired in 1969 planned *inter alia* to evaluate the continued wisdom of own-account transport operations but nothing came of this intent.

when many customers expect to receive their orders the day after they are placed. It would be impossible under existing conditions to handle all such orders directly from Grangemouth. Liverpool, Manchester and Barton are guaranteed bulk delivery within 24 hrs. of an order being placed while Haltwhistle is guaranteed bulk delivery within 12 hrs. But deliveries in the Southampton area entail a 4-day round trip, in part because of inadequate roads in places, but more importantly because of the law limiting drivers to 10 hours' continuous duty. The gradients in the Shap Fells used to cause delays during the winter sometimes but this problem has been largely eliminated by the new motorway connexion. All lorry drivers employed by the PE Division work out of Grangemouth with the exception of three based permanently in Carlisle to facilitate deliveries to Liverpool (20 tanker-loads a week in late 1970).

Taking a broader view of distribution, we can conclude that the function has received relatively little management attention until recently. As a result, operations have been adequate - critical bottlenecks have been avoided or quickly eliminated - but by no means optimum. Policy in effect has been simply to 'keep the stuff moving'. This situation is beginning to change, however, partly as a consequence of divisionalisation, but more significantly, due to the effect of the temporal decline in product value on the size of the distribution cost/turnover ratio. For a long time, this ratio was ignored, if it was calculated at all, because it was microscopic or felt to be so. But it is too big to ignore any longer.

Transport Costs Relative to Turnover

Inbound transport costs as we have seen are negligible. Outbound transport costs are roughly £5 a ton (½d. a lb.) or 4.0% of turnover. This percentage includes the direct outlays by the PE Division on packaging, transport and warehousing. It excludes relevant indirect costs such as administrative overheads and depreciation charges on the storage silos, the warehouse, the tankers and the bins, and direct expenditures on sales, advertising and order processing.

General Operating Experience

Capacity has been expanded frequently during the 13-year life of the Grangemouth plant from 40m lbs. (c. 18,000 tons) a year in 1958 to c. 70m lbs. (c. 31,000 tons) at the time of the UCC-DCL hookup to 175m lbs.

(80,000 metric tons) in 1970 indicating both profitability[1] and the enormous economies of scale mentioned earlier. To date, UCL/BXL has benefitted more or less continuously from a seller's market enabling it to operate consistently at or close to capacity. Despite the four-fold increase in plant size, BXL is still not utilizing a large part of its approximately 50-acre site. In other words, it is obvious that large-scale expansion was anticipated right from the beginning.

Organisational developments have mostly been set out previously. It is necessary to add here only that Grangemouth, until divisionalisation, was essentially a manufacturing centre although the production function was supplemented by small purchasing, distribution and technical departments in the interests of efficiency rather than adherence to any specific organisational concept. We turn now to a brief examination of the structures of BXL and the PE Division as they exist today.

BXL's head office as stated earlier is in London. The accounting function and the company's computer however are in Tyseley, the historic nerve-centre of Bakelite Ltd. There are eight operating divisions: PE in Grangemouth, Cascelloid in Leicester, PVC in Aycliffe, Flexible Packaging in Liverpool, Overseas in London, Industrial Products in Manningtree, Essex and Thermosetting and Warerite in Tyseley. Five of these divisions are multi-plant in structure, partly for historical reasons (Flexible Packaging, Overseas, Cascelloid and Warerite) and partly because of overcrowding at the Tyseley site (Thermosetting and Warerite).

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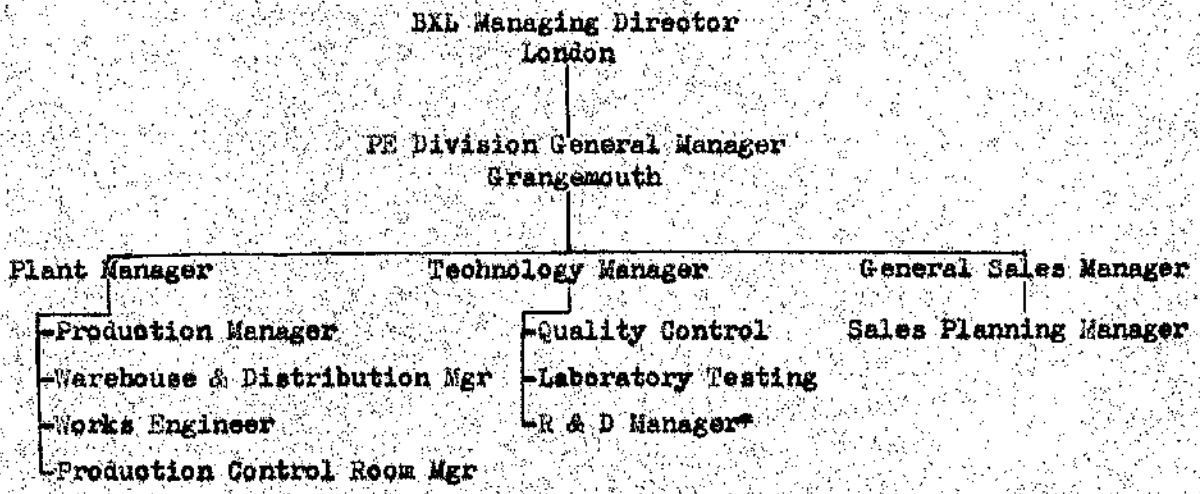
[1] In 1965, the BXL PE plant was being referred to in the press as a "definite success story - a steady process of organic growth". DCL prior to 1967, when it sold the bulk of its chemical interests, normally aimed at a 15% return on its investments in chemicals although sometimes for "defensive" reasons it would continue to invest in going concerns even after profit expectations had declined. Also, chemicals were never as profitable as whisky. See "Scotch Plus." As pointed out earlier, BXL in 1969 earned 9.0% (pretax) on its invested capital, a respectable figure but not a particularly impressive one when set against equivalent figures for DCL (17.0%) and UCL (14.0%). On the other hand, available evidence suggests that the PE Division, a separate profit centre, did rather better than BXL as a whole. According to the Economist (4 Jul 70), the ROI on PE generally in GB is only about 5% at the moment "and this is not enough to generate the funds for new plant". This 5% figure would appear to be an after-tax measure of profitability but unfortunately its precise meaning remains ambiguous. Nonetheless, it seems clear that BXL's PE Division is doing at least as well as its competitors and probably better than most.

The Warerite Division for example has an old production facility in Tyseley, a brand-new one in Aycliffe and a veneering and cutting plant in Ware. Aycliffe will probably succeed Tyseley eventually, if it has not already done so, as the single most important BXL production centre for three reasons: 1) availability of space, 2) availability of labour, 3) its Development Area status. Already it is the heart of BXL's R & D activities. Each of the divisions has considerable autonomy with regard to such functions as purchasing, production, order processing, sales and distribution, but capital expenditure remains the prerogative of the centre.

An organisation chart for the PE Division is portrayed below.

Organisation Chart
Polyethylene Division, BXL
October 1970



*His staff together with the Division's technical service personnel are currently in Aycliffe.

External Contacts

Contact information relating to the PE Division is relatively limited although it was possible to circulate our contact questionnaire to three members of the managerial cadre directly affected by the relocation of the Sales Department's HQs. The findings from this brief survey are presented in this section together with relevant interview results.

Customers. Of note first is the daily frequency of contact between the Production Control Room Manager and customers. This manager it will be recalled is responsible for stock control. Furthermore, he

shares an office with the Sales Planning Manager. Although the two men report to different bosses, their duties dovetail extremely closely. It will be noted secondly that the General Sales Manager meets customers face-to-face weekly (on average) away from the plant implying considerable travel on his part.

Category of Manager	Frequency of Contact	Main Contact Method
General Sales	Weekly	Face-to-face away from works
Sales Planning	Daily	Telephone
Production Control Room	"	" "

Suppliers of goods/materials.

Category of Manager	Frequency of Contact	Main Contact Method
General Sales	Never	n/a*
Sales Planning	Infrequently	"
Production Control Room	Weekly	Post

*not applicable

Suppliers of services and suppliers of capital equipment.

Category of Manager	Frequency of Contact	Main Contact Method
General Sales	Never	n/a
Sales Planning	"	"
Production Control Room	"	"

BXL personnel located elsewhere. Of particular note is the daily frequency of contact between each of the three managers for whom we have information and other parts of the BXL organisation (especially the technical services personnel in Aycliffe and the field sales reps) making use of the telephone or telex imperative.

Category of Manager	Frequency of Contact	Main Contact Method
General Sales	Daily	Telephone
Sales Planning	"	" "
Production Control Room	"	Telex, telephone

As indicated previously, the need to improve communications between the sales, production control and distribution functions was the main reason for the relocation of the sales HQs. Prior to relocation, the telephone had been by far the most important communications link between London and Grangemouth despite the existence of telex facilities in both centres. The reasons for this preference situation are both illuminating and somewhat unexpected. In short, the telephone (STD, not a private line!) was preferred to telex because it was faster.

Given the frequent need to arrange next-day delivery, extremely rapid communications were vital. A reliance on telex would have meant that sales personnel could not have gotten through to Grangemouth from London or vice versa if the telex machines at either end had been engaged. The telephone on the other hand normally permitted instant access by means of multiple lines and extensions. Although BXL had private lines between London and Birmingham (2) and between London and Aycliffe (2), the sales staff did not want one between London and Grangemouth despite the seeming attractiveness of such a link because of their need for immediate access. They argued that private lines encourage non-productive socializing thus cutting down on line availability, and that they give rise to questions of priority - when telephone demand exceeds supply, who gets access to the private line first?

STD in the experience of the PE sales personnel has proved to be a very satisfactory service with few delays or breakdowns. The existing Grangemouth telex machine on the other hand has been plagued by an exasperating series of technical defects. Its main uses at the moment are: 1) the transmission of technical specifications, 2) to advise of air arrivals and 3) arranging/coordinating machinery imports from the U.S., etc.

Bakelite Ltd. used to have a teleprinter or private telex system linking its London HQs with the manufacturing units at Tyseley and Aycliffe and with the warehouses at Wembley, Bredbury (near Manchester) and Pennsnett (near Tyseley but now closed). Upon the formation of BXL the benefits of extending this system to include Grangemouth were evaluated but they were not felt to justify the costs. This conclusion still holds.

Communications between Grangemouth and the accounting and computer personnel in Tyseley are normally conducted by post. This arrangement appears to work very satisfactorily.

An interesting intra-firm communications problem arose in connexion with the transport of PE from Grangemouth to Liverpool. It will be recalled that BXL took over a large, independent Liverpool producer of PE film in 1963. Between the takeover date and 1967, PE orders from the 'new' manufacturing facility were sent to London in the normal manner where they were retransmitted to Grangemouth. The system proved unwieldly but workable as long as the Grangemouth plant sent its PE granules to Liverpool in bags. However, this method of distribution

was dropped early in 1966 in favour of tankers. The shift to tankers had been an integral part of the major PE expansion programme undertaken by BXL during 1965. This programme included the construction of bulk storage silos and a warehouse in Grangemouth, the purchase of a tanker fleet, and the building of storage facilities in Liverpool. Although the use of tankers was meant to enhance efficiency, initially it had the opposite effect. The Liverpool manager, somewhat idiosyncratically from the viewpoint of the production control and distribution staff in Grangemouth, launched a policy of keeping his PE stocks to a minimum. This policy prevented the establishment of regular deliveries between Grangemouth and Liverpool or agreement on a standard grade mix, and the triangular communications system centred on London began to break down under the weight of the constant changes in standing orders. Consequently, the system was altered. During 1967, Liverpool began to telex its orders directly to Grangemouth. Following delivery, Grangemouth would notify the O & D Department in London who would then arrange for the invoicing of Liverpool. Three results ensued: 1) a closer rapport between Liverpool and Grangemouth fostered by the change to direct communication, 2) an improvement in the efficacy of the frequent technical discussions between the two centres with regard to the properties of particular consignments of PE and 3) a gradual modification of the policy decision which had precipitated the alteration in communication procedures in the first place. It might be assumed that this problem and its successful solution are the sort of thing that would attract careful costing. In fact, costs appear to have played an exceedingly minor role in determining the course of events!

Communication Costs

BXL maintains separate communication cost accounts but in Tyseley. Our interviews were conducted in Grangemouth and it was not possible to secure easily the type of information necessary for the computation of communication cost/turnover or CC/net output ratios.

Of interest here is the fact that the decentralisation of the PE Sales Department in June 1970 was preceded by a special three-month survey of telephone usage initiated in January 1970 by the BXL Director of Administration[1] in conjunction with the Post Office and the manager

[1] This post has now been abolished and the incumbent has retired. It was especially created for an ex-company secretary three years prior to his scheduled retirement.

of BXL's London office. Surprisingly, the results have not been seen by the sales managers in Grangemouth but they assume that the survey supported the decision to decentralise.

While the effect on communication costs of the Sales Department's move to Grangemouth has not been evaluated by the PE Division, it was argued during an interview that any cost increases have been more than offset by the savings on office overheads in London.

Travel

Our survey of travel is limited to the same three managers discussed earlier under the heading, external contacts. The results appear below.

Travel Purpose: To See	Travel Frequency by Category Manager		
	General Sales	Sales Planning	Production Control
Customers	Monthly	Infrequently	Never
Suppliers of goods/ materials	Never	Never	Yearly
Suppliers of services	"	"	Never
Suppliers of capital equipment	"	"	"
BXL personnel located elsewhere	Monthly	Infrequently	Monthly
Other	n/a	Never	Yearly*

*Training courses.
n/a = not answered.

We saw previously that the General Sales Manager meets customers face-to-face weekly away from the works, and it was suggested that this contact pattern implied considerable travel. Here we see that he travels monthly (on average) to see customers. Prima facie there seems to be a discrepancy between the two sets of answers. However, it could be that some of his weekly contacts take place within or near Grangemouth, although away from the plant, and that he has interpreted the questions on travel as referring only to more extended trips. Be that as it may, we can also compare and contrast the situation portrayed by the penultimate line in the above table with that prevailing prior to decentralisation. The General Sales Manager (then called Business Manager), until he actually moved to Grangemouth, used to travel there more than once a month to meet with the Plant and Production Control Room Managers, etc. The Sales Planning Manager used to spend two days a month in Grangemouth reviewing sales trends and preparing a monthly sales forecast

in conjunction with the production staff. These trips (and similar ones not detailed here) are obviously no longer necessary. Thus, decentralisation can be said to have brought about a reduction in the Sales Department's travel costs (other travel costs may or may not have fallen - no information has been gathered on this point). Air was the favoured travel mode prior to decentralisation. There were no complaints concerning either facilities or services.

The Sales Planning Manager was asked whether or not a Confraphone system could have been substituted for at least some of the trips which he used to make to Grangemouth. His answer was "no". Not only did his meetings involve the use of considerable documentation, they gave rise to new documents. Confravision, on the other hand, might have reduced the technical need to travel, but in cost terms it appeared to be prohibitively expensive, at least for sales planning purposes.

The Outlook

Demand for PE remains strong although there are indications that its traditional buoyancy is beginning to wane, if only slightly. UK producers can be expected to continue expanding,[1] especially if the current round of Common Market negotiations fails.[2] Turning more specifically to BXL, the PE Division has underway currently a £5m expansion programme at Grangemouth designed to boost capacity from 80,000 to 100,000 metric tons a year. Announced in 1970, the work is scheduled for completion by the end of 1971. Further expansion will undoubtedly take place towards the middle of the decade. Long-term market and supply conditions look favourable, land is available and the plant is competitive.

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[1] According to the Economist (4 Jul 70), the industry plans to augment its productive capacity by 150,000 tons a year by 1974, an amount equal to roughly twice the 1970 capacity of the BXL plant. Like the hog business, the PE industry has been characterised historically by alternative periods of shortage and surplus. When conditions are favourable, everyone expands. When surpluses appear, no one does.

[2] If the negotiations are successful, it is conceivable that the SE portion of the UK market might be divided increasingly between British and Continental producers. Individual plants would find their market areas progressively restricted to a radius of about 350 miles.

CHAPTER 14

H.J.B. PLASTICS LIMITED - A CASE STUDY

Summary

Location of Scottish factory: Abbotsinch Rd., Grangemouth, Stirlingshire.

Approximate distances: Glasgow (26 miles), Edinburgh (25), London (398), Leicester (300).

Order & MLH: XVI-496 (1958 SIC); XIX-496 (1968 SIC).

Commencement of production: 1965.

Capital employed: n/a but very modest.

1970 employment: c. 65.

1970 turnover: n/a.

Products: standard PVC stationery items, e.g., ring binders, transparent flexible folders, cases, etc.; certain higher-priced PVC lines.

Average product value: n/a precisely but over £1,000 a ton.

Type of production: batch.

Main market: UK

Organisational status and ownership: the PVC Division of H.J.B. Plastics Ltd., Leicester.

Assessment of transport factor: inbound transport costs - nil; outbound transport costs = 2.5% of turnover. Distribution policy has received considerable attention in recent years. The PVC Division currently subcontracts its distribution function. Transport was not a major location factor.

Assessment of communications factor: the PVC Division makes use of telex as well as the telephone. The latter service has been found seriously wanting although the situation is improving. Non-cost communication difficulties played a part in the granting during 1970 of increased autonomy to the Grangemouth operation. Lack of communication cost records precludes the calculation of a CCGO ratio for the PVC Division.

Corporate Background

H.J.B. Plastics Ltd.(HJBP) originated in Leicester as a private, unquoted company. It was purchased outright by British Cellophane Ltd. (BCL) in 1960. BCL is a Courtaulds subsidiary[1] and has its HQs

[1] Courtaulds in 1970 held 75% of the ordinary shares. See Courtaulds Report and Accounts, 1969-70, p.21. BCL was set up by Courtaulds in 1935 in association with a French firm, Comptoir des Textiles Artificiels, to manufacture viscose (cellulose) transparent film. A Brief History of Courtaulds(London: Courtaulds, 1969), p.20. It remains the nucleus of Courtaulds's profitable packaging interests which in 1969-70 contributed 6.2% of Group sales but 9.8% of pretax profits.

in Bridgwater, Somerset. Unfortunately for our purposes, Courtaulds publishes its accounts on a consolidated basis. Moreover, BCL and Courtaulds's other packaging interests, e.g., Betts and Co. Ltd., form only a minor part of total Group activity. Thus, the Courtaulds financial position offers only a very limited guide to that prevailing at HJBP. On the other hand, key figures for the Group as a whole such as the profit/sales ratio and the return on capital may provide insight into the financial performance expected from each member of the Group. According to The Times 1000: 1970-71, these figures were 10.7% and 14.7% respectively.[1]

Location Factors

HJBP had a number of interests while it was a private company, one of which was PVC (polyvinyl chloride) converting. This interest is alleged to have given the firm a great deal of difficulty, absorbing in the process a disproportionate amount of management time relative to its contribution to turnover. Confronted with this "untidiness", the former owner decided c. 1964 to move his PVC operation to a different locale with a view to assessing definitively its intrinsic viability. A suitable factory was found near Great Yarmouth in Norfolk.[2] However, it was abandoned some six months later in favour of Grangemouth following a deterioration in the relationships between the former owner and the local authority.

While one can adduce a number of reasons for the selection of of Grangemouth in 1965 on both a posteriori and a priori grounds, it is not clear given the highly individualistic traits commonly attributed to the former owner that any of the more obvious explanations were decisive or even proximate in their effects. Thus, for example, one

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[1]The figures refer to the year ended 31 Mar 70. In both cases, the profit numerators represent net profit before interest and tax.

[2]An ample supply of female labour has traditionally been an important locational consideration for the PVC side of HJBP. Thus, it is not improbable that two interrelated factors played a large part in the decision to locate in East Anglia: 1) the low female participation rates in the region during the mid-1960s, 2) the efforts by several local authorities in North Norfolk at the time to attract small firms with a view to diversifying the area's industrial base away from agriculture and staunching emigration by the young. Hunt Report, App. C and para. 288.

might mention the availability of female labour in the Grangemouth area, the availability of subsidised advance factory accommodation from the local authority, the designation of Grangemouth/Falkirk by the November 1963 White Paper on Central Scotland[1] as one of six major growth areas[2] in which inducements to industry of the type already on offer in Development Districts were to be made available, the availability in Grangemouth during 1965 of i) accelerated depreciation, ii) grants equal to 10% of the cost of new machinery and equipment, iii) special grants and loans from the Board of Trade,[3] or finally but by no means necessarily of least importance, Grangemouth's general reputation as a go-ahead place. Undoubtedly, not all of these factors were unimportant (despite a quip by the present management that "we are in a good spot by chance"!) but available evidence suggests that the central government incentives may have played much less of a role than some of the other variables. For instance, whereas the bulk of the machinery installed in 1965 was used and therefore ineligible for accelerated depreciation, etc. having been transferred to Grangemouth at the former owner's expense from Leicester via Norfolk, the local authority's advance factory inducement and a concomitant 5-year rent subsidy were of immediate significance. Furthermore, as we have already seen, female labour supply was an everpresent consideration. It should be noted on the other hand that HJBP since its purchase by BCL has taken full advantage of the Development Area benefits instituted by the Labour Government. That is to say, while regional policy measures had relatively little effect on HJBP in the short run, over the longer term they have been of considerable help to the firm.

Products

PVC converters usually manufacture one or more of three distinct categories of product: 1) novelty items, 2) standard, relatively low-cost stock items such as stationery lines, 3) higher-priced goods. Between 1965 and 1969, HJBP confined itself to the second category. In 1970, it introduced a range of items in category three[4] with a view

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[1] Scottish Development Department, Central Scotland: A Programme for Development and Growth, Cmnd. 2188(Edinburgh: HMSO, 1963).

[2] These growth areas were defined as "potentially the best locations for industrial expansion" in Central Scotland. Ibid., p.5.

[3] Cf. McCrone (1969), ch. V.

[4] No specific examples have been mentioned at the firm's request.

to achieving a better product mix and "to maximise turnover within existing resource constraints". To date HJBP has eschewed category one products.

Production Technology

Production is on a batch basis and is usually planned three weeks ahead of actual manufacture. Operations are relatively labour-intensive. The scope for a reduction in long-run unit costs through economies of scale is considerable, especially if the increase in volume is associated with an increase in average order size. Larger orders mean fewer machine alterations, enhanced operator efficiency and fewer rearrangements of the factory layout. Larger throughput however (which may or may not be associated with an increase in average order size) normally gives rise to advantages per se in the form of augmented bargaining power vis-à-vis suppliers and thus better supply prices, service, etc.

Typically, three to four weeks elapse between receipt of an order and despatch although, as in the case of most frequency distributions, dispersion around this mean ($\bar{x}$) can be considerable. In general, the more standard the item, the narrower the order receipt-despatch gap.

Markets and Marketing

HJBP's PVC Division markets nationwide. It was beginning to think about export possibilities in 1970 but is unlikely to go much further than that in the near future. Its main customers currently are other manufacturers and wholesalers. Marketing methods include direct mailings, field displays and references both from other parts of the company and from elsewhere in the Courtaulds Group generally. A constant aim, for reasons noted previously, is to increase the average size of order. "Customer education" is one of the main means used to this end. The marketing function has been domiciled in Grangemouth since the beginning of 1970, largely in the person of the Division's General Manager who not only determines the overall sales strategy but also handles directly all of the key sales accounts. Prior to 1970 this function was located in Leicester at HJBP HQs. A sales staff is still maintained in Leicester to take advantage of previous southern contacts and the proximity of the sales organisations set up by the other HJBP divisions. This staff consists of an office-bound sales

correspondent, a field representative and a shorthand-typist. A full-time sales correspondent was hired at the end of 1970 for the Grangemouth office. Earlier, sales matters were handled on a part-time basis by the secretary to the General (and Marketing) Manager.

PVC converting is an intensely competitive business but one where price is rather less important than service, product quality and uniqueness of design, and where rapid growth has enabled even low-profit ventures to survive. Shoestring ("shed") operations are commonplace reflecting the industry's lack of extensive capital requirements and the consequent ease of entry.[1] Most of these operations are vitally dependent on one man, the economist's 'entrepreneur', and thus are seldom competitive on an all-round basis. As has been well-documented by others, few small businessmen are competent in all aspects of their businesses.[2] Most will naturally stress or favour those areas of particular interest to themselves leaving the rest to less certain direction. Marketing and finance often pose the knottiest and most potentially lethal problems.[3] Consequently, it is not surprising that there are few really big independent PVC converters in the UK.[4] HJBP's PVC Division of course has the financial backing of the entire Courtaulds Group. Equally important, its General Manager is a professional businessman rather than a PVC specialist having joined HJBP only in January 1970 after some time with BCL.[5] Not only is he not emotionally involved with any one aspect of the business but he is in the process of building up a team of functional specialists whose existence will enable him to maintain a generalist perspective. One of these specialists is an industrial designer, hired locally about August 1970, and a comparative rarity in the PVC converting game.

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[1] A recent article on plastics in Canada quotes the president of the Society of the Plastics Industry as saying that converting is "a business you can get into with little capital" although a number of entrants "have trouble staying alive". He forecast an annual growth rate of 15% for the conversion side of the industry but stressed that product innovation was the key to profitability given entry conditions. Shepherd, "Widespread Growth," Globe and Mail, 21 Jul 70, p.B1.

[2] "The man who runs a small new business is likely to be an amateur in all, or most, of the managerial activities he undertakes." Tom Lupton, "Small New Firms and Their Significance," New Society, 21 Dec 67, p.890.

[3] Cf. ibid., pp.890-92; John Barr, "What Place for the Family Firm?" New Society, 26 Oct 67, pp.578-80.

[4] Cf. Dunning and Thomas, British Industry, pp.158-61.

[5] Indeed, he remains technically a BCL employee.

It will be obvious from the foregoing that HJBP is seriously committed to the maintenance of a competitive PVC Division. PVC of course has a very wide variety of potential applications.[1] Moreover, it and the other HJBP interests appear to have a more dynamic future than BCL's bread and butter line, cellulose film.[2] Furthermore, the PVC Division would seem to be well-located to meet the challenges of the marketplace. A comment by the General Manager is very apropos in this regard. Observing first that PVC converting in Britain was concentrated in the Midlands and the SE, he then argued that HJBP's PVC Division had not generally been viewed by fellow-converters as a serious competitor until recently because of its location, out of sight as it were, "away up in Scotland". This situation was now changing only because of recent advertisements by the Division in trade journals for specialist staff. Competitors suddenly realised that anyone taking on specialist staff was not entirely out of the running.

Purchases and Inbound Transport Costs

Soft PVC sheet (IV-276; 1958 SIC) in the form of rolls of various lengths, depending on sheet thickness, is the main input to the Grangemouth works. PVC is the cheapest plastic on the market and is available in many different grades. PVC sheet can be produced in varying thicknesses from 2/1000s of an inch upwards. It can either be smooth or embossed. Chromatic colour or fillers for opacity can be added on a bespoke basis during the precalendering mixing process or they can be entirely omitted to produce a transparent sheet.[3]

PVC, bulk production of which began (in the UK) in 1944, is today one of the two most widely used plastics in Britain (the other being polyethylene). Powdered resin consumption in 1970 exceeded 300,000 tons at an average cost per ton of over £100.[4] Almost a quarter of

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[1] Cf. Part Two, "Plastics Applied," in Couzens and Yarsley, op. cit.

[2] Ibid.; Michael Ryan, "Annual Review of British Business: XXVIII-Rates of Growth Vary in Packaging Materials," Financial Times, 27 Jul 70, p.22; "British Cellophane did a little better than the previous year, largely due to new activities." Statement by the Chairman, Lord Kearton, at the 57th Annual General Meeting (London: Courtaulds, 1970), p.9.

[3] Cf. Couzens and Yarsley, op. cit., passim (see index).

[4] Clive Callow, "ICI and BP Chemicals Put Up Key Plastic Price," The Times, 6 Jan 71, p.17. See also the chart showing PVC price trends in Britain during the 1950s and 1960s in Knight, "Petrochemicals," p.xvii.

this total was accounted for by imports. ICI, BP Chemicals, Vinatex and BXL are the top four domestic producers in that order but their market shares vary enormously. All production is in England or Wales. Recently BP expanded its PVC capacity at Baglan Bay to 185,000 tons a year while Vinatex doubled its capacity at Staveley to 50,000 tons. According to one estimate, domestic sales could reach 500-600,000 tons a year by 1974-75.[1] Reddaway, writing in 1956-57, argued that "Comparatively few producers of plastics materials use them themselves to make plastic goods . . ."[2] This assertion would appear to be less true now, a decade and a half later,[3] although it remains relevant to the HJBP situation.

Soft PVC sheeting is made by calenders via a highly capital-intensive process from two basic ingredients: powdered PVC resin and a plasticizer. As is true of the resin, sheet production is concentrated south of Hadrian's Wall though not exclusively so. Nonetheless, until the latter part of 1970, all of HJBP's PVC requirements were supplied by southern sources reflecting in large measure the location of the buying function in Leicester. This function moved north to Grangemouth about mid-1970. Shortly thereafter an active investigation was launched into the feasibility of buying from Scottish supply sources, not so much for price reasons since PVC sheet is normally sold on a uniform delivered price basis and price is less important than product quality or service, but in the hope of creating closer ties with suppliers. Closer ties involve a combination of greater goodwill, better service and better price with the emphasis on the former two. It was felt that these goals would be more easily achieved if suppliers were geographically nearer. The search was partially successful. HJBP has started buying some of its PVC requirements from an Edinburgh producer.[4] It is prepared to buy more in Scotland but cannot as yet obtain some of its needs.

All PVC inputs arrive at the Grangemouth works by road. As suggested above, inbound transport costs are not identifiable. Transport

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[1] "Rapid Growth Predicted for PVC Industry," The Times, 21 Oct 70, p.22.

[2] Reddaway, "The Chemical Industry," in The Structure of British Industry, I, p.257.

[3] Cf. our case study of BXL.

[4] Duraplex Industries Ltd., a fellow 'migrant' from England (London), which opened its Scottish branch in 1948.

arrangements are left entirely to the supplier. Order leadtimes average about three weeks. No purchases are made from other members of the Courtaulds Group for practical rather than policy reasons.

Distribution

Formulation of policy. Since the beginning of 1970, distribution policy has been set up by the General Manager of the PVC Division but policy execution has been the responsibility of the Works and Distribution Manager. Prior to 1970, policy would appear to have been formulated in Leicester and executed in Grangemouth. Policy today is not kept under continuous review but is subject to scrutiny at relatively frequent intervals.

Policy in practice. Normally, the PVC Division quotes on a delivered price basis, i.e., it absorbs freight costs. However, when order values are £10 or less, buyers are charged a flat delivery fee of 10s. This fee is designed to cover on an average cost basis both transport outlays and handlings costs and is really more of a distribution than a transport charge.[1] Being a batch producer and given the nature of the market and demand conditions, the Division utilizes no depots apart from limited storage space at its works.

While the Division owns a small van, it is used mainly for odd jobs. The transport function has been largely subcontracted, initially to local road hauliers, but more recently to British Road Services(BRS). Subcontracting is seen as a way of avoiding the "prohibitive" costs of vehicle fleet ownership. The substitution of BRS for local hauliers reflected a number of considerations including better service, better rates and a greater ability to cope with both a wide range of shipment sizes (from a few lbs. to 30 cwt.) and widely dispersed consignees. Perhaps most important however was the existence of a group contract between Courtaulds and BRS. On the other hand, NJBP is not forced to partake in this arrangement which tends to affect price more than service. Since the latter is more important than the former to the PVC Division, it feels free to adopt whatever arrangement is in its own best interests. And in fact, distribution policy for the Grangemouth works is again under active study. It is worth noting at this point that very small shipments have traditionally been despatched from Grangemouth by post. This

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[1] On the difference between distribution and transport, see Part One, "Distribution," in M.S.V. Turner, Freight Transport Planning and Control(London: Business Publications Limited, 1966).

distribution method accounts for about 3% of total shipments and is unlikely to be abandoned regardless of the outcome of the current policy review.

An interesting aspect of distribution in the broadest sense is the handling of customer inquiries. The PVC Division has as an internal objective the maintenance of a 72-hr. service on all customer requests for information whereby samples or other relevant material are despatched within three working days of the receipt of an inquiry. Not uncommonly, this service involves the use of air freight and, in exceptional circumstances, samples can be in the hands of the inquirer within three days.

Transport Costs Relative to Turnover

As we have seen, the PVC Division's inbound transport costs are effectively nil. Outbound transport costs comprise 2.5% of turnover.

General Operating Experience

HJBP's growth aspirations appear to have been relatively limited while it was a private company. Also, the PVC operation may have suffered somewhat from the 'shed' mentality referred to earlier. However, this situation has undergone a sea-change since the takeover by BCL in 1968 and the subsequent replacement of the management. Output has been raised substantially, employment is now double the 1965 figure of c. 33, the firm has moved into bigger premises (on the same thoroughfare), greatly increased autonomy has been devolved upon the Grangemouth operation, a new dynamism has been engendered and continued growth has been established as a key objective. Labour availability in the Grangemouth area has proved more than adequate, the average quality of the labour is felt to be higher than in the South while total costs are considered to be much the same as would obtain in the Leicester area. In short, the new owners have found their Grangemouth location, broadly speaking, to be very congenial. One major problem has been encountered however, viz., difficulties in management recruitment.[1] Whereas Scotland does not appear to be generating enough indigenous talent, English managers in the experience of BCL are either frequently not interested in a Scottish posting or they come, not always enthusiastically, for a limited

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[1] Cf. Garnsey (1965, p.57) who noted that "In Courtaulds, intra-Group transfers play a prominent part in filling senior posts."

period only as a necessary step in their career ladders. Short-stay English 'draftees' are not viewed by BCL and HJBP as being of great help in building up a dynamic management team in Scotland committed to the future of the PVC Division, in part because they tend to spend too much time worrying about head office developments to the detriment of what should be their more immediate interests.

HJBP in Grangemouth was essentially a production unit between 1965 and 1 January 1970 when the divisionalisation of the company became effective. Most functions relevant to the PVC operation - buying, marketing, accounting, etc. - were based in Leicester as were all of the other HJBP production facilities. Following the takeover by BCL, the Grangemouth works was made the responsibility on an interim basis, i.e., until divisionalisation, of an HJBP director in Leicester.

Divisionalisation was probably inevitable once BCL took charge inasmuch as it was Courtaulds policy generally.[1] On the other hand, it was apparent from HJBP's pre-divisionalisation experience that greater autonomy for the Grangemouth operation was essential if it were to realise its maximum potential. Coordination of sales, production and buying over a distance of 300 miles posed too many problems for anything like peak efficiency to be achieved. Indeed, it can be argued that greater autonomy for the Grangemouth operation was inevitable, regardless of the Courtaulds link, if it were to remain viable. The reasons behind this line of thinking are essentially psychological. Leicester personnel had no personal involvement in the future of the Grangemouth works. Branch crises were usually not matters of urgency at HQs. Face-to-face contacts were either missing or too infrequent. Other forms of communication therefore remained somehow impersonal. It was difficult to sustain morale in Grangemouth or to motivate the staff. As emphasized repeatedly by the present management of the PVC Division, "motivation cannot be bought". This general situation might not have become so acute in a relatively uncomplicated branch environment such as a mass assembly operation characterised by limited autonomy,

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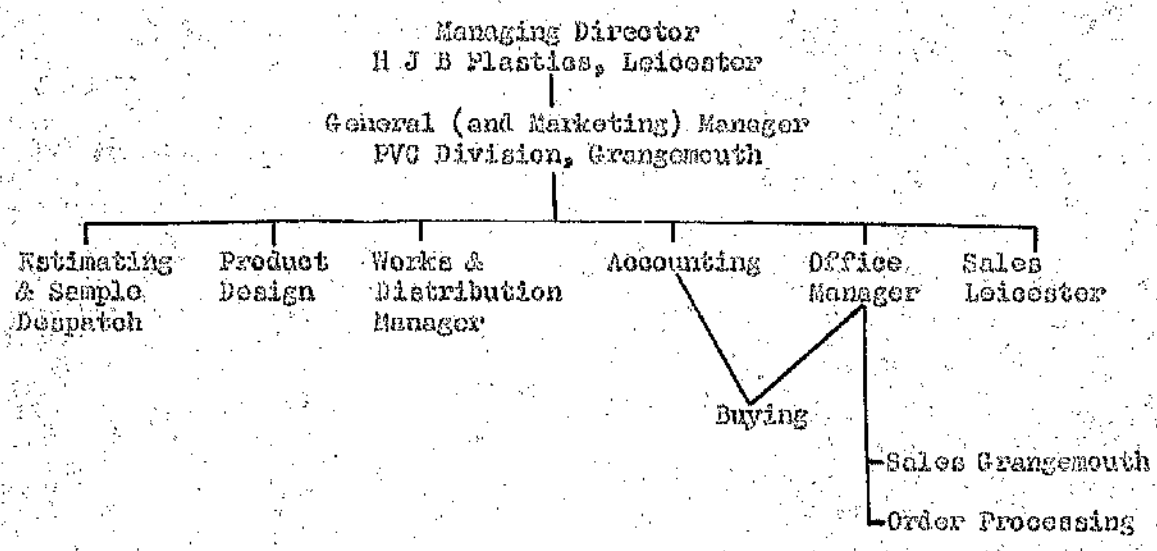
[1] Although Courtaulds came rather belatedly to accept the logic of divisionalisation, an organisational concept dating from about 1920 when Alfred P. Sloan effectively radicalised General Motors. Cf. the brief history of Courtaulds, op. cit., pp.22ff.; "Courtaulds Sales Switch," The Times, 8 Sep 70, p.22. On the other hand, its experience would appear to support Chandler's aphorism that "structure follows strategy". See Alfred D. Chandler, Jr., Strategy and Structure: Chapters in the History of the Industrial Enterprise, M.I.T. Press Research Monograph (Cambridge, Mass.: M.I.T. Press, 1962).

routine decision-making and standardised intra-firm communications. Batch production, however, at least in the opinion of HJBP is different; more local initiative is required and intra-firm communications can be quite complex. Under such circumstances, limited autonomy is not conducive to good results.

Divisionalisation involved the creation of five divisions. Four of them - polythene, polypropylene, film and bags - are based in Leicester. The fifth is PVC. Each has a general manager responsible to the HJBP managing director in Leicester who is responsible in turn to the BCL board of directors. Each is run as a separate and largely autonomous profit centre. The PVC Division for example is responsible for its own production, buying, product innovation and design, marketing including price policy, distribution, accounting and long range planning. New investment proposals on the other hand must be 'passed up the line' for approval. The PVC Division's general manager reports monthly to his managing director in Leicester. Bi-monthly, he attends joint meetings of the HJBP and BCL boards in Leicester although he is not a director.

A schematic interpretation of the PVC Division's organisational structure as of January 1971 is presented below:

Organisation Chart
PVC Division, HJB Plastics Ltd.
January 1971



This structure has been revamped a number of times since its nascence and will undoubtedly continue to evolve. We have mentioned earlier the timing of some of the alterations. It should be noted in addition

that the accounting function dates only from October 1970 while order processing and the position of office manager did not appear till December of that year. Buying and marketing are considered by senior management to be the two most important functions although all are obviously part of an integrated whole.

External Contacts

Largely because of the 1971 postal strike in Britain, it proved impossible to obtain any information on external contacts (or travel characteristics) apart from the interview results. Questionnaires were left with the PVC Division in January 1971 for mailing, when completed, to Glasgow. The strike intervened. By its end, 47 days later, they had either been lost or thrown out. More important, the momentum created by the interviews had been dissipated.

Telecommunications are used more than any other contact method for communicating with HQs in Leicester. Telex is the preferred method for routine messages, e.g., order information and plant performance measures because it is cheaper than the telephone. It is also preferred when the PVC sales personnel in Leicester require speedy quotations from an estimator in Grangemouth because of its reliability. A telephone call might be faster theoretically but in practice it is often slower (see below). Also, it leaves no printed record.

Grangemouth personnel are in contact with suppliers 2-3 times a week.

At the beginning of 1970, there was only one telephone line servicing the Grangemouth works plus a telex line. Great difficulty was experienced in getting through to HQs in Leicester because of STD system congestion. Telephone queues often formed. A decision was thus taken to expand the factory's telecommunications facilities. This decision was easier made than executed however. It took two months to get a telephone representative to visit the plant. He concluded when he did arrive that to add two telephone lines and to set up an internal intercom system as requested by the PVC Division would involve a delay of 6-8 months! This period was cut to five weeks in actuality but only by a combination of vociferous complaint and pressure. Today, the Division's telecommunications system embraces three telephone lines, one telex line and eight telephone handsets. The STD system has noticeably improved but the telephone service generally could be a "lot better" in

the opinion of the management.

Installation of a private telephone line between Grangemouth and Leicester was considered at the time of the telecommunications system expansion but rejected somewhat summarily, in part for a seemingly unusual (although perhaps not so uncommon) reason, viz., there was no obviously optimum location in the plant for a single private line telephone handset. Another important consideration in addition to the palpable one of cost was the danger that the ready availability of a private line might lead to excessive use.

Confraphone and Confravision are of limited interest to the General Manager of the PVC Division given his current degree of freedom to operate as he seen fit. On the other hand, he feels that Confravision could have mitigated the impersonal branch-centre relationship characteristic of the pre-divisionalisation situation.

The PVC Division makes no use of computers.

Communication Costs

While communication costs are not unimportant to the PVC Division, cost records are not normally kept on a routine basis and thus it has not been possible to compute a communications cost/turnover ratio. Underlying the lack of routine records are two interrelated management views: 1) contact with customers and suppliers is always more important than contact cost, 2) communication costs are probably small anyway and as long as they show no sign of getting out of hand, their computation is not worth the effort. Interestingly, this laissez-faire attitude has recently been suspended with regard to intra-firm STD calls by accounting personnel. Records of such calls began to be kept towards the end of 1970. These records comprise length of call, cost, name of originator and name and location of recipient. The purpose of the record is twofold; 1) information, 2) control. Once these objectives have been attained in adequate measure, the record will probably be terminated.

Travel

On average, the General Manager is away from Grangemouth three days a week promoting sales, attending exhibitions, visiting capital equipment suppliers or handling customer complaints. His trips take him throughout the UK. He can be at Turnhouse Airport and on a plane

within half an hour of leaving the factory. Normally he flys BEA, in part because he has a car permanently based at Heathrow. Flight frequency and seat availability have posed no problems. On trips to Leicester, he often drives. His need to travel should diminish somewhat when the Grangemouth operation is fully staffed. In general, Grangemouth is considered to be an eminently suitable location from a travel point of view.

The only other PVC Division employees who travel much at present (January 1971) are the Works & Distribution Manager and the Industrial Designer. Visits to equipment suppliers represent the main travel purpose in the former case. The Industrial Designer travels in order to keep up with new ideas through attendance at exhibitions, etc.

The Outlook

Grangemouth has proved to be a good location for PVC converting and HJBP's PVC Division has ambitious growth plans encouraged in part by the fact that plastics consumption per capita in the UK remains considerably below that in West Germany, the world's leading consumer.[1] These plans include entry into the export field. The present divisional manager believes strongly in the greatest possible degree of autonomy for the Grangemouth works compatible with continued membership in a large corporate group and can be expected to continue this advocacy for as long as he remains in Scotland. An interesting facet of this stance is his desire to alter the name of the Grangemouth venture in due course to something with a more Scottish connotation. Indeed, it would be unrealistic to regard the present organisational structure of HJBP as immutable.

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1 Cf. Knight, "Petrochemicals," p.x; OECD, Plastics, p.44.

CHAPTER 15

IBM UNITED KINGDOM LIMITED - A CASE STUDY

Summary

Location of Scottish factory: Spango Valley, Greenock, Renfrewshire.

Approximate distances: Glasgow (24 miles), London (416).

Order & MLH: VI-364 (1958 SIC); IX-366 (1968 SIC).

Commencement of production: 1951.

Capital employed: n/a but the initial investment was only £20,000.

1970 employment: 2,000-2,200.

1970 turnover: n/a.

Products: punches, verifiers, several standard keyboards, the 1130 scientific computer, the 1287 optical character reader, the 1288 page reader, read-only storage units for the central processors of IBM models 360/30 and 360/40, System/3 printers, System/3 data recorders, etc.

Average product value: indeterminate without careful examination of the relevant cost accounts and shipping records due to the wide range of product values but generally very high (i.e., over £1,000 a ton) and rising over time.

Type of production: both mass assembly and bespoke with the trend favouring the latter.

Main markets: 85% export, 15% UK - export markets are much more important today than they were initially.

Ownership and organisational status: a branch of IBM United Kingdom Ltd., London.

Assessment of transport factor: IBM Greenock is a classic example of a migrant almost impervious to transport costs but vitally dependent on quick, reliable and efficient goods transport. Its TC:O ratio is about 0.25%. The transport function is currently subcontracted but a thorough review of all distribution arrangements was launched at the end of 1970. Scottish air links to the Continent are felt to be inadequate.

Assessment of communications factor: communication costs, at about 0.3% of turnover, exceed transport costs, a highly unusual situation. IBM Greenock is a very heavy user of telecommunications. Telephone facilities at Spango Valley have never been adequate. This situation may have contributed significantly to the decision during the mid-1960s to open a plant at Havant rather than twin the Spango Valley works.

Corporate Background

IBM United Kingdom Ltd.(IBM UKL) is one of four operating

subsidiaries owned by IBM United Kingdom Holdings Ltd., London, the others being IBM United Kingdom Rentals Ltd., IBM United Kingdom Laboratories Ltd. and IBM Information Services Ltd. Total Group employment is about 11,000[1] making the UK subsidiary the 3rd-largest IBM operation in Europe after IBM Germany and IBM France. Turnover in 1968 was £124.9m, net profits before interest and tax were £34.9m(£18.4m in 1967), capital employed was £79.2m, the return on capital was an astounding 56.8% (37.4% in 1967), and exports totalled £33.8m.[2] The UK holding company is a wholly-owned subsidiary of IBM World Trade Corporation(IBM WTC) in New York; IBM WTC is wholly-owned in turn by the sole public IBM company, International Business Machines Corporation, also in New York. IBM, of course, is one of the world's largest business firms with some 259,000 (non-unionised) employees, some 550,000 shareholders, operations in 105 countries, a 1968 turnover of US$6,900m and pretax profits of $1,800m (giving a profit/sales ratio of approximately 26.1% compared to 27.9% for IBM UKHL). It had manufacturing facilities in 13 countries outside the U.S. in 1968, viz.: Argentina, Brazil, Canada, Columbia, France, India, Italy, Japan, Mexico, Holland, Sweden, the UK and West Germany.

IBM's corporate history can be traced back to the Tabulating Machine Co.(TMC) established in the U.S. in 1896 to manufacture the electromechanical punched-card calculating machines invented by Herman Hollerith, a U.S. Government statistician.[3] TMC granted an exclusive licence to the British Tabulating Machine Co.(BTMC - established 1907) in 1908 to manufacture and sell its products throughout the Empire excluding Canada. In 1911, TMC was merged with 12 other firms including the International Time Recording Co. and the Computing Scale Company of America in a deal engineered by Charles R. Flint, U.S. financier and organiser of trusts. The result was the Computing-Tabulating-Recording Co.(C-T-R) whose name was changed in 1924 to IBM.

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[1] This total can be broken down as follows: marketing, installing and servicing data processing equipment (5,000), manufacturing (2,500), administration (1,400), R & D (1,100), the office products (other than computers) division (1,000). GB, Select Committee on Science and Technology, UK Computer Industry, Vol. I: Minutes of Evidence, H.C. 137, 1969-70(London: HMSO, 1970) qq. 374-75.

[2] Ibid., qq. 320-21; The Times 1000: 1970-71, pp.18-19.

[3] Cf. Chart 10 in OECD, Electronic Computers, Gaps in Technology Between Member Countries Series(Paris: OECD, 1969), p.83.

C-T-R/IBM maintained TMC's licensing arrangement with BMTC until 1949 when it was renegotiated by Thomas J. Watson, IBM President, thereby paving the way for the formation of IBM UKL in 1951.[1]

Thomas J. Watson was the general manager (later president) of C-T-R between 1914 and 1924, president of IBM from 1924 to 1950, and IBM chairman from 1950 until his death in 1956. For most of this long period, he was the dominant force in the company and its development is inexplicable without reference to his background and personality. One of his tenets was the desirability of "an integrated world-wide company free of ownership entanglements in foreign lands."[2] Thus, corporate policy has been to retain sole ownership of all IBM operations outside the U.S. and to eschew the granting of manufacturing licences to other firms, in part "to protect its commercial knowhow".[3] The 1908 agreement with BTMC predated Watson's tenure; its continuance until 1949 was clearly an exception to his general predilection. Surprisingly, however, he made another exception when IBM UKL was established; partial ownership in the new subsidiary was offered to UK nationals. Ten years later, shortly after IBM UKL began to export in volume, this offer was reversed and IBM WTC took exclusive possession of its UK offshoot.

Location Factors

IBM's first and only UK manufacturing facility until 1967 was located in Greenock. Production began during 1951 in accommodation leased from the Admiralty on a temporary basis while more suitable

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[1] BTMC merged with Powers-Samas Ltd. in 1959 to form International Computers and Tabulators Ltd.(ICT). ICT, English Electric Computers Ltd. and Plessey Co. Ltd. came together in July 1968, with support from MinTech, to form International Computers Ltd., the largest company outside the U.S. specialising in commercial and scientific computers. See the statement on 21 Mar 68 by the Minister of Technology to the House of Commons concerning the UK computer industry - GB, Parliamentary Debates, H.C., 5th ser.(1967-68), Vol. 761 (18-29 Mar 68), cols. 607-09; GB, MinTech, Industrial Investment: The Computers Merger Project, 1968, Cmnd. 3660(London: HMSO, 1968); H.C. 137, pp.1-37.

[2] William Rodgers, Think: A Biography of the Watsons and IBM(London: Weidenfeld and Nicolson, 1969), p.245. Rodger's book was not authorised by IBM; indeed, it incurred the company's displeasure. Needless to say, its general tenor is not entirely sympathetic.

[3] Barton William-Powlett, "The Transnational Companies: #4. IBM," The Times, 8 Jan 70, p.23.

premises were being erected by Scottish Industrial Estates Ltd.(now SIEC). They were officially opened on 30 August 1954. (IBM later purchased the factory.)

The decision to locate in Greenock would appear to have had several ingredients, not all of them ascertainable even after considerable research. Hence, the following account is by no means definitive. Nonetheless, it is felt to be reasonably accurate although we have been unable to apply weights to the various factors.

It is apparent first that IBM was induced to locate in a Development Area by a combination of government pressure and financial inducements analogous, at least in part, to those that led another multinational firm, Massey-Harris Co. Ltd., two years earlier, to open a production facility in Kilmarnock.[1] Secondly, Greenock suffered from exceptionally high unemployment, the Spango Valley site provided room for expansion,[2] Clydeside generally had excellent sea, air and rail transport facilities,[3] and subcontractors were available in the area.[4] Third, Hector McNeil, the incumbent Labour M.P. for Greenock and Secretary of State for Scotland, is alleged to have played an important role in

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[1] Cf. E.P. Neufeld, A Global Corporation: A History of the International Development of Massey-Ferguson Limited(Toronto: University of Toronto Press, 1969), pp.80-84. Allan Young, BOT Controller for Scotland, told a House of Commons committee in 1955 that the main reason why unemployment in Scotland remained consistently double the UK average was a lack of sufficient assembly industries capable of employing the semi- and the unskilled. GB, Select Committee on Estimates, Second Report: Development Areas Together with the Minutes of Evidence . . . and Appendices, H.C. 139, 1955-56(London: HMSO, 1955), Q.704. Thus, IBM must have seemed an ideal type of firm to steer to the area.

[2] Today IBM owns well over 100 contiguous acres.

[3] But not adequate roads. Cf. Patrick Abercrombie and Robert H. Matthew, The Clyde Valley Regional Plan, 1946: A Report Prepared for the Clyde Valley Regional Planning Committee(Edinburgh: HMSO, 1949), pp.11-12 & ch.5.

[4] According to the Managing Director of IBM UKL, the firm has "a positive policy of sub-contracting about 30 per cent. of our output - quite a deliberate policy - so that there are about 420 British vendors to our factories in this country." H.C. 137, Q.330. Presumably, this policy is not a recent one. On the other hand, the value of purchases from Scottish vendors or suppliers is low relative to inputs from other UK manufacturers. Possibly, despite IBM's good intentions, the following statement by William Fowlett (op. cit.) has more than a little relevance to Scotland: "Conscious of the political virtue of purchasing from outside suppliers, I.B.M. fitted up a caravan in 1965 and toured England advertising its requirements, in an attempt to

tipping the balance in favour of his constituency. Finally, there is some evidence of sentiment on the part of Mr Watson whose forebears emigrated from Clydeside at an indeterminate date after 1800 first to Ireland[1] and then during the 1840s to New York State. It would be dangerous to assume that this factor was the least important of those mentioned!

Products

As is evident from the product mix shown above in the Summary, the Greenock plant today is a producer of electronic computers and computer system components, and thus is classified to MLH 364 (1958 SIC). This situation did not always prevail however. Initially, sorters (MLH 338) were manufactured in Greenock.[2] Sorters, of course, are a type of punched-card machine.[3] They were being sold by IBM long before the invention of the electronic computer (the ENIAC) in 1945-46.[4] Later, typewriters (MLH 338) were added.[5] Dunning, writing in 1957, indicated that IBM UKL was a manufacturer of "office appliances, time recorders and electric clocks,"[6] and that it was "interested in

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overcome the lethargy of local manufacturers." It was reported recently that, in a typical year, IBM UKL places about £25m of business in the UK. See Kenneth Owen, "Computer News," The Times, 9 Mar 71, p.18.

IBM would appear to have been one of the six engineering firms, all of them postwar migrants to Clydeside from the U.S., surveyed by the U.S. Consul, Glasgow, in 1954. Subcontracting was the source of many problems for these companies; suppliers failed to adhere to agreed delivery dates, their output was frequently substandard owing to nil or minimal quality control, etc. See Taylor G. Belcher, "American Factory Operation in Scotland Successful," Foreign Commerce Weekly (Washington, D.C.), 17 Jan 55, pp.15-17,22.

[1] Rodgers (op. cit., p.16) states that they moved to "Castle Borg". However, so far as can be determined, there is no such place. Furthermore, 'borg' is Teutonic rather than Irish in derivation. It is possible that Rodgers had in mind Castlederg, Co. Tyrone, a small woollen town on the River Derg. Ulster was considered by IBM as a possible location at the beginning of the 1950s but it was rejected because of the adverse implications for delicate machinery of the sea barrier to intercourse with the rest of the UK.

[2] H.C. 137, Q.399.

[3] For a brief description of how they operate, see S.H. Hollingdale and G.C. Tootill, Electronic Computers, Pelican Book A524 (Harmondsworth, Middx.: Penguin Books, 1965), pp.53-54.

[4] Cf. Fig. 74, a time chart of the first decade of British computer development, in ibid., p.232.

[5] H.C.137, Q.408.

[6] Dunning, American Investment, p.351.

computer production".[1] In due course, when the Greenock plant had 'earned its spurs,'[2] it was given the opportunity to manufacture more sophisticated products than sorters and typewriters. The production of the former was transferred to South America and of the latter to Amsterdam.[3] Their replacements at Greenock demanded greater skill on the part of the work force and yielded more added value. This upgrading process continues. Punch and verifier production (MM 338) will likely be transferred from Greenock in the near future to make way for yet more demanding types of product.

The process whereby products are allocated to specific plants is a complicated one. We have mentioned that a plant must prove itself before it is given more complex types of assignment. But what lies behind the initial assignment? To understand the process, it is necessary to look at IBM WTC as a whole. This subsidiary manufactures or assembles almost all types of IBM product sold outside the U.S.[4] Production is organized on a 'product by plant' basis whereby a specific factory is responsible for only a segment of the total IBM product range in order to achieve economies of scale while spreading production over as many countries as possible. The result is an enormous volume of inter-plant movement of intermediate goods making it impossible in the case of the more sophisticated items to attribute the final product to any one factory. For example, while IBM Greenock assembles the 1130 Computing System, many of the components are 'purchased' elsewhere. This situation has arisen relatively recently according to a very informative OECD report on the computer industry:

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[1] Ibid., p.68.

[2] H.C.137, Q.399.

[3] According to Rodgers, tariff and related barriers to trade in end products made it necessary for IBM when it first began making electric typewriters in Europe to spread the manufacture of parts over 9 different countries, to locate an assembly plant in each of these countries, and to confine exports and imports to intermediate goods. With the advent of the EEC and other postwar measures to facilitate international trade, a gradual easing of this situation occurred. Today, all of IBM's European typewriter production is concentrated in a single plant. Op. cit., pp.24-45.

[4] Current exceptions: the very biggest machines in the 360 series, Models 75 and 195. IBM Corp., the parent company, confines its sales activities largely to the U.S. although this general rule is being relaxed slightly at the moment owing to the 1970 recession in the American computer market. Cf. James Ensor, "Computers: 'The Market Will Be Tough, But We're Ready'," Financial Times, 8 Feb 71, p.8.

> . . . IBM's international organisation . . . is the result of decades of growth and experimentation: in the early days of the punched card industry, each of IBM's subsidiaries catered for the national market on which it was established . . . the present international organisation of production has been influenced by the introduction of the 360 series in 1964.[1]

IBM WTC finds itself subject to two types of pressure with regard to the national allocation of product manufacture or assembly. On the one hand, the managements of the various national subsidiaries are continually pressing for more and better[2] assignments.[3] On the other, national governments are anxious to avoid trade deficits and, *ceteris paribus*, each would prefer its IBM subsidiary to be a net exporter. Since both of these pressures operate in the same direction, they can only be reconciled on an international basis. Reconciliation is accomplished in fact according to the following guideline: where possible, national production should match national sales with the latter being the independent variable. In the words of the IBM UKL Managing Director: "Our objective is to balance our imports and exports, taking one year with another . . .".[4] This objective was one of the main considerations behind the opening in 1967 of IBM's second UK

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[1] OECD, *op. cit.*, p.85. It will be recalled that IBM UKL exports exceeded £33m f.o.b. in 1968. In 1960, the equivalent export value was only £3m. It would appear from the above that part of the difference between these two figures is a reflection of a change in export policy rather than growth *per se*.

[2] 'Better' is used here to mean more sophisticated and of greater added value. Interestingly, the Managing Director of IBM UKL claims that he prefers to produce intermediate goods rather than final assembly units in the UK "because it is on the components of the sub-assembly where one gets the greatest added value and that, of course, helps our net exporting position." H.C.137, Q.397. However, the latter part of this quote could lead the less charitable to wonder if his remarks were in any way tailored to suit the assumed prejudices of his audience, the House of Commons Select Committee on Science and Technology!

[3] William-Powlett argues (*op. cit.*) that a research laboratory is the real status symbol of the national IBM subsidiary. IBM UK Laboratories Ltd. began operations in 1957 at Hursley, near Winchester, and has become the largest of the six IBM R & D concerns outside the U.S. Its growth is not constrained by UK sales. Our interviews revealed that IBM employees engaged in manufacturing measure prestige in terms of floor space! The most recent (1970-71) extension to the Greenock plant will make it, at almost 300,000 sq.ft., one of the largest in the IBM WTC stable.

[4] H.C.137, Q.326.

manufacturing facility, the Havant plant near Hursley.[1]

Production Technology

The trend is towards more and more bespoke manufacturing by skilled operatives and technicians in contrast to the mass assembly operations by 'green labour' characteristic of the early years.

Markets and Marketing

It is widely held that virtuosity and acumen in marketing is the key to IBM's success. Using rhetoric associated more with Cassius Clay than The Times, William-Powlett was moved to write that:

> . . . I.B.M. undeniably is the greatest. In its chosen line

Less effusively but equally to the point, an OECD report stated recently that:

> the success of IBM can be attributed to the following management factors:

that:

> the success of IBM can be attributed to the following management factors:

a) A clear identification of what the market required. Customers were more interested in the services provided by the computer than in the computer itself. This meant large expenditures on software and support to the customer . . . .

b) The ability to stimulate, and even create the markets for the services and products offered by the company. This was done both by new product development and by a highly effective sales and servicing organisation, with strong customer support in the form of training programmes, maintenance assistance and large programme libraries;

c) A flexible and well adapted internal organisation.[3]

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[1] The Havant plant is expected to employ about 2,000 workers by 1975 and to have a floor space of 341,000 sq.ft. Its current (March 1971) product mix includes System/370 Models 135 and 165, System/3 disc files, computer memories for the smaller 360 models and for the 1130 and 3980 banking terminal units. William-Powlett (op. cit.) cites good communications and labour availability as the main location factors. But if these were the most important considerations, it might reasonably be argued, at least prima facie, that the plant could equally well have been located in Greenock. Indeed, it is almost certain that an argument in favour of twinning the Spango Valley works was put forward (at one time during the early 1950s, the Greenock plant was expected to employ some 5,000 workers ultimately). Clearly, the Greenock protagonists were not sufficiently persuasive. On the other hand, a successful advocacy would have led to serious communications problems given the importance of telecommunications to IBM UKL and the chronic inadequacy of the relevant infrastructure in the Greenock area (see below). It could well be that these potential problems played an important part in the ultimate decision.

[2] Op. cit.

[3] OECD, Electronic Computers, p.104.

Thomas J. Watson, of course, was above all a salesman;[1] he invariably put the customer first, regardless of the circumstances. This philosophy still dominates the company 15 years after his death.

The following figures illustrate the size of the UK computer market and IBM's relative share. At the beginning of 1962, there were 512 computer installations in the country, 17.9% of which were built by IBM. By the beginning of 1967, the number of installations had risen to 2,252 and IBM's share of the total had increased to 28.8%.[2] In value terms its share was even greater; according to one source,[3] it stood at 39% by the end of 1967. More comprehensive figures are presented in a recent House of Commons Select Committee report:[4]

Percentage Distribution of the (Nationally-Valued) UK Computer Market by Sector, 1964-68

Sector	1964 %	1965 %	1966 %	1967 %	1968 %
Private	64.2	71.8	67.2	66.2	65.7
Central government	17.1	11.6	15.5	15.1	15.7
Local government	4.7	4.7	9.5	6.5	4.5
Public corporations	14.0	11.9	7.8	12.2	14.1
	100.0	100.0	100.0	100.0	100.0

IBM's Share of the UK Computer Market by Sector & Notional Value, 1964-69[5]

Sector	1964 %	1965 %	1966 %	1967 %	1968 %	1969 %
Private	44.5	39.9	48.5	46.8	30.6	35.0
Central government	21.1	19.3	31.6	25.4	12.7	12.1
Local government	17.5	12.7	36.7	21.6	24.5	3.3
Public corporations	47.9	30.9	29.6	51.5	1.5	7.9
All sectors	40.0	35.1	43.2	42.5	23.4	27.7
Notional value(£'000)	21,461	22,574	36,264	60,526	28,130	39,591

[1] In poignant contrast, he was a very poor technological forecaster; it was largely on account of Watson that IBM was relatively late getting into the computer industry. He actually spurned a chance to acquire the Eckert-Mauchly Co. prior to its purchase by Remington Rand in 1949. This purchase of course led to the introduction of the first U.S. commercial computer, Remington Rand's UNIVAC I, in 1951 and gave the firm a virtual monopoly of the U.S. industry for 3 years.

[2] OECD, op. cit., p.162.

[3] Ibid., p.161

[4] GB, Select Committee on Science and Technology, U.K. Computer Industry, Vol. II: Appendices, H.C.272, 1969-70 (London: HMSO, 1970), pp.3-9. The figures were compiled by MinTech.

[5] The 1969 data were compiled by the Department of Trade and Industry. They appear in Kenneth Owen, "ICL Holds Lead over Rivals in British Computers Market", The Times, 15 Mar 71, p.16.

Some 4,000 computer systems had been installed in the UK by the end of 1969 and the value of the market was growing at a rate of about 27% a year (16% in 1969, 38% in 1970). The average growth rate during the 1960s was 40% a year. This figure is expected by ICL to drop to 12.5% over the 1970s as a whole. IBM is more optimistic and puts expected growth at 20-30% a year. ICL is IBM's major competitor in Britain at the moment followed distantly by Honeywell Information Systems Ltd.[1] ICL's turnover in 1968 was £92m and pretax profits totalled £3.9m giving a profits/turnover ratio of 4.2%. The equivalent figures for IBM UKHL, it will be recalled, were £125m, £34.5m and 27.6%.

According to the OECD report cited previously, a successful computer firm today must have all-round capability including: 1) advanced engineering, technology and manufacturing facilities, 2) a sophisticated marketing organization with a systems analysis and programming capability, 3) software development facilities, and 4) sufficient capital or financial arrangements to support a leased equipment-oriented business and to sustain temporary losses.[2] Minimum economic size varies from U.S.$25m when a company sells but does not lease to $85-200m when it does both. In contrast, total IBM financial commitments, e.g., development costs, production facilities and leasing capital, in connection with the 360 series launched on 7 April 1964 are estimated at about $5,000m! To compete with IBM, smaller firms must have the financial and managerial resources to grow quickly and be able to offer either more sophisticated technology or lower prices.[3]

IBM sets its prices on a worldwide basis so that customers pay

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[1] Cf. Kenneth Owen, "Up Among the Computer Leaders," The Times, 21 Sep 70, p.20.

[2] E.g., IBM's STRETCH computer system developed during the latter part of the 1950s was a commercial fiasco. A smaller firm might not have survived the heavy losses involved which have been estimated at over $20m.

[3] ". . . according to several specialists, a computer system which is to compete successfully with a comparable IBM system should be approximately 20% cheaper. This means that profits will have to be lower . . . and the software less extensive." Op. cit., p.113. Cf. "Computers in Britain: Official Policy," ch.9 in Michael Rose, Computers, Managers and Society, Pelican Book A1097(Harmondsworth, Middx.: Penguin Books, 1969), pp.212-36; "The Battle of Computing," ch.14 in Jean-Jacques Servan-Schreiber, The American Challenge, trans. by Ronald Steel with a Foreword by Arthur Schlesinger, Jr.(Harmondsworth, Middx.: Penguin Books, 1968), pp.111-16.

the same amount for the same product irrespective of location. These prices are determined in the U.S. and are expressed in U.S. dollars. The rationale behind this policy is explained succinctly in an IBM UKL memo to the Commons Select Committee:

> The requirements for D.P. products know no national frontiers. There is a world market for IBM products, and the complexity, sophistication and cost of these products is such that we submit that they can best be designed, developed, manufactured and marketed on a world-wide basis . . . . Operations on this scale can only be successfully carried out if they are centrally co-ordinated and, for mainly historical reasons, this is done in the U.S.A.[1]

It follows from this policy that, where manufacturing costs are low relative to the U.S., profits per unit of output should be relatively high because market prices are the same. Presumably this phenomenon is at least part of the explanation for the fact noted earlier that IBM UKHL is currently more profitable (before tax) than IBM Corp. as a whole. William Pavlott[2] maintains that IBM's policy on transfer pricing is "scrupulously fair" to the governments of the countries in which the firm has manufacturing facilities:

> A standard formula is applied to the actual cost of each component crossing a national border, thus ensuring that a taxable profit is made on manufacturing operations.

Whereas IBM UKL is both a manufacturing and a marketing company,[3] the Greenock plant is concerned solely with production. Its personnel have little direct contact with ultimate customers since all 'sales,' both domestic and export, are confined to other parts of the IBM empire. Initially, most of the plant's output was purchased within the UK. Today, roughly 85% is exported.

Purchases and Inbound Transport Costs

IBM Greenock purchases mainly intermediate goods, including both

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[1] H.C.137, pp.66-67.

[2] Op. cit.

[3] ". . . IBM WTC treats each country in the world outside the U.S.A. as a separate and independent geographic market. The responsibility for selling in that market lies with the local IBM management, subject only to overall policy control." IBM UKL memo, H.C. 137, p.65.

parts and machines (sub-assemblies and peripherals). Some are imported from IBM factories abroad or from foreign vendors. Others are manufactured in the UK either by vendors or by the Havant plant. The latter supplies Greenock with the memories for the 1130 scientific computer. It was suggested earlier that IBM Greenock might be prepared to buy more of its requirements within Britain if suitable suppliers could be found. Be that as it may, UK purchases already exceed imports because the Purchasing Function at Greenock, which issues all purchase orders, not only buys for the Spango Valley plant, it also purchases components from UK vendors on behalf of IBM plants abroad.

It has not been possible to go back very far in time in connection with purchasing but delivery arrangements during the latter part of 1970 can be described. Inbound domestic traffic arrives at the Greenock factory entirely by road. Over 45% of the relevant tonnage, however, reaches Glasgow by rail. Less than 5% is delivered to Abbotsinch or Prestwick Airports. Indeed, air freight is used only when components are urgently required. In such circumstances, IBM Greenock assumes direct control of the delivery arrangements. Otherwise, vendors are left to their own devices with the exception of the arrangements noted below. Invariably, they use their own vehicles, BR or BRS; air freight is never used voluntarily which is hardly surprising given the smallness of the country and the generally excellent surface transport arrangements.

Six years ago, IBM Greenock appointed LEP Transport Ltd. to act as its agent in the Birmingham area. LEP's task is to collect Greenock-bound traffic from vendors in the Midlands and the Cotswolds. Pickups are made in Coleford, Glos. on Mondays, in Swindon (from a Plessey plant) on Wednesdays, and in Birmingham and district on Tuesdays, Thursdays and Fridays. A 10-ton articulated van under permanent contract to IBM by a Greenock haulier makes three round trips to Birmingham a week to collect from the LEP depot. The advantages claimed for this delivery arrangement over the more traditional system of vendor responsibility are threefold: 1) a reduction in the number of late deliveries and, consequently, less danger of costly production line holdups, 2) a reduction in the delivered cost of the affected goods, 3) greater control over the timing of deliveries.

Clarke's Transport Ltd. is used for urgent shipments from the

Birmingham area when the goods can be delivered to one of the city's Freightliner terminals by 17.00 hrs. IBM Greenock collects from Clarke's Glasgow depot the following morning using one of its permanently-hired vehicles (see below). Between 17.00 and 18.00 hrs., Birmingham area goods can be despatched to Scotland by air freight; an airport agent is employed by IBM Greenock to handle all details. After 18.00 hrs., BR's Red Star (passenger train) express parcel service can be used. IBM Greenock collects the goods from BR's Central Station in Glasgow.

In May 1970, IBM Greenock contracted with a warehouseman in Greenford, Middx. for the collection of Greenock-bound traffic from vendors in the SE. However, if they wish, vendors may deliver directly to the Greenford depot. Goods arriving there by 16.30 hrs. can be delivered to the Greenock plant by 09.00 hrs. the following morning. Tartan Arrow Service Ltd. (Transportation) despatches a container to Greenford daily, Monday through Friday. The box is sent to Glasgow via the Freightliner service. Tartan Arrow delivers it from there to Greenock. So far, this new arrangement has worked very well.

Between them, the Birmingham and Greenford depots handle 34-40 tons of Greenock-bound traffic a week. It has not been possible to determine total weekly domestic deliveries to Greenock but obviously they are somewhat greater than 40 tons inasmuch as this figure excludes traffic from Scotland, the north of England, etc.

IBM Greenock's Purchasing Function has an Expediting Department, part of whose task, as the name implies, is to query late deliveries and to make alternative delivery arrangements as necessary. Both the Birmingham and Greenford depots are in constant touch with Purchasing by telex to inform it about what is being despatched and how.

Normally, vendors' outlays on transport are included in their prices making it difficult for IBM Greenock to identify transport charges per se. Over 95% of total inbound domestic tonnage originates with vendors. The remainder of course comes from Havant.

Imports during the first eight months of 1970 in tonnage terms were made up as follows:

parts from IBM factories abroad	55.16%
parts from foreign vendors	9.71%
machines (8% were re-exported)	35.13%
	100.00%

This distribution is considered to be typical of the situation prevailing during the latter half of the 1960s. Parts usually arrive in Britain by air with the exception of some special types of steel and goods from Japan and South America. No information is readily available on the modal split for machine imports but it seems probable that, like parts, the majority arrive by air although, to the extent that imports are Continental in origin, road may well be the dominant mode (cf. below). IBM Greenock pays all transport costs on imports directly; therefore, (through the Expediting Department) it specifies the mode to be used by consignors. Air freight is favoured for two related reasons: 1) it is faster, 2) computer components are peculiarly subject to temporal obsolescence. Despite the extensive use of air freight, inbound transport costs as a proportion of sales remain very low (unfortunately, a precise figure is unavailable). Computer components are characterised typically by a high value/weight ratio. Goods of this type are especially suited to air transport because air freight tariffs are normally weight-based. Furthermore, the use of air freight means reduced inventory costs. It also minimises the likelihood of production delays. Even if air freight rates were higher, however, IBM would still prefer the mode because of the company's very strong market orientation. When it comes to a choice between extra transport costs and customer satisfaction, the customer always wins. Commitments to customers are reviewed every Friday as a matter of routine.

Inventory control is a major preoccupation of the Production Control Function. Normally, IBM Greenock stocks enough of each input to last two months with the exception of goods from Japan and South America in which case three months' stock is held. Typical order lead-times on imports are: Europe - 2 weeks, U.S. - 3 weeks, Japan and South America - 6/8 weeks. Stocks are physically located, not at Spango Valley (due to lack of space), but at Battery Park, another Greenock site. They are turned over entirely four times a year.

Distribution

Formulation of policy. Late in 1970, IBM UKL appointed a Country Distribution Manager. This London post is a new one. The incumbent's job initially is to study the feasibility of setting up a

number of distribution centres within the UK under the control of a central Distribution Function. Such a function would be responsible for all distribution matters from the end of the assembly or production line to the ultimate customer. In other words, it looks as if IBM UKL is planning to embrace the concept of Total Distribution. Apparently, every other European subsidiary of IBM WTC has already done so; IBM UKL is simply getting in line.

Prior to this development, distribution policy as it affected IBM Greenock was divided between the plant's Production Control Function and IBM UKL HQs in London or buyers abroad. However, the Greenock management had very limited responsibilities in fact, handling only packaging and local transport. This arrangement appears to have been in force for many years but its commencement date has not been determined.

Policy in practice. There are two Traffic Departments at IBM Greenock, Domestic and International. The latter has two sections, Export and Import. This degree of specialisation reflects the varying characteristics of domestic, export and import traffic and the consequent need for different management and other skills.

IBM UKL owns no haulage vehicles. It did so at one time, i.e., for a short period during the mid-1950s (when exports were much less important), as an experiment but decided that transport was not its forte. At peak, there were two vans and an open lorry at Greenock. They were used mainly for the delivery of final product to agent-operated depots in England. IBM UKL had (and has) no depots of its own.

Otherwise, IBM UKL has contracted out the transport function. In November 1970, there were 18 vehicles under permanent hire to the Greenock plant. Eleven were supplied by a Greenock haulier, to wit:

a) 8 were local work vehicles; they ranged in size from 15-cwt to 7 tons,

b) two 9-ton vans operated between the plant of a vendor in Irvine, Spango Valley and the depot of Wm. Hamilton's Transport (Cambuslang) Ltd. in Elderslie (see below) (this arrangement may be discontinued in 1971),

c) the 10-ton articulated van used on the Birmingham run as noted earlier.

The remaining seven vehicles were as follows:

i) 2 tractors + 3 trailers were supplied by a Glasgow contractor for use between Irvine and Spango Valley,

ii) a second Glasgow contractor supplied a 15-cwt van for use on a 3-point circuit - Glasgow, Battery Park and Spango Valley, and a 3-cwt van for use on a 4-point circuit - a Glasgow depot, a vendor in Carntyne, a vendor in Airdrie and Spango Valley,

iii) two 20-ft., 5-ton flats were used for deliveries to and from Abbotsinch; each normally made two round trips a day,

iv) a 5-ton van was employed for deliveries to and from Prestwick; it normally made two round trips a day.

In addition to these permanent arrangements, IBM Greenock makes frequent use of for-hire vehicles on an ad hoc basis.

Domestic outbound traffic is much less in volume than either exports or domestic inbound traffic. It consists mostly of machines, the modal split in weight terms during the first eight months of 1970 was:

road	93.28%
air	5.75%
post	0.70%
BR	0.27%
	100.00%

Since the sole consignee, the London-based Data Processing Division of IBM UKL, pays directly or assumes responsibility for all distribution expenses once output is put into storage locally, it specifies the mode to be used. Most machines leaving the assembly line at Spango Valley are taken directly to a commercial terminal (Ladyburn) in Greenock for checking and packing. From there, they are transported to Hamilton's depot in Elderslie where control passes to the Data Processing Division. IBM Greenock is responsible for all distribution expenses between Spango Valley and Elderslie but these are negligible relative to the value of the products involved. Commercial depots are used because of the reported lack of space at Spango Valley.

The distribution of export traffic in value terms by product and mode during 1969-70 was roughly as follows:

Product	Mode				
	Air	Road	Sea	Totals	
	%	%	%	%	%
Machines	57	44	19	100	(79)
2nd-level products*	35	42	3	100	(11)
Parts	50	6	44	100	(10)
All products	40	40	20	100	(100)

*Items such as memory units and keyboards, some with serial numbers and some without, which look like complete entities (as opposed to parts)

but in fact have no utility value in themselves; they are useful only as part of a computer system. In a sense, 2nd-level products are simply large parts; i.e., the distinction between these two categories of product is not always clearcut.

All export sales are internal to IBM; the 'buyers' specify the mode to be used and pay the bulk of the transport costs. The Invoicing Section within IBM Greenock notifies the International Traffic Department as to each buyer's modal preference. Goods are held at Ladyburn until precise delivery instructions are received. IBM Greenock pays all distribution costs incurred between Spango Valley and final loading. It also pays the difference, if any, between the cost of air freight and the cost of transport by the mode specified by the buyer originally if deliveries are late.

Most exports by air involve Abbotsinch and Heathrow rather than Prestwick, presumably because of the relative lack of flights from the latter. Air freight tariffs between London and New York and Glasgow-NY are exactly the same. Airport-based export agents handle all documentation, insurance, etc. IBM Greenock's only complaint with respect to air freight, indeed with existing transport arrangements generally, is its lack of control over transhipment arrangements at Heathrow. When deliveries go astray or get delayed, IBM Greenock only hears about it if a consignee makes a complaint. Since most parts of IBM are very quick to complain about such matters, little time is usually lost before remedial action is taken. Nonetheless, this situation is not considered to be entirely satisfactory. The problem can be mitigated, albeit for a price, by asking the airlines to keep track of urgent consignments.

Exports by road normally entail the use of Ferry Trailers Ltd., a National Freight Corporation subsidiary, and a roll-on/roll-off short sea journey to the Continent. It will have been noted above that 44% of all machine exports currently travel by road, and that machine exports comprise 4/5ths of total exports. Ferryvans (see Model Toys case study below) were used occasionally at one point for exports to the Continent but IBM Greenock found it difficult to obtain sufficient wagons.

Exports by sea take a variety of forms reflecting their widely disparate destinations. Goods bound for Norway, Denmark, Holland and Portugal are still sent via Grangemouth or Leith as ordinary sea freight although the general trend is away from these ports towards

Ferry Trailers. All goods bound for Australasia are despatched via Garscherrie Inland Container Depot(Coatbridge) and Tilbury. Sea transport is also used for all exports to Japan and South America; Glasgow is the preferred port (Greenock has only been used once - the shipment involved went to Canada). Sea exports to Canada are routed via Garscherrie and Manchester. Nothing goes to the U.S. by sea at the moment.

Transport Costs Relative to Turnover

Transport costs as a proportion of IBM Greenock's gross output during a typical quarter in 1970 were only 0.25%; the UK 7030 ratio for MLH 364 from the 1963 Census of Production was 0.9%. The difference between the two figures, of course, may or may not be significant inasmuch as the census figure is an average, it is less comprehensive excluding transport costs incurred abroad, and it predates the ratio for IBM Greenock by 7 years. More noteworthy is the way in which IBM Greenock has adjusted, consciously or fortuitously, to its location in a relatively inaccessible corner of a peripheral region.[1] Many of its inputs are purchased at delivered (though not necessarily standard) prices or imported, and most of its output is sold for little more than the ex-works price. Under these circumstances, intra-UK transport costs per se can mean very little. Indeed, the factory more and more is deliberately incurring additional inbound transport costs in order to cut total costs and improve the timeliness of deliveries. Nevertheless, expenditures on transport generally may still be less than communication costs (see below), an unusual situation for a manufactory.

General Operating Experience

IBM has clearly found Greenock to be a satisfactory location. Output there has increased phenomenally since 1951. Employment has quadrupled since the move to Spango Valley in 1954. The plant opened in that year has been expanded a number of times; a large extension was underway during the spring of 1957, a 70,000 sq.ft. addition was completed in April 1960, and a further expansion took place during the mid-1960s. By the end of the decade, 254,000 sq.ft. of floor space was being occupied. The latest extension, involving an additional

[1] There is some evidence to show that transport costs relative to output were higher a decade ago than they are now.

40,000 sq.ft. of floor space, was opened officially on 18 September 1970 although it was not quite ready for occupancy. In short, there has been almost continuous expansion at the Spango Valley site, and there is every prospect of further expansion in the years to come. While *prima facie* this assertion contradicts an earlier suggestion that lack of space has precluded the building of a company depot adjacent to the production unit, what seems to have been meant by the interviewee making this suggestion is not that a shortage of land exists but that: 1) all available floor space has been needed for production and administration, 2) production will continue to expand indefinitely, 3) a custom-built depot could not readily be converted into a production facility should the need arise, 4) a makeshift depot would be inefficient, 5) while it is essential that production facilities at Greenock be kept together, contiguousness is not necessary for production and warehousing, and 6) IBM has no particular expertise in the operation of depots.

Despite the foregoing, the company's decision to build its second UK manufacturing facility at Havant rather than Greenock must be seen as a major blow to Scotland's economic future and, to a lesser extent, as corroboration of the Scottish Council's centralisation thesis. Not only will the Havant plant soon be as big as, or bigger than, the Spango Valley works but it is located close to an important external economy, IBM UK Laboratories Ltd. at Hursley. Furthermore, IBM Information Services Ltd. (est. 1967) is situated at Havant, and IBM UKL will be moving its HQs to the area (specifically, to Cosham) from London in 1974. Presumably at least some of these activities could have prospered at Greenock in spite of its communications problem (see below) and some difficulty historically in attracting professional workers to the area because of the rather unattractive man-made environment and a shortage of quality housing. However, IBM clearly thinks that they will prosper more in the South with the result that Scotland has failed to obtain a badly-needed potential dynamic. Moreover, it will appear to many employees of IBM Greenock, particularly to the 'high flyers', that Havant has become IBM UKL's real action centre. Increasingly, ... for the very ambitious, Greenock will likely be just a way-station.

IBM UKL has three main divisions:

1) Technical and International Division - it includes both manufacturing plants,
2) Data Processing Division - it includes the sales organisation and related field staff,
3) Office Products Division (e.g., typewriters).

A fourth but minor division, External Affairs, is responsible for liaison between the company and governments, universities, etc.

Within the Greenock plant, the management structure is both relatively shallow and highly fluid.[1] During the autumn of 1970, the management pyramid was made up as follows:

Plant Manager
Assistant Plant Manager & General Management Staff[2]
Function Managers
Project Managers
1st-line Managers

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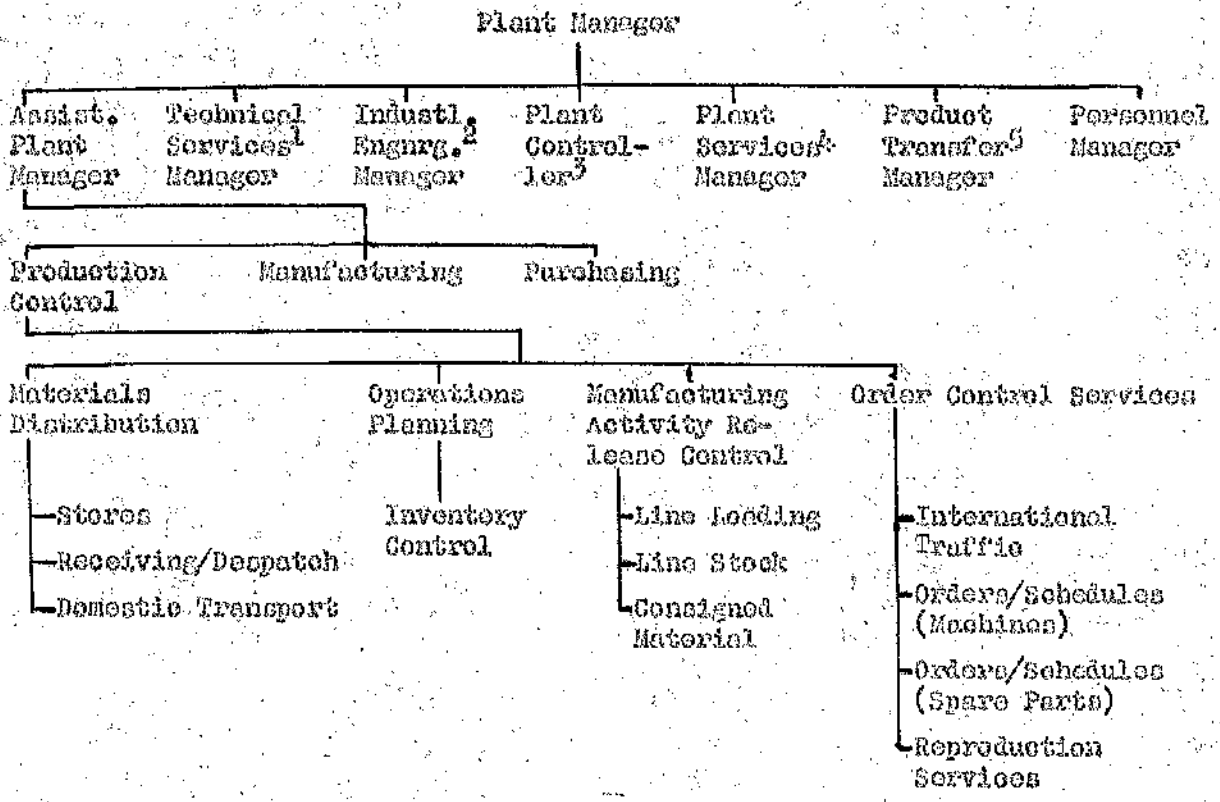
[1] 'Organic' in the terminology of Tom Burns and G.M. Stalker. See their The Management of Innovation (2nd ed.; London: Tavistock Publications, 1966), ch.6.

[2] Function managers reporting directly to the Plant Manager. Behind the distinction between GMS and other function managers lies a need to cut down on the number of people reporting directly to the 'top'.

The organisation chart prevailing during that period is presented below with special emphasis on the Production Control Function:

IBM Greenock's Organisation Chart
September 1970



External Contacts

There are some 200 managers of one type or another in the Greenock plant or roughly one for every 10 employees. It was deemed impractical to circulate our contact questionnaire to this number of eligible respondents even if senior management had been keen to help. As it turned out, they were not keen and understandably so given the implicit demands on their

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[1] Quality control, engineering support, pure engineering, etc.

[2] Work study, operations research, long-range planning, etc.

[3] Accounting, systems auditing, etc.

[4] Maintenance, safety, security, etc.

[5] Logistics, technology changes, etc. (a small and temporary function).

time and the work disruption involved. They also appeared to argue, however, that IBM was atypical because of its multinational character[1] and the unusually large proportion of graduates or equivalent in the work force, the inference from this latter point being that contact frequency was somehow correlated with educational attainment.[2] It followed from these reasons that to proceed in the intended manner with a survey of IBM managers was a waste of time since the results could not be generalized. In light of the above, it was not possible to obtain even a sample of external contact patterns.

Communications

Telephones. In October 1970, 936 telephones were available for use in the Greenock plant, i.e., almost every other employee had one![3] A majority (about 700) had blue discs on their dials; the remainder had either red or green discs. 'Green phones' were for calls internal to the plant, 'red phones' were for local area calls, and 'blue phones' were for trunk calls. Access to the national trunk network was readily obtained by dialling '9'; no switchboard was involved. There being no controls, individual calls were not costed. Indeed, there was nothing to prevent the telephone being used for non-essential and even non-business purposes. Initially, the blue phone privilege was confined to managers of whom, as already noted, there were about 200. But gradually, access to blue phones was extended to include non-managerial personnel such as systems analysts and various people in the Production Control and Purchasing Functions. Eventually a point was reached where the number of blue phones had become excessive; action was being contemplated at the time of our plant visits to curtail the blue phone privilege, in part because of growing evidence of abuse.

In a major breakthrough, IBM was allowed by the Post Office to buy and instal its own telephone equipment at Havant. At Greenock, on the other hand, all telephone facilities are owned by the PO in keeping

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[1] IBM of course is far from being the only multinational company. Nevertheless, the firm maintains that its multinational structure "goes further than most and is believed to be unique." IBM UKL memo, M.C. 137, p.63.

[2] A priori, this inference seems eminently reasonable.

[3] IBM Greenock's Internal Telephone Directory (March 1970 edition) reads: "Your telephone is a vital link in our communications system. As a business expedient it is practically unrivalled."

with its traditional monopoly policy. The Havant plant is able to record and meter all domestic long-distance telephone traffic. This facility was not built into the Greenock plant at the time of its initial construction; to do so now would require special instruments and the outlay of a sizable amount of money. Alternatively, IBM could substitute its own equipment for the existing public facilities. However, the PO has indicated that this procedure would take three months. To date, neither of the two choices mentioned has seemed worth the expense.

International telephone traffic can be and is recorded at the Greenock plant. Vouchers are used for the purpose. For each call originating within the factory, a telephone supervisor notes the following details: 1) date, 2) name and location of call recipient, 3) name, telephone extension and department of call originator, 4) length of call, and 5) its cost. This information is reviewed monthly by the Office Services Manager. Two weeks or so after the end of each month, the review findings are made known to the function managers. As an aid in keeping total costs under control, all telephone calls costing more than £15 or lasting over 20 minutes are audited if there is time; when sufficient time is not available, a sample only of the relevant call population is checked. The Greenock management is currently clamping down very hard on international calls. Conversations of up to 1½ hours have not been uncommon in the recent past. A sheet selected randomly from the pile of international telephone call vouchers for October 1970 contained the details of 15 separate calls; two out of the 15, both of them to U.S. destinations, exceeded 60 minutes in duration. The total bill for these two calls alone was almost £100! Many of the more lengthy conversations involve highly technical engineering matters.

To help curb costs, a new procedure was adopted in June 1970 whereby the appropriate manager must approve every international call by a non-managerial employee. Telex is to be used in place of the telephone wherever possible although circumstances will always ultimately determine what communications method is used. Occasionally heretofore, telex has been used to verify agreements reached over the telephone, a clearly "wasteful" procedure according to the Office Services Manager.

There were 58 telephone lines serving the Greenock plant during the autumn of 1970, 54 directory and 4 ex-directory. Two out of the 54 were reserved solely for international traffic. There has seldom

been a major problem in obtaining international lines as needed. Also, their quality has usually been good, indeed often better than that of domestic lines. (A minor problem in placing transatlantic calls has been the failure by a number of call originators to take into account the time difference between Greenock and points in the Americas!) On the domestic front, the Greenock management had never been able to obtain as many lines as it would have liked. Being physically closer the Gourock than Greenock, the factory is served by the Gourock Telephone Exchange. According to IBM, this exchange has never had adequate capacity since 1951. Periodic increases in the size of the telephone plant have been more than matched by the temporal buildup in traffic. A new industrial estate under construction between Greenock and Gourock is expected to compound the problem. During peak periods, it is almost impossible already, claims the company, to telephone into or out of the Greenock works.

Telex. Some 400 telex messages a day emanate from the Greenock factory; an estimated 450 are received. Over 1/3 of this traffic is generated by a single function - Production Control. Engineering personnel are another important traffic source. Production Control is responsible, inter alia, for maintaining adequate stocks of material. As noted previously, production line holdups can be costly, and the desirability of helping to avert them by effective inventory control procedures is taken very seriously. Thus, Production Control is constantly in touch with other IBM factories and vendors, both in the UK and abroad, to ensure that orders are being met on schedule. Most of the intra-IBM communications are sent by telex. In contrast, vendors are frequently contacted by telephone. Engineers, the other major source of telex traffic, find it helpful to have their more technical communications in printed form as an aid to accuracy and the minimization of misunderstandings.

All intra-IBM telex messages (except those to South America and some Asian destinations), including messages to UK points, go initially to the Paris office of IBM WTC (European Area) via RESPOND(Retrieval Entry Storage and Processing of On-line Network Data), a telecommunications centre in Havant operated by IBM Information Services Ltd. Paris, on the other hand, transmits directly to Greenock, i.e., it does not utilize RESPOND for such traffic. This triangular arrangement involving Paris, Greenock and RESPOND is part of IBM WTC's internal

European Telecommunications System(ETS).[1] ETS in the UK utilises private lines rented from the PO. It is analogous to the PO's Datel service but the latter, of course, makes use of public lines. ETS is not normally employed for voice transmission although a voice switching capability exists in Paris. Rather, its main purpose is to transmit telex messages and to switch them from one destination to another as required. Data are sometimes transmitted as well.

Modified PO telex machines are used in Greenock. Messages are first sorted by destination (there are some 300 IBM telex locations alone) and are then transmitted to Paris at the relatively slow speed of 60 words (1 word=5 letters) a minute. They are stored there on disco prior to being sent to their final destinations. Thus, if Greenock is telexing IBM offices in London, the route followed by the message is Greenock-Paris-London. Paris has private lines to New York and other centres, some of which serve as 'refile' points where messages are again put into disc storage before being retransmitted. Refiling occurs for instance between Paris and Beirut. Telex messages from Greenock to New York and other destinations in the U.S. and Canada reach North America via Paris. When non-NY IBM offices or telex-equipped vendors are involved, NY serves as a refile point. In the case of non-telex-equipped vendors, telegrams are sent from the New York offices of IBM WTC. Messages from Greenock to IBM offices in South America and some Asian locations do not go first to Paris being sent directly through the international telex operator, London, over commercial lines. Such messages total about 40 a day, 10% of outbound traffic. About 40 outbound messages a day are destined for vendors. Most are either in the UK or North America although a few Continental ones are used.

The advantages claimed for ETS are its speed and cheapness relative to the commercial telex system, guaranteed line quality and message protection (all messages are logged and can thus be retrieved by means of a code number). These advantages stem from the privateness of the system. However, ETS has not been trouble-free, it has had to cope with a phenomenal growth in traffic, and, as already pointed out, it transmits at a relatively slow speed. One factor

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[1] Cf. Brian Simmons, "Private Wire Economics," Financial Times, 3 Jul 70, p.17.

that has facilitated its use is IBM's insistence on standard word abbreviations. These are set out in manuals issued by IBM WTC(NY). (Cf. the Plyglass case study below.)

Expenditures on telecommunications. Some £60,000 was spent in Greenock by IBM during 1969 on telegrams, telephone and telex rental charges, and telephone and telex user charges. Expenditures in 1970 were expected to rise to about £100,000. Contributing to the increase were exceptionally heavy international telephone traffic and an approximately 7.5% jump in telephone and telex charges effective 1 July 1970. Actual international telephone (only) charges for the 7-month period, January-July 1970, were:

transatlantic calls	£22,496
Continental calls	3,946
total international calls	£26,442

It is difficult to project these figures over a 12-month period for three reasons: 1) the Greenock factory was closed during much of July because of holidays, 2) traffic rises to an annual peak during the September-December period, in part because of preparations for the end of the corporate financial year on December 31st, 3) the rise in charges mentioned above.

Post. Some £16,000 was spent on postage in 1969. The post is used, of course, for many reasons. Some of the main ones in the case of the Greenock works are: 1) invoicing, 2) the payment of bills, 3) the sending of purchase orders to vendors, 4) the transmittal of engineering specifications and various IBM WTC manuals, and 5) traffic with IBM UKL HQs in London arising out of the Personnel Function's activities. In general, the Greenock management spoke favourably of the post.

Other communications devices. Taxis are used on average about once a day for the delivery of urgent messages to planes at Abbotsinch or Prestwick.

Communication costs relative to turnover. Communication costs incurred by Greenock personnel in 1969 totalled about £76,000. Regrettably, it has not been possible to obtain either a comparable turnover figure or an official estimate of the communication cost/turnover ratio. However, as a guess, this ratio was probably about 0.3% in 1969. Also, it seems likely that the ratio trend has been

upwards recently for three reasons: 1) the assertion by a senior manager that outlays on communications are considered by management to be a very important cost variable, 2) the concern noted earlier over long-distance telephone costs, and 3) the mid-1970 jump in telecommunications charges.

Travel

While it was not possible to circulate our travel questionnaire to any of the managerial staff in Greenock owing to the difficulties mentioned earlier in the section on external contacts, some interesting information on various aspects of travel by Greenock personnel generally was obtained by interview. For instance, it was ascertained that travel is a very common phenomenon. Selection of mode is left to the individuals concerned. Most seem to prefer air. Personnel flying abroad enjoy the convenience of Prestwick and use it whenever possible. Air services from Scotland to the Continent, however, are felt to be inadequate necessitating considerable use of Heathrow and Manchester. But the use of Heathrow in particular frequently involves a great deal of time wastage in 'stacking', etc. Hence, the Greenock management strongly supports the survey of Scottish air services launched during 1970 by the Scottish Council. A commonly unrecognised aspect of the problem of inadequate services, according to IBM, is the usefulness of passenger flights for air freight. Thus, when KLM, for example, stopped using Prestwick a few years ago in connection with its North American services, a good deal of air cargo space was lost to Scottish manufacturers in addition to passenger seats.

Careful and timely travel records are maintained by IBM Greenock. An air bookings register is kept, for example, and tabulations such as those in the following tables can be made available soon after the end of each month. Before examining these tables, it is worthwhile looking briefly at the recordings procedure which is interesting in itself and not just as a source of statistics. Black's Travel Agency Ltd., a multi-branch firm, has a full-time office inside the factory. An employee wishing to travel submits a travel order form to his/her departmental manager for approval. Copies then go to Black's for ticket issuance and to a section of the Plant Controller Function for record maintenance. Black's is not paid directly by IBM UKL but on a commission basis by the various travel businesses utilised. Each function has an annual travel budget disaggregated by department.

Domestic Air Bookings by IBM Greenock Personnel During October 1970 by Carrier and Destination

Destination	Carrier					
	Cambrian Airways	BEA	British Island Airways	British Midland Airways	BUA	Totals
London	..	143	..	1	59	203
Southampton	..	..	..	..	50	50
Birmingham	..	18	..	..	..	18
Manchester	..	9	..	..	..	9
E. Midlands	..	..	..	8	..	8
Leeds	..	..	..	6	..	6
Isle of Man	..	..	3	..	..	3
Belfast	..	2	..	..	..	2
Liverpool	2	..	..	..	..	2
Bristol	1	..	..	..	..	1
Newcastle	..	..	..	..	1	1
						303

International Air Bookings by IBM Greenock Personnel During October 1970 by Carrier and Destination

Destination	Carrier									
	AF	AL	BEA	BOAC	KLM	LH	QT	SAS	TWA	Totals
Paris	9	..	23	..	..	..	..	..	..	32
Stuttgart	..	..	4	..	..	14	..	..	..	18
Toronto	..	..	..	7	..	..	..	..	..	7
New York	..	..	..	5	..	..	1	..	..	6
Amsterdam	..	..	..	..	4	..	..	..	..	4
Milan	..	1	3	..	..	..	..	..	..	4
San Francisco	..	..	..	..	..	..	..	..	4	4
Binghampton	..	..	..	3	..	..	..	..	..	3
Copenhagen	..	..	..	..	..	..	..	1	..	1
Miami	..	..	..	1	..	..	..	..	..	1
Montpellier	..	..	1	..	..	..	..	..	..	1
Munich	..	..	..	..	..	1	..	..	..	1
Raleigh	..	..	..	..	..	..	..	..	1	1
Rome	..	..	1	..	..	..	..	..	..	1
										81

Airline Codes:

AF	Air France
AL	Alitalia Air Lines
BEA	British European Airways
BOAC	British Overseas Airways Corporation
BUA	British United Airways
KLM	Royal Dutch Airlines
LH	Lufthansa
QT	Qantas Airways
SAS	Scandinavian Airlines System
TWA	Trans World Airlines

Turning to the tables, we see first that domestic air bookings during October 1970, a typical month, greatly exceeded international

bookings. On a percentage basis, taking the total number of bookings (387) as 100, we find that over 3/4s (78%) were to domestic destinations. Two-thirds (67%) of these domestic bookings were to one centre - London. A further 16.5% were to Southampton. The rest were much more widely dispersed. London and Southampton, of course, either have or are close to sizable contingents of IBM UKL employees suggesting that many of the trips had as their main purpose face-to-face contacts with other members of the company. Two centres, Paris and Stuttgart, also dominate the international air travel pattern, accounting together for 60% of the total number of bookings. Again, the remainder showed considerable dispersal. Furthermore, it seems reasonable to assume from the foregoing, and from the nature of the Greenock operation, that many of the international trips had intra-firm contacts as their governing motive. Almost 3/4s (74%) of the international bookings were to Continental destinations. The remainder were to North America with Toronto being the most popular destination followed closely by New York. This ranking suggests that technical rather than executive matters were behind many of the trips. Not only are IBM's Canadian operations centred in Toronto; the city is also the location of a large IBM manufacturing unit similar to that in Greenock.

The Outlook[1]

Computer production has been one of Britain's most dynamic growth industries for several years now. Yet, according to some observers, computer usage in the UK is still only a fifth of the U.S. level. Thus, there is little doubt that output will continue to expand faster at Spango Valley than in Scotland as a whole during the 1970s. Communications facilities in the Greenock area and Scottish air services can also be expected to improve during the decade thereby vitiating some current complaints by IBM Greenock. On the other hand, it is unlikely, given recent developments at Havant, that the Scottish factory will become anything more than a production unit.

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[1] For a critical look at the future of the computer industry generally, see Dan Smith, "The Accident-Prone Miracle: A Survey of the Computer Industry," Economist, 27 Feb 71, pp.xl.

CHAPTER 16

MODEL TOYS LIMITED - A CASE STUDY

Summary

Location: Torbothie Rd., Shotts, Lanarkshire.

Approximate distances: Glasgow (20 miles), Edinburgh (28), London (389).

Order & MLH: XVI-494 (1958 SIC); XIX-494 (1968 SIC).

Commencement of Production in Scotland: July 1964.

Capital employed: n/a.

1970 employment: 800.

1970 turnover: n/a.

Product: plastic toys.

Average product value: about £1,018 a ton.

Type of production: both mass assembly and moulding with the former being the more important in terms of employment.

Main markets: over 75% export, the remainder UK.

Ownership and organisational status: originally a transfer, now part of the Berwick-Timpo Group, London.

Assessment of transport factor: in general, Model Toys (MTL) does not find transport a problem in part because of its own keen interest in the field. Other reasons are the firm's low TCGO ratio (1.9%), the use of own-account transport for the majority of domestic deliveries, and the policy of selling f.o.b. British 'port' in the case of exports.

Assessment of communications factor: no complaints despite heavy use of communications network. Lack of readily available cost accounts of the right type precludes the calculation of a CCGO ratio.

Corporate Background

Model Toys is one of the few remaining all-British toy companies, being part of the Berwick-Timpo Group, London. The firm began in London pre-1939 as a toy importing and distributing company - hence the appellation, Timpo, or toy imports. World War II destroyed the importing end of the business. Thus the owners, Messrs. S. Gee and S. Lander, turned to manufacturing. By 1964, they were operating three small toy factories plus a warehouse in different parts of London under the Model Toys name. Their decision to locate in Scotland involved the complete cessation of activity in London and the transfer of all machinery and equipment to Shotts. The date of the move was July, 1964. Some two years later, MTL was sold to the Berwick Toy Co.

Ltd., Wallasey, Cheshire. Two considerations led to the decision to sell. Most important was the desire of Messrs. Gee and Lander to ensure the long-term future of the company. Mr. Lander was in declining health (he has since retired) and neither he nor Mr Gee had natural heirs. A second but less significant reason was a need for additional capital to finance large-scale expansion plans (see below). More recently, control has shifted to London with the formation of the Berwick-Timpo Group. Mr Gee continues with MTL as Sales Director but now resides in Zug, Switzerland, a town of some 15,000 midway between Zurich and Lucerne. MTL has a subsidiary, Timpo AG, in Zug. It was formed in 1967.

Location Factors

By 1964 Messrs. Gee and Lander were experiencing great difficulty in coordinating the activities of their four spatially-separate London operations. Also, an excessive amount of time was being spent moving goods between the different buildings. Thus a search began for a way of getting everything under one roof. Suitable premises seemed to be out of the question in the London area in part because of the very high rents being asked. Therefore, the owners approached the Board of Trade (BOT) for information on the Development Districts. Their prime requirements were twofold: 1) a large supply of available female labour, 2) a building suitable for immediate occupancy. MTL could not afford the loss of much production. Accordingly, any move had to be capable of completion within a very short time.

The BOT provided a short list of alternative locations. Of these, Shotts seemed to offer the best prospects. A mining town in the heart of the North Lanarkshire coalfield, it had seen most of its pits close. Unemployment, male and female, was considerable. In addition, there was a large reservoir of female labour in the area which, because of a chronic lack of job opportunities, was not technically unemployed but was nonetheless felt to be available for employment, given a chance. The only large-scale employer of women anywhere near Shotts in 1964 was the Honeywell electronics complex on the Newhouse Industrial Estate some 10 miles distant. Thus, competition for female workers was not expected to be strong. A Shotts advantage apart from the labour factor was the availability on the edge of the town of advance factories for rent from the Scottish Industrial Estates Corporation(SIEC). In addition, the full range of Development District

incentives applied to the area including accelerated depreciation of investment in new plant and machinery, grants equal to 10% of the cost of such investment, and special grants and loans on the advice of the BOT Advisory Committee.

One reservation held by Messrs. Gee and Lander with regard to a Shotts location was its suitability as an export centre. Then, as now, exports comprised over 75% of MTL's turnover. However, this reservation did not prove crucial and Shotts was selected as MTL's new HQs. The move from London was largely accomplished over a weekend. Very little production was lost. Two trainloads of machinery, equipment, raw materials, stocks, etc. were involved. Most of the machines were back in production it is claimed within 30 hrs. of being shut down. Both owners took up residence in the new location.

Products and Production Technology

MTL produces 150 different 'lines' of plastic toy at Shotts such as model figures (e.g., soldiers, Indians, cowboys) and 'Wild West' buildings. The production sequence involves moulding, assembly and packaging.[1] As of early November 1970, MTL had 55 injection-moulding machines in operation and another 12 on order. It also had more than 100 over-moulding machines and claimed to be the largest plastics moulding "shop" in Scotland. The injection-moulding machines are very expensive costing currently from £12,000 to £18,000 apiece, and must be used intensively if their costs are to be fully recovered. MTL operates them (but not the entire factory) 24 hrs. a day, 7 days a week. The over-moulding machines are of MTL's own design. Over-moulding is a technique whereby different colours of plastic can be applied sequentially to the same figure or item. MTL claims that the over-moulding development gives it a unique advantage.[2]

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[1] Assembly line operations in a factory owned by Lesney Products Ltd., one of MTL's British competitors, were described recently in a supplement to The Times. See Innes Macbeath, "Change Could Be Key to Job Enrichment and Higher Productivity," in "Involvement at Work: A Special Report," The Times, 23 Nov 70, p.III. The job enrichment scheme outlined there is analogous to one adopted a few months ago (i.e., about mid-1970) by MTL. While this aspect of MTL production is obviously important, it is not relevant to our thesis and thus is not discussed here further.

[2] On plastics moulding generally, see Couzens and Yarsley, Plastics in the Modern World, pp.167-74.

Markets and Marketing

Less than 25% of turnover is derived from the UK market. Of total exports, Western Europe (including Greece) accounts for 80% and non-European countries such as Canada, Australia, Argentina and the United States for the remainder. To date, the main emphasis in the export field has been on the West European market. However, other foreign markets are being built up steadily if not very quickly.

Exports generally are preferred to home market sales for several reasons. First, fewer customers are involved easing distribution problems. By using only one distribution agent in each national market and by selling f.o.b. British export point, MTL has cut its role to the minimum commensurate with the quality service that it tries to provide. Second, the average size of export order is larger leading to longer production runs, lower packaging costs and the cheaper transport rates available on volume shipments. Third, the firm has been export-oriented almost from the beginning of its manufacturing activities, has genuine expertise in the export field, and is international in outlook. As a consequence, much of its product range (e.g., Romano with catapult) is designed for sale abroad and its catalogue is multilingual with the four languages used (English, French, German and Italian) all receiving equal prominence.

The toy market is extremely competitive.[1] While manufacturers constantly strive, using a wide variety of stratagems, to differentiate their products from those made by their competitors, because of what appears to be a relatively low elasticity of aggregate demand for toys, product differentiation cannot be carried very far before diminishing returns in the form of reduced profits set in for the industry as a whole.[2] For individual manufacturers, on the other hand, product differentiation can be extremely important. Witness for example the

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[1] Cf. Philip Clarke, "Something Nasty in Santa's Toy Grotto," Sunday Times, 20 Dec 70, p.36. According to Clarke, outlays on toys and games by UK consumers in 1969 totalled £81 million. Lumsden, in what seems to be a much more accurate figure has valued the 1969 UK retail market at £183m. Andrew Lumsden, "Toys: No Fun in the Falling Profits," The Times, 20 Aug 70, p.21.

[2] In textbook terms, for many if not most producers price remains greater than long-run marginal cost.

impact of Rosebud Mattel's 'Hot Wheels' innovation on the profitability of Lesney Products.[1] Of perhaps less significance than product 'uniqueness' in the short run but of greater import over the long haul is type of construction material. Cousens and Yarsley note for instance that in little over a decade plastics have superseded wood and metal as the material "par excellence for the toy-maker".[2] Take the case of toy soldiers. Lead used to be the main construction material but by four years ago in the UK it had given way entirely to plastics. Now lead models which sold for 1d. each when new are being auctioned for £2 and more apiece![3]

Despite product differentiation and material supersession, for many adult customers at any given point in time (if not for the modern child) a toy in the final analysis is simply a toy. Toy budgets are largely fixed. Thus, if toy X exhausts an individual budget, toy Y will either not be bought at all or only after the elapse of some considerable time interval.

Whereas MTL is one of the leading producers of plastic figures in the UK and the only producer of ancillary items such as buildings, it follows from the foregoing that the firm has nothing approaching a genuine monopoly position in any segment of the domestic marketplace in part because of the widespread availability of imports but more importantly on account of the ease with which customers can and do substitute one toy for another. Indeed, the key element in MTL's marketing strategy is price. Close behind however are product quality and display packaging.[4] Only slightly less significant are product range and availability of complementary products (e.g., cowboys and

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[1] "Lesney Products, Lines Bros.: How the Mighty Have Fallen," Economist, 31 Oct 70, p.80; Anthony Hilton, "Fire in the Matchbox," Observer, 23 Aug 70, p.8. Nonetheless, The Times 1000: 1970-71 showed Lesney earning 31.7% on capital employed (81.7% the previous year!). In contrast, Lines, although it was the largest British toy manufacturer with annual sales of c. £38m, made only 8.9% on its investment (9.9% the previous year).

[2] Cf. op. cit., pp.249-52.

[3] Tim Jones, "Army Goes for the Highest Bid," The Times, 9 Dec 70, p.4.

[4] An Edinburgh firm of commercial artists does much of the design and development work intrinsic to MTL's successful display packaging. This firm also assists with the production of the annual MTL trade catalogue. The 1970 version was printed in England. However, if MTL proceeds with tentative plans for the issuance in 1971 of its first colour catalogue,

Indians, guards and sentry boxes, Arabs and Legionnaires, or farm animals and farm buildings). Above all, MTL attempts to produce something for every price bracket. Taking price as given, it then tries to manufacture a competitive product to match. In October 1970, the company's 150 product lines ranged in value from 9d. to £3.10.0.

Purchases and Inbound Transport Costs

The most important purchases of 'material' by MTL are:

1) bags of various plastics granules, e.g., high-impact polystyrene, low-density polyethylene and high-density polyethylene (MLH 276-1958 SIC)
2) cardboard display boxes (MLH 482)
3) outer cardboard cartons (MLH 482)

Minor purchases include glass (MLH 463) and metallic powder (MLHs 321-22) for the Etch-a-Sketch line, cellulose acetate film (MLH 276) and shrink-wrap film (MLH 276). Most of these inputs come from English origins. Notable exceptions are the outer cardboard cartons (from Bowaters), some of the display boxes, stationery and layout sheets, all of which are made in Scotland. One of the few imports, if not the only one, is the metal tip of the Etch-a-Sketch stylus (MLH 399) which is manufactured in the U.S. by the same firm that supplies the original U.S. patentee.

Most of the inputs are purchased on a delivered price basis and the associated transport costs are not identifiable by MTL. Suppliers grant a rebate in lieu of transport costs however when MTL vehicles collect purchases directly from their works. This occurs quite frequently, especially in the case of the plastics. In fact, MTL vehicles pick up a quarter in value terms of the firm's total plastics purchases. In contrast, paper products are almost never collected by MTL from their places of manufacture. Overall, some 7.5% of total purchases in value terms are brought to Skotts by MTL personnel. Yet the cost to the company is negligible. Special trips for the purpose of picking up supplies are rarely made. Indeed, normally three conditions must be met simultaneously before collection is undertaken:

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the printing may be done in Germany for reasons of punctuality and general reliability rather than price. The latter promises to be much the same in both countries with the UK having perhaps a slight advantage.

1) an MTL vehicle is returning to Shotts empty after making a delivery, 2) it is passing by or close to the works of a supplier, 3) the stock of the item in question at Shotts is becoming depleted. Since the lorry would be returning to Shotts anyway, and since a driver is seldom asked to deviate very far from his preplanned route, few extra costs are incurred.

Purchasing and stock control is the responsibility of the MTL Buyer in Shotts. By virtue of continuous and close liaison with the Transport and Warehouse Manager, he knows when a company lorry is "down South" and when a pickup can be arranged economically. Two-three weeks' supply of most stock items is the norm. Three criteria govern the selection of suppliers: 1) product quality, 2) price, 3) service - in that order. For example, price cannot assume paramountcy over quality in the case of plastics purchases for the simple reason that poor-quality granules would gum up the injection-moulding machines.

An interesting development on the immediate horizon in connection with the buying function is MTL's plan to shift to a system whereby colour is added to the various plastics by its own personnel as required; heretofore granules were bought already coloured. The reasons for the change are threefold: 1) the firm will be able to do away with all coloured granule stocks and thus the possibility of waste through occasional overbuying, 2) the leadtime necessary for re-ordering will be shortened by confining purchases to one neutral colour of granule, 3) the space occupied by 'material' will be cut down - space is in very short supply at the moment even with a recent plant extension.

Distribution

Formulation of policy. Existing policy was formulated by the Commercial Manager in his previous position as head of the Shipping Department (see organisation chart below). He still maintains an active interest in the subject being the immediate superior of the present Shipping Manager. His qualifications for the task appear to be better than average for British industry and include associate membership in the Institute of Shipping and Forwarding Agents. Policy is kept under frequent review, particularly as it pertains to exports. MTL professes to look at most important changes affecting the company from a total distribution cost point of view as well as from other viewpoints but does not keep detailed distribution cost records.

Home market distribution. MTL sells only to wholesalers and, like the domestic toy trade generally, pays all delivery charges. It owns three lorries but no depots. The only rented depot employed is one beneath part of the company's manufacturing area (the plant is on a hillside). Some 75% of home market sales are delivered in the MTL lorries. The remaining portion is divided between BR (20%) and commercial road hauliers (5%). As these rough percentages suggest, non-company lorries are used only in exceptional circumstances. MTL does not sell directly to retailers for three interrelated reasons: 1) the problems involved in cutting out the wholesaler entirely would not be worth the extra gross revenue, 2) it is difficult selling to both wholesalers and retailers - usually, according to the Commercial Manager, it has to be one or the other, 3) delivery to retailers would necessitate depots and a mammoth lorry fleet, i.e., a sizable capital outlay and an enormous amount of extra work. Delivery times vary widely depending on the product, the season, the location of the consignee and the transport mode used.

Deliveries are coordinated by the Transport and Warehouse Manager who reports directly to the General Manager (see organisation chart). He decides on the division of traffic between the company lorries and other means of transport, plans the delivery routes and supervises loading. In general, MTL uses its own lorries wherever delivery requirements are reasonably regular because of the ever-present danger of pilferage (an exception is the use of the Freightliner service mentioned below). Toys are consumer goods and thus particularly subject to theft. Interestingly, the cost of pilferage to MTL is not so much the value of the goods lost as the time and expense involved in making a claim. The latter bears little relationship to the amount claimed.

BR is used for deliveries to the more remote consignees although, in the experience of MTL, 14-21 day intra-UK transit times are not uncommon. Surprisingly, BR offers a wider territorial coverage than BRS and its rates are cheaper. The explanation for this latter phenomenon lies in the nature of the typical shipment and the carriers' pricing policies. Most MTL output is relatively low in weight and value per cubic foot,[1] i.e., it is high in 'cube'. Because BR's rate

[1] The average value of MTL output is about £1 per kilo or roughly £1,018 per long ton but we have not obtained precise data on weight or value per cubic foot.

structure is more favourable than the BRS tariffs with respect to goods with such characteristics, the railway gets MTL's business.[1] BR invariably collects from the works.

MTL despatches one containerload of products destined for the home market each week via the Cushetfaulds Freightliner terminal in Glasgow some 20 miles away. Only one product line is involved - Etch-a-Sketch - for which Denys Fisher Toys Ltd., Boston Spa, Yorkshire has sole UK and Commonwealth marketing rights.[2]

Exports. MTL now sells the bulk of its output destined for the Continent f.o.b. Bathgate, an inland centre 12 miles from the factory. Prior to 1970, however, most sales to Continental customers were made f.o.b. Grangemouth, a port twice as far away, or f.o.b. Leith, another Forth port, 30 miles away. Grangemouth continues to be used for shipments to certain ports in northern Europe.

What was behind the shift from Grangemouth and Leith to Bathgate? The answer to this question illustrates MTL's unusual expertise in the distribution field. The firm acts as its own forwarding agent from the works to the point of export unless a customer specifies otherwise. Under the old distribution system, it found that dockside queues were frequently tying up the company lorries for an entire day despite the relatively short distances between Shotts and Grangemouth or Leith. Loading on to the various ships was entirely out of its control. Containers were not used and extra packing was necessary to minimise damage arising out of any mishandling by the dockers. At Bathgate however there is no queuing. The consequent drop in turnaround time means better utilisation of the lorries and their 2-man crews. BR offers a rail ferry wagon or 'Ferryvan' service between Bathgate and the Continent. Ferryvans provide the same payload capacity as 40-ft. containers (2,500 cu. ft.) but in contrast to containers are rigid on their bogies. The Ferryvans offered to MTL at Bathgate are loaded by the firm's own men thereby avoiding 3rd-party handling and of course are always filled to capacity to secure for MTL the best rates and to

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[1] Cf. the discussions of pricing in the rail and road industries in Reid and Allen, Nationalized Industries, chs.5 & 6, passim.

[2] Denys Fisher subcontracts the production of many of the toys sold under its name. The firm is owned by General Mills Ltd., a U.S. conglomerate.

avoid many customers' dislike of groupage. BR quotes through rates to a number of Continental points. The actual delivery route followed by MTL-loaded Ferryvans is Bathgate-Harwich-BR short sea ferry to Zeebrugge (or Dunkirk depending on the final destination)-Continental railway to consignee. Germany is MTL's biggest single export market. By using Ferryvans, the firm can package its products more lightly. Also, Ferryvan rates are apparently very favourable in the case of relatively low weight/high cube goods such as plastic toys, especially when the containers are filled to capacity. In addition, the Ferryvan service is relatively fast. MTL has found that its products can be in the hands of Continental wholesalers within 10 days of their despatch from the Shotts warehouse even in the case of destinations as far away as Copenhagen and Malmo. In light of the foregoing, it is not surprising that MTL has shifted so enthusiastically to the Ferryvan. Indeed the company claims to be the largest user in Scotland. On the other hand, the availability of the Ferryvan service does not appear to be widely known or publicised.[1]

Whereas MTL is very keen to provide good service to its customers, it loses control over many of the transport arrangements affecting its products by selling f.o.b. British export point. In fact, from this point onwards to the wholesaler the arrangements are specified by the Continental distribution agents. It took some time before MTL could convince the bulk of them that they should make use of the Ferryvan service[2] but now most specify it. MTL has investigated the economics of delivering direct to Continental wholesalers but has decided, at least for the time being, to continue with existing arrangements. The firm estimates that a Continental delivery policy would necessitate a markup on its ex-works price of 39-46%. Since existing arrangements already result in markups within this range, MTL has decided that the

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[1] Cf. Ronald Holloway, "The Problems of the Ports," Lloyds Bank Review, No.99 (January 1971), 14. Holloway, until recently the economist to a major UK port authority, foresees little growth in the use of roll-on/roll-off rail ferries for unit load traffic.

[2] According to the Economist, freight forwarders are a "notoriously conservative bunch of people". Also, "European railways are notoriously bad at co-operating with one another." "Landbridges: Going Slow," Economist, 14 Nov 70, pp.84 & 87. MTL has apparently not suffered from the latter problem. The former statment however would appear to be at least partly applicable to distribution agents!

potential payoff from the assumption of additional responsibilities in the area of distribution to the Continent would not be worth the candle.

Exports to Australia are sent via Overseas Containers Ltd.(OCL). The goods are picked up in Shotts. Customs clearance takes place at the Garthsherrie Inland Container Depot in Coatbridge, 15 miles distant. From there, the goods are sent via Freightliner to Tilbury where they are loaded on board an OCL containership. Very unusual is the fact that OCL rates on the intra-GB leg of the journey are uniform throughout the island irrespective of the origin of the goods.[1] On the other hand, the rates are based on the cubic capacity of the container used[2] and not on its weight or the nature of the contents. MTL clearly benefits from the first aspect of the rate structure but is penalised by the second. On balance, however, its location with regard to the Australian trade does not present the disadvantages that might appear to exist prima facie.

Exports to the U.S. and Canada are sent on containerships via the ports of Greenock and Glasgow respectively. Contract hauliers handle the inland transport involved. In the case of shipments to other countries, e.g., Argentina, MTL tries to use the closest possible port given its export pricing policy, subject of course to the constraint of sailing frequency. Thus, while Liverpool might be preferred to London, it may occasionally be necessary to use the latter due to the absence of a ship within a reasonable time period at the former.

MTL's growing use of containers, particularly for export shipments, and the attendant packing problems have led it to investigate the feasibility of cutting down on the number of outer cartons sizes currently (October 1970) being employed. The results of this exercise are striking. Whereas 28 sizes are used at the moment, only three

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[1] K.M. Johnson and H.C. Garnett, "Containerisation: Overseas Trade," Ch. 3 in Containerisation: Implications for Distribution and Transportation in West Central Scotland, Final Report to the Scottish Development Department and the Glasgow Chamber of Commerce by the Universities of Glasgow and Strathclyde (Glasgow, 1970), p.3.17; H.C. Garnett, "Competition Between Ports and Investment Planning," Scottish Journal of Political Economy, XVII (November 1970), 418.

[2] 10% discounts are offered on 'full' containerloads, 'full' meaning 2/3rds or more of total capacity.

sizes will be used next year: large, medium and small.

Air freight is used solely for the shipment of samples. Customers have generally been unwilling to pay air charges on normal consignments. MTL foresees no change in this attitude.

Transport Costs Relative to Turnover

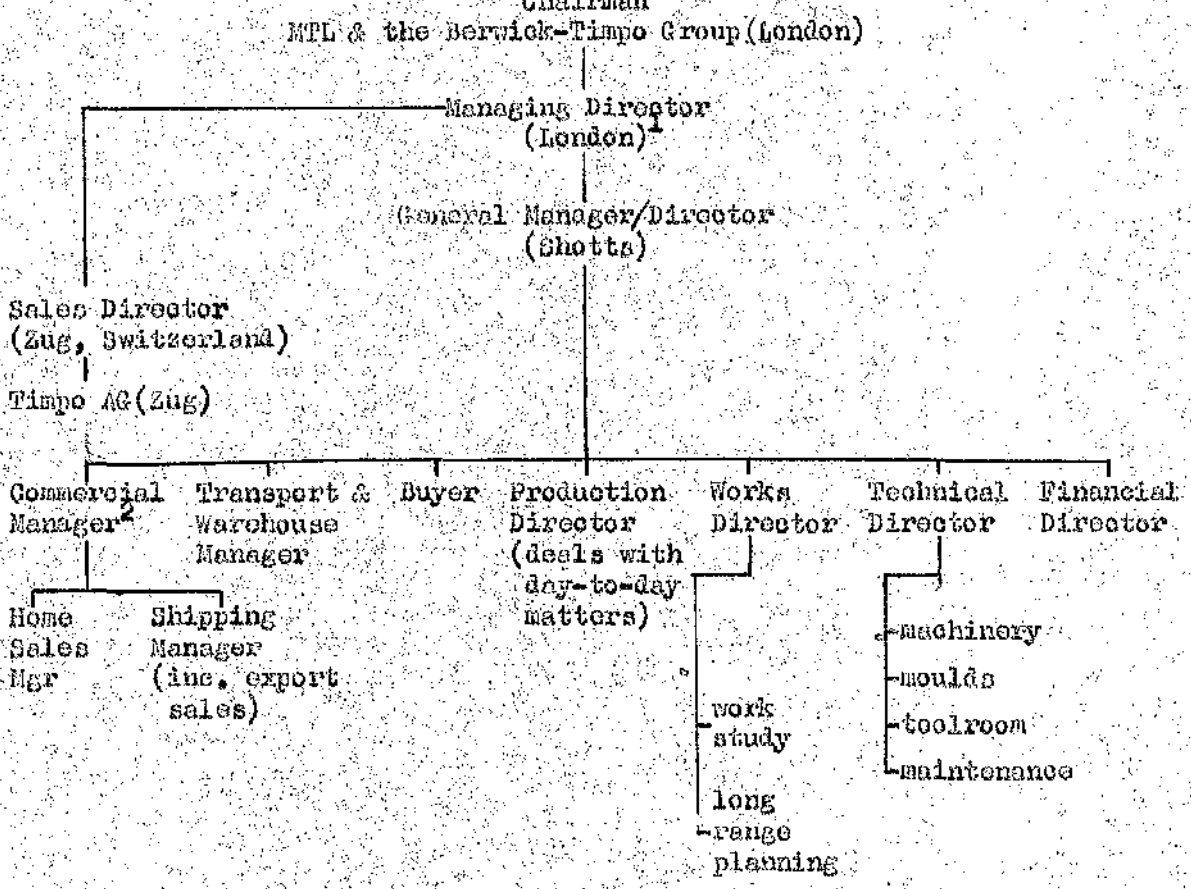
Inbound transport costs, as we have seen, are negligible. Outbound transport costs form about 10% of the value of the MTL invoices relating to domestic deliveries by BR and commercial road hauliers but only about 5% (including provision for depreciation) in the case of own-transport deliveries. Domestic sales represent some 25% of total turnover. Outbound transport costs in connection with export shipments are less than 0.5% of the value of export sales. It follows that the outbound transport cost/turnover ratio is 10% for 6.25% of total sales (1/4 x 25%/100), 5% for 18.75% (3/4 x 25%/100), and less than 0.5% for the remaining 75%. Therefore, the total transport cost/turnover ratio is less than (6.25 x 10) + (18.75 x 5) + (75 x 0.5)/100 or 1.9%.

General Operating Experience

MTL has flourished in Shotts. Its original floor space was 60,000 sq.ft. This figure was doubled in 1966; in 1970 it was further increased to about 150,000 sq.ft. (the 1970 extension was completed during the summer). In both instances, SIEC contributed the necessary capital. MTL's relationship with this body has generally been very satisfactory. Despite the recent extension, MTL can still not satisfy demand and the receipt of order/delivery gap is growing wider and wider. Employment in 1964 was about 150. Today it is 300. Both figures relate mainly to women.

The company's managerial structure as it existed in October 1970 is presented in chart form on the following page.

Organisation Chart
Model Toys Ltd.
October 1970



Several changes in the upper echelons were authorized by the Board of Directors in November 1970, viz.:

1) the post of General Manager was abolished

2) the existing General Manager/Director will become the Managing Director(Shotts)

3) the existing Managing Director(London) will become MTL Chairman (London)

4) the existing Chairman of MTL and the Berwick-Timpo Group(London) will become the Chairman of the Berwick-Timpo Group only.

These changes are diagrammed below.

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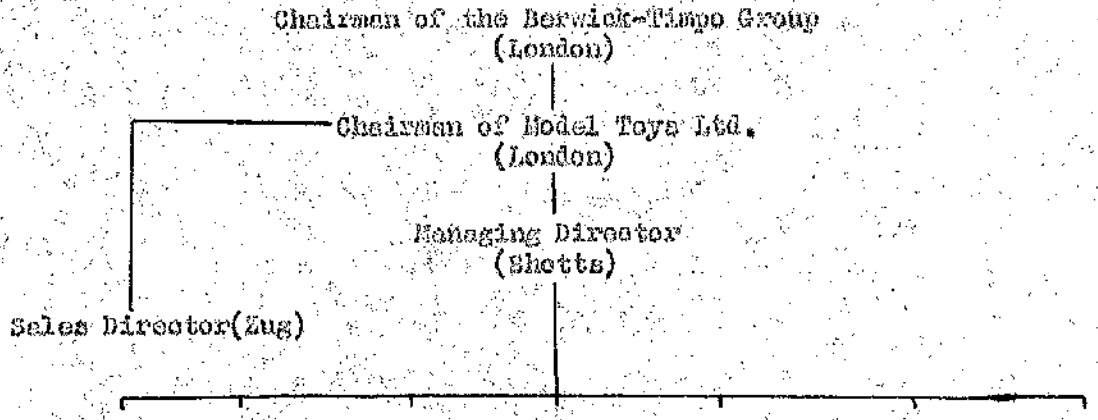
[1] Main concerns: finance, marketing.

[2] An assistant to the General Manager with responsibilities for order processing, invoicing, liaison between production and sales, office routine, hiring of office staff, customer relations and toy fairs.



External Contacts

Customers. Most members of MTL's top management staff in Shotts (cf. the organisation chart above) were asked to indicate the frequency with which they had contact with existing or potential customers and the main contact method used.[1] Seven replies were received, enough to obtain a reasonably detailed insight into the variables under examination. The results are presented below.

Category of Manager	Frequency of Contact	Main Contact Method
General Mgr/Director	Yearly	Post
Works Director	Infrequently	Telephone
Buyer	Never	n/a
Commercial	Daily	Telephone, post[2]
Home Sales	Daily	Post
Shipping	Infrequently	Post
Work Study	Never	n/a

Two points are particularly noteworthy. The first is the importance of the post as a means of customer contact. As is indicated later on, telex is not widely used in the toy trade. MTL's product range on the other hand is very wide making some form of written contact with customers essential. The obvious contact method in these circumstances is the post. More generally, however, logic would suggest the telephone to be the ideal instrument for daily contact over any sort of distance. Secondly, the lack of contact between the Shipping Manager and customers is surprising given his responsibility for export sales and the daily contact paradigm of the Home Sales Manager. Presumably foreign customers are the preserve of the Commercial Manager and the Sales Director. The latter of course is resident abroad.

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[1] The questionnaire was circulated by the Commercial Manager.

[2] The Commercial Manager was consistently unable to delineate a single main method.

Suppliers of goods/materials. One would expect the Buyer to be in very close contact with the suppliers of 'material' and this was indeed the case as indicated by the following table based on the questionnaire survey referred to above.

Category of Manager	Frequency of Contact	Main Contact Method
General Mgr/Director	Monthly	Telephone
Works Director	"	" "
Buyer	Daily	"
Commercial	"	Telephone, post
Home Sales	Weekly	Telephone
Shipping	Never	n/a
Work Study	Infrequently	Telephone

More interesting perhaps than the expected is the revelation of daily contact between the Commercial Manager and suppliers of goods/materials, and of weekly contact on the part of the Home Sales Manager. Neither of these phenomena is readily explicable in *a priori* terms. As for the main contact method, the telephone would appear to predominate.

Suppliers of services. Three of the seven managers/directors for whom information is available had daily contact with suppliers of services and a fourth had weekly contact. While none of these

Category of Manager	Frequency of Contact	Main Contact Method
General Mgr/Director	Infrequently	Post
Works Director	Yearly	Telephone, face-to-face away from works
Buyer	Daily	Not specified
Commercial	"	Telephone, post
Home Sales	Weekly	Telephone
Shipping	Daily	Telephone, post
Work Study	Infrequently	Telephone

individual frequencies is particularly remarkable in itself, the resulting proportion, 4/7ths, is of interest because of its size relative to the proportions for other groups, i.e., it is greater than one might have expected. The telephone and the post would appear to be of roughly equal significance as methods for contacting suppliers of services indicating perhaps that the post is often used to confirm in writing an agreement reached on the telephone or simply that most

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[1] Unfortunately the Buyer seriously misunderstood the questions relating to main contact method used. For example, despite his professed lack of contact with customers, he circled *five* main contact methods including telex. It could be that this answer was meant to apply to suppliers of goods/materials. But surely the methods were not all of equal importance and how except in terms of misinterpretation is one to explain the circling of telex?

telephone contacts result in a bill which is paid by post.

Suppliers of capital equipment. This group of suppliers is contacted relatively infrequently. Face-to-face contacts would seem to be of greater than usual significance.

Category of Manager	Frequency of Contact	Main Contact Method
General Mgr/Director	Yearly	Post
Works Director	Yearly[1]	Telephone, face-to-face away from works
Buyer	Never	n/a
Commercial	Monthly	Telephone, post
Home Sales	Not specified	Telephone
Shipping	Never	n/a
Work Study	Monthly	Face-to-face at works

Other MTL personnel. The answers to the survey questions relating to contacts with MTL personnel located away from Shotts contain a number of surprises. There are relatively few MTL employees located permanently elsewhere but some (perhaps all) of them are

Category of Manager	Frequency of Contact	Main Contact Method
General Mgr/Director	Infrequently	Telephone
Works Director	Yearly	Face-to-face away from works
Buyer	Daily	Not specified
Commercial	"	Telephone, post
Home Sales	Not specified	Telephone
Shipping	Weekly	Post
Work Study	Infrequently	Face-to-face away from works

highly important to the firm, the main ones of course being the Chairman, the Managing Director and the Sales Director. Additional members of the possible contact universe include the employees of Timpo AG in Switzerland and MTL employees temporarily away from Shotts such as lorry drivers. Thus it is very surprising and indeed puzzling to find first that the MTL General Manager has infrequent, i.e., less than yearly, contact with "company personnel located elsewhere" unless in answering he unconsciously excluded contacts with his superiors. Secondly, the daily contact frequency claimed by the buyer is at all plausible only if it involves requests to company drivers making deliveries to pick up supplies on their way back to the works. Even then, daily contact is scarcely credible. Thirdly and analogously, it is difficult to envisage the daily contact pattern indicated by the

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[1] Cf. travel section below.

Commercial Manager. Finally, the Shipping Manager's weekly postal contact paradox defies explanation. From the foregoing, it follows that either the set of questions and answers under review here was widely misinterpreted or else the interviews with various company personnel failed to elicit a considerable body of relevant information.

In summary, our survey of external contacts has yielded some interesting material but at the same time has raised a series of conundrums none of which can be solved with the information at hand. Several reasonably valid conclusions can be drawn however. First, it is dangerous to infer either frequency of contact or main method used from a manager's title. Second, frequency of contact varies widely depending on the nature of the person being contacted. Third, frequency of contact does not necessarily dictate the main method used although there would appear to be certain tendencies in this regard. Finally, main contact method varies with the nature of the person being contacted but less so than frequency of contact.

Communication Costs

Communication cost records are not kept on a routine basis and it proved impossible to calculate a communication/cost/turnover ratio. However, such costs were not felt to be of any great significance by the company. The telephone, in the opinion of our interviewees, was the most important method of communication overall. There are seven telephone lines into the Shotts works, five of them PBX and two ex-directory. The switchboard services 28 telephone extensions. Some 300-400 outside calls are made a day, a number of them to points abroad. International traffic goes through Bathgate. The PBX operator is kept extremely busy but prefers it that way - "the time passes more quickly". She spoke very highly of the "Bathgate girls". In general, there were no complaints concerning the telephone system. No calls are metered and there are no coordinated records of origins (by name or in occupational terms) and destinations.

Telex is not widely used in the toy trade although a number of MTL's German customers have telex machines. Although MTL does not itself use telex at the moment, it is thinking of doing so and intends to survey its customers with a view to determining the economics of telex versus the telephone and post. The advantages envisaged from the use of telex are fourfold: 1) reduced costs relative to the telephone, 2) greater speed relative to the post, 3) automatic 'hard'

copies of messages sent and received, 4) an easing of pressure on the PBX which is operating at capacity.

Obviously, Confraphone and Confravision would be of little value to MTL at the moment, especially with the management changes approved in November 1970.

Travel

Part of our survey questionnaire sought information on travel frequencies and purposes. The results are encapsulated in the following matrix.

Travel Purpose: To See	Travel Frequency by Category of Manager						
	General Manager	Works Director	Buyer	Commercial Mgr	Home Sales Mgr	Shipping Mgr	Work Study Mgr
Customers	Yearly	Seldom	Never	Seldom	Never	Never	Never
Suppliers of goods	Seldom	Monthly	Wky-Mon	Seldom	Never	Never	Seldom
Suppliers of services	Never	Yearly	Wky-Mon	Seldom	Never	Seldom	Seldom
Suppliers of capital equip.	Seldom	Monthly[1]	Never	Never	Never	Never	Seldom
Other MTL personnel	Seldom	Yearly	Never	Seldom	Never	Never	Seldom

The respondents were also asked if they travelled for purposes not specified on the questionnaire. Three of them - viz., the Works Director, the Commercial Manager and the Works Study Manager - did not answer the question and it seems reasonable to assume that they do not in fact travel for non-specified purposes. Three others - viz., the General Manager/Director, the Buyer and the Home Sales Manager - answered "nil" or "never". Indeed, only the Shipping Manager answered the question in the affirmative; he visits BR in Bathgate "infrequently". Since BR is a supplier of a service, i.e., transport, this answer was in fact already specified. Ergo, it can be concluded that none of our cross-section of MTL managers travels for purposes not specified on our questionnaire.

Two results from our travel survey are worthy of special note. The first is the general infrequency of travel. This phenomenon would appear to reflect the nature of the industry rather than any particular travel

[1] The Works Director had indicated earlier that he was in yearly rather than monthly contact with suppliers of capital equipment. Inasmuch as travel frequency is probably easier to recall at short notice than contact frequency, the answer, 'monthly', is likely more accurate than 'yearly' but this is obviously nothing more than conjecture.

problems inherent in a Shotts location. Apart from the Works Director and the Buyer, managerial travel for business purposes would seem to be a distinct rarity. We have already mentioned the puzzling infrequency of contact, both face-to-face and otherwise, between the top echelons in Shotts and London/Zug. Secondly, the Home Sales Manager never travels and the Shipping Manager, with responsibility inter alia for export sales, travels only rarely. Both rely almost entirely on the post and the telephone for contact with the 'outside world'!

When managerial personnel in Shotts do travel, the motor car is the favoured mode. Abbotsinch is the most popular airport simply because most of the executives happen to live west of Shotts together with the fact that they seldom travel to North America and thus have little occasion to use the international airport at Prestwick. Turnhouse Airport on the other hand is normally used by visitors to Shotts. NFL has adjusted to the quality and frequency of the air services available in Central Scotland and has no complaints. Undoubtedly any improvements would be well-received but the Company is not pressing for any changes.

The Outlook

NFL is apparently well-satisfied with Shotts as a location. Growth has been rapid since it moved there in 1964 from London and the outlook is bright.

CHAPTER 17

PLYGLASS LIMITED - A CASE STUDY

Summary

Location of Scottish factory: Irvine Industrial Estate, Portland Rd., Irvine, Ayshire.

Approximate distances: Glasgow (27 miles), London (399).

Order & MLH: XIII-463 (1958 SIC); XVI-463 (1968 SIC).

Commencement of production: May 1965.

Initial investment: c. £25,000.

1970 employment: 70.

1970 turnover: n/a.

Product: hermetically-sealed double glazing units.

Product value: c. £381 a ton.

Type of production: bespoke.

Main markets: Scotland; North, NE & NW England; North Wales; Ireland.

Ownership and organisational status: a branch of Plyglass Ltd., Harlow.

Assessment of transport factor: because of the fragile nature of its product, the Irvine branch has found it necessary to provide much of its own transport in connection with sales but buys most of its inputs on a delivered price basis. Transport is of vital interest partly for cost reasons but more importantly because of the need in the industry to offer customers a consistently 1st-class delivery service. The Plyglass Company's TCGO ratio in 1969-70 was 5.87%; the TCNO ratio was 8.0%.

Assessment of communications factor: costs are relatively low but receive careful scrutiny. Problems with the intra-firm communications system have led to a gradual devolution of responsibility from the HQs to the branch. The Plyglass Company's CCGO ratio in 1969-70 was 0.72%; the CCNO ratio was 1.0%.

Corporate Background

Plyglass Ltd. has its HQs in Harlow, a New Town NE of London in Essex. The firm is a wholly-owned subsidiary of the Gas Purification & Chemical Co. Ltd. which is owned in turn by British Industrial Holdings Ltd.(BIH), a holding company with HQs in London. BIH is listed on the London Stock Exchange and is controlled by British capital. The BIH Group comprises more than 17 companies, all of them in the UK. Apart from financial matters, Plyglass is quite independent of the Group. As long

as it achieves an acceptable return on investment, BIH leaves it alone to operate as it sees fit.

Location Factors

The firm's sole production unit in early 1965, i.e., just prior to its decision to establish a branch in Scotland, was a 40,000 sq ft. factory in Harlow. Hermetically-sealed double glazing units were (and remain) the only product. Employment totalled about 90.

The double glazing market has been growing at an annual rate of 20% for over a decade. Plyglass first began to experience capacity problems during the early 1960s. It decided to expand its 40,000 sq. ft. plant and approached the Harlow Development Corporation, the owner, about the possibility of an extension. The Corporation was willing to accommodate Plyglass's expansion plans but wanted a sizable increase in rent to compensate for the very high land costs involved. Plyglass, finding the proposed terms prohibitively expensive, began looking elsewhere for a suitable place to locate new capacity. Inter alia, it approached the Board of Trade about the possibilities in the Development Districts, especially in the NE and Scotland where a combination of high transport costs, extra packing expenses to minimize damage, delivery delays and better-situated competitors in the North Midlands, Lancashire and Yorkshire had effectively precluded the firm from the bulk of the market. Its market share was even worse in the case of Ireland. Part of the marketing problem at that point was the use of British Rail for most long-distance shipments. Extra packing expenses were incurred and average delivery time was considerably longer relative to distribution by road. Consequently, customer service was generally poor.

Prior to its search for additional space, Plyglass had its work study engineer determine: a) the optimum size of plant for the manufacture of double glazing units, b) the minimum economic size of plant. In both instances, the assumed technology was the injection seal method of production which is labour-intensive. The optimum plant size was deduced to be 60,000 sq. ft. - hence the initial desire to expand the 40,000 sq. ft. Harlow works. In contrast, the minimum economic plant size was judged to be only 20,000 sq. ft.

BOT officials took Plyglass's work study engineer round the available advance factories in the Central Belt of Scotland and the NE.

The most suitable premises however happened to be not an advance plant but a 20,000 sq. ft. factory on the Irvine Development Corporation's Portland Road Industrial Estate about to be vacated because of the occupant's bankruptcy. Plyglass moved in almost immediately, i.e., in May 1965. Noteworthy is the fact that the site selection procedure took very little time once the decision had been made to expand by opening a production unit in the North. The firm knew exactly what it was seeking. Two considerations were particularly important: 1) the availability of premises ready for immediate occupancy, 2) sufficient adjacent land for future expansion up to the optimum plant size of 60,000 sq. ft. Overall, Plyglass felt that the benefits from locating in a suitable Development District were enormous relative to expanding in Hanlow. Its initial investment at Irvine was only £25,000.

Production Technology

Plyglass was considered by the BOT to be an ideal type of migrant company because of its relatively simple production procedures, its consequent ability to utilise unskilled labour, its need for male workers, its footlooseness, its willingness to take immediate occupancy of a standard factory, and its modest capital requirements. The public outlay required per job created was very low. Moreover, as will be noted again later, the Irvine plant was soon making a profit. Thus, the BOT selected Plyglass to illustrate the advantages of a Development Area location in an advertising campaign conducted during the autumn of 1968.[1] For the company this publicity was free and very welcome.

The production sequence at Irvine is approximately as follows:

1) selection of glass sheets from racks near factory door for handcutting to order;
2) actual cutting;
3) movement of cut glass on mobile racks to a washing/polishing machine;
4) hand assertion of pre-assembled aluminium frames or spacers between each pair of cut glass sheets in a specially-created, dust-free atmosphere of dried air;
5) application of clamps by hand to hold each pair of glass sheets (separated by an aluminium spacer) together;
6) application via handgun of sealing resin around outer edge of each spacer;
7) hand application of aluminium foil on top of resin;
8) standing the now-sealed double glazing units in racks for 12 hrs. to allow the resin to 'cure' or harden.

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[1] Cf. Sunday Times, 24 Nov 68, p.33.

Production is normally carried out on a small-lot, bespoke basis. Given the limited scope for standard sizes in the insulating glass trade, Plyglass does not manufacture and stockpile in advance of known demand. Order processing, buying, production and despatch are carefully coordinated so as to keep finished product stocks to an absolute minimum. Output is usually despatched within three days of manufacture. Production is relatively steady all year round but rises to slight peaks in the spring and late autumn in line with demand fluctuations.

Markets and Marketing

Plyglass sells almost entirely to glass merchants but its ultimate customers are local authorities, commercial and industrial property developers, large building concerns specialising in housing estates, and private householders either building or converting their own homes. In other words, being derived, demand is only indirectly responsive to advertising and other selling efforts in the ultimate marketplace. Market penetration has been particularly successful in the North and South of Britain but less so in the middle. Including Plyglass, there are seven major sealed double glazing unit manufacturers in the UK. A majority are located in mid-England. Most are controlled either by a glass manufacturer (i.e., Pilkington Brothers Ltd., the sole manufacturer and principal supplier of flat glass in Britain) or by a glass merchant (e.g., Bradford Glass Co. Ltd.). Plyglass is the largest 'independent' double glazing firm.

As noted earlier, the double glazing market is expanding very rapidly. During the early 1960s, the most important determinant of market share was product quality rather than delivery or price. By mid-decade, however, quality differences between the products of the various manufacturers had largely disappeared and price became the main determinant of sales. More recently, customer service has superseded price as a result of the gradual elimination of significant differences in the latter. Today the most important sales consideration is quick delivery although price and quality must also be right.

The Plyglass policy of selling only to glass merchants reflects several factors. First, the firm does not wish to compete with the

wholesalers by selling directly to their customers.[1] Second, tradition still dominates the glass trade. Tradition calls *inter alia* for sticking to recognised trade channels and the soft-sell approach. Thus, Pilglass supplies the glass merchants with sales material of an informative nature but otherwise eschews the 'hard sell'. Third, Pilglass distribution personnel, *ceteris paribus*, want to minimize the total number of delivery points. A policy of selling directly to ultimate customers would raise distribution costs considerably. Finally, by dealing solely with glass merchants, sales, order processing, invoicing and credit control costs are all kept to a minimum.

Four Pilglass sales representatives are employed in the area served by the Irvine factory, the boundaries of which are roughly Inverness-Orkneys in the North, Belfast-Dublin in the West, and North Wales-Hull in the South and East. Two of these reps cover Scotland, the third handles North and NE England while the fourth is responsible for NW England, North Wales and Ireland (Eire + NI). All are nominally responsible to the Pilglass Sales Representatives Manager in Harlow but *de facto* are closely integrated with the Irvine operation. The sales reps' main task is to keep the glass merchants up-to-date on Pilglass products through periodic visits, and to call on architects and large builders in the hope that they will specify Pilglass units when ordering from merchants.

Purchases and Inbound Transport Costs

Sheet glass (MLH 463-1950 SIC) is the major input to the Irvine works. Initially, Pilkington's was the only supplier. Manufacture took place in St. Helens, but Pilglass sent its orders to the Pilkington depot in Glasgow. Pilkington's continues to be used for certain specialty items but the bulk of the glass purchased by Pilglass is now imported from a Belgian manufacturer.[2] It too maintains a depot in Glasgow. Pilglass can obtain small consignments on very short notice. Sheet glass is generally sold on a delivered price basis in the UK and the transport component of the price is not identifiable by the purchaser. Thus prices are the same in Irvine and Harlow with one exception, viz., a particular quality of imported glass for which the Irvine factory pays an extra 1d. per sq. ft. This extra cost raises the total amount paid for the item in Irvine to 110% of the price at the Harlow works. The price difference is felt to be due entirely to the necessity of

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[1] Indeed, non-vertically integrated insulating glass product manufacturers will not even quote retail prices.

[2] Cf. Richard Spiegelberg, "Floating the Float People," The Times, 20 Nov 70, p.29.

transporting the glass an additional 400 miles or so relative to Harlow. However, the offset on the total cost structure at Irvine is unimportant.

Other significant inputs are aluminium extrusions (MLH 321), sealing resin (MLH 276) and aluminium foil (MLH 321). All are made in England, the resin in Leicester and the aluminium materials in the Manchester and London areas. Again, the prices are all quoted on a delivered basis and Irvine is at no locational disadvantage.

Three considerations govern supplier selection: 1) price, 2) product quality, 3) ability to deliver as required. None predominates.

Initially, all buying for the Irvine factory was done by the Stock Controller at Harlow. However, this arrangement proved unsatisfactory due to communication difficulties. Flyglass policy is to keep 'raw material' stocks to a minimum. Because of postal delays and despite the existence of the telephone, the Harlow Stock Controller frequently found the stock levels at Irvine to be different from what he expected. It proved impossible to bring this obviously unsatisfactory situation under adequate control. Thus, the Irvine factory hired its own Stock Controller in March 1966, i.e., only some 10 months after the plant began operations (cf. section on external contacts below). Nonetheless, both centres continued to utilise the same suppliers.

Modest quantities of glass are kept by the Irvine factory in a nearby warehouse. Suppliers are asked to load their vehicles in a certain manner to facilitate unloading. Modest stocks of the other inputs are maintained in a corner of the factory proper.

Distribution

Flyglass policy generally is to deliver to glass merchants on a carriage-paid, average-cost basis. Normal delivery time is three weeks from receipt of the customer's order. This total period is broken down roughly as follows:

1st week	order processing
2nd week	manufacture
3rd week	delivery

Distribution is controlled by a Despatch Manager. Each factory has its own. The Irvine plant distributes partly by own-account lorry and partly by commercial haulier with the former being much the more important of the two methods. As already mentioned, delivery points

are largely fixed. Thus, the manufacturing process is oriented towards defined delivery areas of which there are seven:

1) North Scotland
2) East Scotland
3) West Scotland (Perth and Falkirk mark the N/S and E/W divisions respectively
4) Ireland
5) NE England (Tyneside)
6) North England (east of the Pennines and south of Tyneside)
7) NW England

Output destined for these various areas is segregated on the factory floor. Because finished goods seldom stay in the factory for more than a few days, stockholding costs are negligible.

Six Plyglass road vehicles are attached permanently to the Irvine branch. They have lift-off bodies (all lifting is done by a large overhead crane on runners above the factory floor) similar in design to containers but fitted with racks on the two long sides. Payload capacity is 6½ tons. Seven drivers are employed, one in a relief capacity. Normally, each of the six main drivers spends three nights a week away from Irvine. The drivers are not asked to go out of their way to pick up return loads though pickups are not uncommon. Generally, however, the vehicles return empty.

Each week one of the Irvine vehicles is sent to Ireland via Ardrossan. Plyglass has a permanent return booking on the ferry. Initially, only containers were shipped to Ireland. They were collected at the Belfast docks by a commercial haulier for delivery to their ultimate destination(s). Getting the containers back on schedule presented a continuing problem however and the usual loads picked up for the return journey frequently damaged their insides. Thus, the practice of sending containers unaccompanied was stopped.

Monthly a container is despatched to the Isle of Man. Shipments to the Orkneys are sent via the North of Scotland, Orkney and Shetland Shipping Company, Edinburgh. Deliveries to points on the Scottish 'mainland' north of Inverness are handled by commercial hauliers in Glasgow. MacBrayne Ltd. services the Western Isles for Plyglass.

Maintenance is subcontracted to local garages in the Irvine area. By scheduling maintenance on a calendar rather than a mileage basis, these garages can plan ahead, and downtime due to maintenance is minimized.

Plyglass receives real net benefits from its use of own-account transport despite the growing management problems arising out of increasingly onerous government requirements such as those having their origin in the 1968 Transport Act. For example, less packing material is required and damage is reduced when own-account rather than for-hire transport is employed. Nevertheless, commercial hauliers are being used more and more although always in particular circumstances, i.e., only when cost savings can be realised. Thus, when an entire lorry-load is consigned to a single address, delivery is now normally effected by a local Irvine haulier. In the beginning, however, each such load was accompanied by a Plyglass employee to ensure proper handling. In other words, additional costs were incurred by Plyglass in the short run, i.e., while the local haulier moved along a learning curve as it were, in the hope of a long run reduction in delivery costs. Sometimes there is an interchange of work between the Irvine and Harlow plants; a commercial haulier is used for the 400-mile (one-way) trips involved. Future deliveries between Irvine and the new Plyglass plant being built in Alfreton (see below) will likely be characterised by commercial haulage of containers owned and packed by Plyglass. The special arrangements in effect with respect to the Orkneys, etc. were outlined earlier.

In general, commercial hauliers are felt to take inadequate pains when handling glass products. Thus, they are not used when a number of widely dispersed customers are being served in small lots from the same lorryload or when a series of local deliveries is required at a single general destination. In both these instances, a great deal of handling is necessary.

Plyglass does not utilise the National Freight Corporation's Freightliner service because the Irvine and Harlow works are each too far from a Freightliner terminal. Also, shipment via Freightliner would necessitate extra packing (i.e., extra cost) and extra handling (i.e., additional danger of damage). In sum, for Plyglass Freightliners are uneconomic.

Transport Costs Relative to Turnover

Because it services a larger territory, the Irvine factory found itself with a higher transport bill per unit of output than its Harlow counterpart. This extra cost item was highly visible due to the

excellent cost accounts maintained by Plyglass. In view of the difference in average distance travelled by products made in Irvine and Harlow and the consequences for unit costs, it was decided some years ago to treat "carriage" as a company rather than a plant overhead. During the year ending in June 1970, Plyglass carriage costs comprised 5.87% of total turnover, somewhat more than the budgeted figure of 5.0%. Carriage costs for the month of June, 1970 were equal to 5.9% of turnover indicating considerable temporal stability in the ratio. The transport component of these percentages was compiled in two stages. First, seven separate cost variables were summed, viz.:

1) running and maintenance costs
2) depreciation
3) drivers' wages
4) the cost of breakage in transit
5) tax and insurance outlays
6) payments to non-Plyglass transport companies including commercial road hauliers, coastal shipping firms, ferry operators and air freighters (air freight is used very infrequently as Plyglass does not export)
7) the cost of the extra packing materials needed for sea voyages.

Second, "carriage recovered" was subtracted from the resulting total. This latter step warrants some explanation in view of our previous assertion that Plyglass absorbs transport costs. Indeed, it does with one group of exceptions, i.e., shipments to the Western Isles, the Orkneys and the Scottish 'mainland' north of Inverness. Merchants in these areas pay a fixed surcharge equal to 7.5% of the value of their orders, the purpose of which is to compensate for the extra crating (wood), packing (polystyrene) and labour involved in shipping by commercial haulier (see above).

Plyglass's net output/turnover ratio is approximately 73.5%. We know that the TCGO ratio is 5.87% and wish to find the TCNO ratio. Using the standard formula R = P/B where R = Rate, P = Percentage and B = Base, we get R or the TCNO ratio = 5.87/73.5 = 8.0%.

Delivery miles travelled by all Plyglass vehicles in June 1970 totalled 35,244 (for the year ending in June 1970 the total was 392,419). The cost per mile was 29.1d. This figure approximates the annual average cost per mile.

General Operating Experience

The Irvine factory as noted earlier opened in May 1965. It

employed 12 persons, only two of whom came from Harlow. By the end of the calendar year, employment was up to 30. By the end of the initial 12 months the works had begun to generate profits, an outstanding performance compared to the experience of many 'migrant' companies.[1] Employment in 1970 was 70, a total not far short of that for Plyglass immediately prior to the launching of the Irvine venture.

Whereas Plyglass sales in Scotland were negligible when Harlow was the sole manufactory, the firm as the only major double glazing unit manufacturer 'North of the border'[2] quickly moved into a dominant position relative to the local market. However, the bulk of the sales by the Irvine branch during the early stages were made in the North of England in part because it had been given the northern fringes of the Harlow plant's 'catchment area' including a number of established Plyglass customers. Unanticipated was the convenience of the Ardrossan ferry link with Belfast. Only seven miles away, this ferry service enabled the firm to penetrate the Belfast and Dublin markets in force for the first time. It had been hoped to expand Irish sales as a consequence of opening in Irvine but via the much less convenient Stranraer-Larne route.

With the double glazing market growing at a rate of 20% a year, it had been anticipated by the Plyglass management that the Irvine factory would be operating at or close to capacity by 1969, i.e., output would have reached a minimum economic level from a long-term point of view. It was realised that a decision would then have to be made on the relative merits of expansion at Irvine and/or Harlow versus a new plant elsewhere in the UK bearing in mind the likelihood that the

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[1] Cf. Luttrell, Factory Location and Industrial Movement, I, p.298. He found that branch unit costs in year 1 averaged 201% of those experienced at the parents' main works, 142% in year 2 and 115% in year 3. Almost identical findings were reported by Dame Alix Kilroy (later Lady Francis Meynell), Under-Secretary in charge of the BOT's Distribution of Industry and Regional Division, some seven years earlier in evidence to a House of Commons Select Committee on Estimates. GB, Select Committee on Estimates, Second Report: Development Areas, H.C. 139, 1955-56, Q.1080. It is not clear whether she was reporting Luttrell's preliminary results (his study was underway from 1949 to 1957) or separate BOT findings. In support of the former hypothesis, apart from the uncanny similarity in conclusions, is the fact that Luttrell's work was funded, at least in part, by the BOT.

[2] There is one other manufacturer.

volume of production by the 20,000 sq. ft. Irvine factory utilized to capacity would saturate the Scottish market. This was the situation as it appeared in 1965. Four years later the Irvine works was indeed operating close to capacity and the UK market was still expanding at a 20% annual rate. Clearly, if Plyglass was to retain its share of this market, it needed additional production facilities. However, the question remained - where?

It was decided first to build a new plant rather than expand the two existing factories. An important consideration at this stage was the fact that neither Irvine nor Harlow was at the centre of the UK market. On the other hand, the company wanted to locate in an area eligible for benefit under the government's regional policy. Indeed, this criterion was given equal weighting with the market factor because this time Plyglass was building the factory itself to its own specifications. Previously, it will be recalled, the firm utilised rented space. Winsford, Cheshire, an overspill town with respect to the Merseyside Development Area, seemed to meet both criteria prima facie but closer examination revealed serious problems with regard to sites and building specifications, and the danger of excessive costs. Attention then reverted to the feasibility of expansion at Irvine but only briefly because of the importance of the market criterion. Thus the firm was led to look again at the possibilities in mid-England. In due course a decision was taken in favour of Alfreton in the Notts/Derby Coalfield Intermediate Area. Three considerations governed this choice: 1) the town's central location relative to the national market, 2) excellent accessibility to the motorway network by virtue of Alfreton's proximity to the M1,[1] 3) the availability of Intermediate Area benefits.[2] The scheduled opening date for the new plant is Spring, 1971.

Plyglass viewed its Irvine branch solely as a production unit in 1965. However, it proved difficult to translate this concept into a

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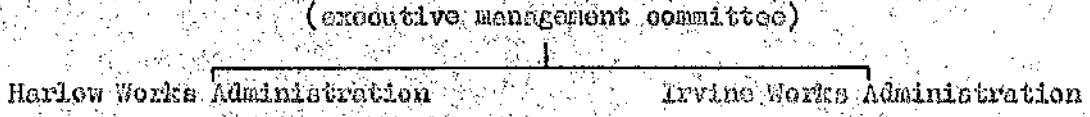
[1] Cf. the pull-out maps in GB, Ministry of Transport, Roads for the Future: A New Inter-Urban Plan (London: HMSO, 1969).

[2] These benefits are outlined in a supplement, "Industrial Incentives in Proposed Intermediate Areas" (October 1969), to the BOT pamphlet, Room to Expand: Government Help for Your Business in the Development Areas and Northern Ireland (London: BOT and Central Office of Information, 1969). At the time of the Plyglass decision, they included building grants at the rate of 25 to 35% depending on circumstances, investment grants on new machinery and equipment at the rate of 20%, training grants and help for transferred workers.

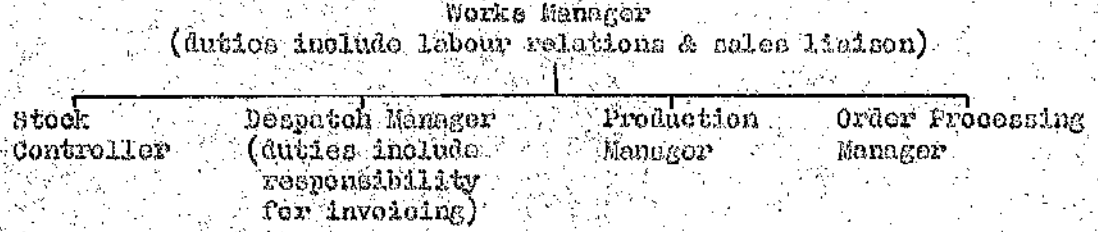
viable reality because of the distance separating the branch from the Harlow HQs. Irvine was just too far away. Thus gradually, more and more responsibility was delegated to the branch, at first unofficially and as a matter of convenience, but later in a more formal fashion in recognition of the greater efficiency involved. The Irvine Works Manager described the process as "drift". Eventually, a "works administration unit" was created at Irvine encompassing production, buying, order processing, liaison with the sales reps handling the area served from Irvine, distribution, invoicing, budgeting, labour relations, and the determination of bonuses and other wage matters outside the scope of the national Plyglass wage agreements. The sales function on the other hand has been retained by the 'centre' together with certain major decision areas, viz., general policy, corporate planning, capital expenditure and financing.

The Plyglass organisation in November 1970 as it related to Irvine can be portrayed schematically as follows:

Plyglass Organisation Chart, 1970



Irvine Works Administration



Plyglass's executive management committee, whilst the composition varies from time to time, has a 7-man 'hard core' consisting of two Company Directors (the General Manager and the Secretary), the Works Managers at Irvine and Harlow, the Personal Assistant to the General Manager, the Sales Administration Manager and the Sales Representatives Manager. With the one obvious exception, all are based in Harlow. The Irvine Works Manager has been a member of this committee since the opening of the Irvine branch. Initially, the committee met monthly, primarily to

review the monthly accounts for each of the two factories but also to discuss general policy matters. However, this schedule proved too time-consuming and the frequency of the meetings was cut back to four times a year.

External Contacts

Customers. Each of the five top managers at the Irvine works was asked to indicate the frequency with which he had contact with various specified groups of people outside the Irvine factory and the main contact method used.[1] The results with respect to existing/potential customers are set forth in the following table.

Category of Manager	Frequency of Contact	Main Contact Method
Works	Weekly	Face-to-face away from works, telephone
Stock Controller	Infrequently	Telephone
Production	Monthly	Telephone
Order Processing	Daily	Telephone
Despatch	Daily	Telephone, post, telex

It will be noted that all five managers mentioned the telephone as either the main or one of the main contact methods used.

Suppliers of goods/materials. Contact information concerning suppliers of goods/materials is presented below. No pattern emerges. Of interest however is the daily contact paradigm of the Stock Controller. We saw earlier that the stock control function was devolved to Irvine because of communication difficulties between the branch and

Category of Manager	Frequency of Contact	Main Contact Method
Works	Weekly	Face-to-face at works, telex, telephone
Stock Controller	Daily	Telephone, post
Production	Monthly	Telex
Order Processing	Monthly	Telephone
Despatch	Never	n/a

the HQs. Given the frequency of contact between the Stock Controller and goods suppliers, these difficulties are readily understandable.

Suppliers of services. The following table summarizes the contact information from our survey relating to suppliers of services.

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[1] Initially, each was asked to indicate the most important single method used with regard to each group but in several instances, through either misunderstanding of the questions or inadequate factual information, it proved impossible at short notice to weight one method more highly than the others.

There are no surprises.

Category of Manager	Frequency of Contact	Main Contact Method
Works	Weekly	Telephone
Stock Controller	Infrequently	Telephone, post
Production	Never	n/a
Order Processing	Never	n/a
Despatch	Weekly	Face-to-face at works, face-to-face away from works, telephone, post, telex

Suppliers of capital equipment: As indicated below, the Plyglass managers in Irvine have very little contact with capital equipment suppliers. The contacts that do take place appear to be largely dependent on the postal service suggesting that decisions on equipment replacement, etc. are taken in Harlow.

Category of Manager	Frequency of Contact	Main Contact Method
Works	Monthly	Post
Stock Controller	Never	n/a
Production	Infrequently	Post
Order Processing	Never	n/a
Despatch	Never	n/a

Plyglass personnel located elsewhere. Contacts with Plyglass employees permanently situated away from Irvine display a frequency pattern similar to that shown earlier for customers. This similarity

Category of Manager	Frequency of Contact	Main Contact Method
Works	Weekly	Telephone
Stock Controller	Infrequently	Telex
Production	Infrequently	Telex
Order Processing	Daily	Telex
Despatch	Daily	Telex, telephone, post

does not extend however to main contact method used. Whereas the telephone predominates in contacts with customers, the telex would appear to be the main intra-firm contact method (see the following section on communication costs for additional information on telex usage).

Three general points stand out from this survey of external contacts by senior managerial personnel at the Irvine works. First, contact frequency is very much a function of managerial position, i.e., some managers by virtue of the nature of their duties have many more contacts than others. Secondly, a less important but still significant determinant of contact frequency is the business of the person being contacted. Thus the Works Manager, because of his need to keep all branch activities under continuous review, is in contact with most

relevant outside groups weekly. In contrast, the Stock Controller is normally in contact only with suppliers of goods/materials. Thirdly, main contact method is a function of both the managerial position of the Irvine employee and the business of the person being contacted but the latter would appear to be more significant than the former. This point is illustrated particularly well by the dissimilarity between the customer and intra-firm paradigms.

It was noted earlier that intra-firm communication problems were instrumental in bringing about a gradual devolution of responsibility from Plyglass HQs to the Irvine branch. One of these problems involved order processing and invoicing. Both functions were handled entirely in Harlow at the beginning of the HQs-branch relationship. Irvine was kept in touch by post. However, this method of communication proved inadequate. Postal delays of up to a fortnight were not uncommon and it became impossible for the Irvine factory to keep to the firm's 3-week receipt of order/manufacture/delivery cycle. In an attempt to overcome these difficulties, the Irvine branch began to do its own paperwork but on a temporary basis. Efficiency improved and gradually what had been a temporising initiative was made permanent; responsibility for its own order processing and invoicing was formally devolved to the Irvine works.

Plyglass prior to the Irvine venture had a complaints unit as part of its Sales Department in Harlow. Upon the establishment of the Irvine branch, it was prescribed that any customer complaints arising out of its operation were to be transmitted to Harlow either by post or telephone depending on their urgency. However, the delays encountered in following this procedure were eventually deemed to be intolerable. The Irvine Works Manager began to handle more and more of the complaints relating to the Irvine branch himself but on an unofficial basis. Today, he has formal responsibility for handling them all.

For some time after the Irvine branch opened, the net wages due its employees were calculated in Harlow. At the end of each week, hours worked and bonus earnings were computed and converted into gross wages in Irvine and then posted to Harlow. At the HQs, tax and other deductions were made following which the net figures were posted back to Irvine. There were always last-minute changes to be made in the gross wages and if any problems could not be resolved by the weekly mail deadline, they had to wait until the following week. At best the system was frustrating. At worst it resulted in unnecessary expense.

Thus, the decision was taken to devolve all wage matters affecting Irvine employees to Irvine.

Other examples of problems could be cited. But it will already be evident that Plyglass experienced considerable and continuing difficulty in trying to resolve intra-firm matters of a routine or recurring nature satisfactorily and quickly by using the post and telecommunications. Its general solution was to delegate. On the other hand, the company is satisfied with the technical side of long-distance telecommunications although it currently utilises only the STD and telex services. It investigated but could not justify because of insufficient traffic a private telephone line between Harlow and Irvine. It is aware of Confraphone and Confravision but can see no immediate internal need for these services. Similarly, the various Datel services are of little use at the moment since the firm does not use a computer.

Communication Costs

Plyglass communication costs during the 12 months ending in June 1970 formed 11% of general overheads (as defined by the company) but only 0.72% of turnover and 0.98% of net output. Included in the communication cost total were long-distance and internal telephone charges, telex costs and outlays on postage. Expressing each of these components separately as a proportion of turnover and of net output, we get the following percentages:

long-distance telephone	0.46%	0.63%
postage	0.13	0.18
telex	0.09	0.12
internal telephone	0.04	0.05
	0.72	0.98

Alternatively, we can show the Plyglass communication cost structure as follows:

total communication costs	=	100.0% of which
long-distance telephone	=	63.8
postage	=	18.6
telex	=	12.2
internal telephone	=	5.4

With long-distance telephone charges alone accounting for some 7% of total overheads, Plyglass installed telex machines at Irvine and Harlow in the hope of diverting some of the telephone traffic to this cheaper but less direct communications device. In the event, telephone traffic decreased only slightly. On the other hand, some 20 telex messages a

day are both sent and received by the Irvine branch now suggesting that, in the absence of telex, telephone usage might have increased considerably. But quite apart from any direct cost advantage, telex gives rise to 'hard' copy and normally reduces transmission errors. Both these results may yield cost savings. Yet, ironically, sometimes the reverse has occurred, i.e., communication costs have been raised by the use of telex. The Irvine Works Manager explained how this situation can come about. Telex, he said, seems to encourage users to substitute abbreviations for complete words wherever possible. Undoubtedly this is a general tendency and not one confined to Plyglass employees. Unfortunately from a cost standpoint, Plyglass does not issue a standard abbreviations manual to its employees. Thus, telex messages have frequently proved indecipherable owing to verbal shortcuts by their senders. When this occurs of course the messages have to be retransmitted afresh thus defeating the company's purpose in installing telex.[1]

Overall, despite their seeming insignificance relative to turnover, communication costs are not microscopic especially when set against total overheads. Plyglass makes continuing efforts to keep them under control. Indeed, sometimes excessive zeal is displayed according to the Irvine Works Manager. Yet, in a way, this zeal simply reflects the excellence of the company's cost accounts, an attribute which enables management to keep all cost items under careful scrutiny.

Travel

The senior managerial personnel at the Irvine works were asked to indicate the frequency with which they travelled on company business for each of a variety of specified purposes. Their answers can be summarized as follows:

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[1] IBM, a major telex user, has found it necessary to insist on standard word abbreviations and has issued manuals on a worldwide basis to this end. Cf. the IBM case study above. One is reminded of a recent advertisement by the International Telephone and Telegraph Corp. which incorporates an apposite quote from French artist, Yves Millecamps:

> Rapid communication today can move people and nations closer together. But speed isn't everything. To be effective, a communication must be understood. It should be transmitted speedily, of course, but with clarity and precision.

This ad appears *inter loci* in the *Economist*, 5 Dec 70, p.76.

Travel Purpose: To See	Travel Frequency by Category of Manager				
	Works	Stock Controller	Production	Order Processing	Despatch
Customers	Monthly	Never	Never	Never	Seldom
Suppliers of goods	Monthly	Seldom	Seldom	Never	n/s
Suppliers of services	Monthly	Seldom	Never	Never	Monthly
Suppliers of capital equipment	Seldom	Never	Seldom	Never	n/s
Plyglass personnel located elsewhere	Monthly	Seldom	Seldom	Never	Seldom
Other	Seldom*	n/s	Never	Never	n/s

*Training courses, trade association meetings, exhibitions.
n/s = not specified but presumably never or very infrequently.

It is apparent from the above matrix that, apart from the Works Manager, travel by Irvine branch personnel is infrequent (with the obvious exception of the lorry drivers!) The Works Manager however is away on business at least once a month. Normally, he travels by air (BEA) although a car is used occasionally. On his periodic trips to Harlow, he has often found that the Heathrow Airport-Harlow leg of the journey can take longer than the plane trip! On the other hand, getting from Irvine to Abbotsinch Airport near Glasgow even under optimum road and traffic conditions takes the better part of an hour by car excluding the time required to park and check in.

The Plyglass case study provides an interesting example of psychological distance. When the Irvine factory was first opened, the Works Manager found that many Harlow personnel had difficulty visualising the distance involved between Irvine and the North Midlands. Thus it was frequently suggested that delivery to a North Midlands customer be made from Irvine rather than Harlow because Irvine was "closer"! It took some time before this phenomenon was overcome.

The Outlook

Plyglass's decision to set up a branch in Scotland has proved profitable for the company and must be seen as a wise move given the circumstances prevailing at the time the decision was made. However, there is some doubt as to whether the same decision would be made today. The meaning behind this assertion will become clearer before the end of 1971, that is to say, within a few months of the opening of the Alfreton works. In the meantime, the firm has asked that its future plans be kept obscure. One certainty can be stated here, however, to wit - Plyglass will continue to maintain a manufacturing presence in Scotland for the foreseeable future.

CHAPTER 18

SCOTTISH REXCO LIMITED - A CASE STUDY

Summary

Location: Comrie Colliery, Oakley, Fife.

Approximate distances: Glasgow (36 miles), Edinburgh (22), Mansfield (258), London (395).

Order & MLH: IV-261 (1958 SIC); IV-261 (1968 SIC).

Commencement of production: 9 Dec 63.

Initial investment: c. £480,000.

1970 employment: 60.

1970 turnover: c. £1.2m.

Main product: premium smokeless fuel.

Product value: c. £13s. a ton.

Type of production: batch.

Main market: Scotland.

Ownership and organisational status: a wholly-owned subsidiary of National Carbonising Co. Ltd., London.

Assessment of transport factor: adequate facilities are vital to Scottish Rexco (SRL); costs are high relative to turnover but they do not represent a major constraint on profitability; SRL indicated no serious complaints with regard to transport. Approximate TCSO ratio: 13.8%

Assessment of communications factor: costs are insignificant; facilities are adequate; the nature and efficiency of the parent-subsidiary communications system was at one time of major concern but the underlying difficulties have now been largely eliminated by the gradual devolution of increased powers and responsibilities to the subsidiary. Approximate CCSO ratio: 0.09-0.10%.

Corporate Background

National Carbonising (NCC) is a fast-growing, private fuel producer operating from bases in London and Mansfield, Notts., the heart of the East Midlands coalfield. The firm expanded rapidly during the 1960s; the output of Rexco, its main product, rose from 113,748 tons in 1959-60 to 602,239 tons in 1969-70. This growth occurred mainly through the construction of new plant such as the SRL facility and through extensions to existing manufacturing units in England. But takeovers were also important. NCC bought a number of going concerns in a diversification attempt and today is active in the fields of bulk

transport, engineering, plant hire and the manufacture of hard coke in addition to its traditional activities. For example, entry into bulk transport was achieved in October 1961 with the purchase of J. Clarke (Haulage) Ltd., a small 20-vehicle Nottinghamshire road haulage firm. Hard coke facilities were acquired in 1969-70 by taking over the South Yorkshire Chemical Works Ltd. located near Rotherham, Yorks. and the Birchenwood Gas and Coke Co. Ltd. of Stoke-on-Trent, Staffs. NCC is currently[1] negotiating a merger with Barrow Barnsley (Holdings) Ltd. of Barnsley, Yorks., the owner of a coking company[2] and Barnsley Burnbrite Ltd., another smokeless fuel producer. Already, it is the second-largest private producer of smokeless fuel in the UK after Coalite & Chemical Products Ltd. of Chesterfield, Derbyshire. Bigger than either of them at the moment in terms of smokeless fuel output are the National Coal Board (NCB) and the Gas Council. The latter, however, is rapidly getting out of the solid fuel business. Thus, within a short time, NCC should be the 3rd-largest smokeless fuel manufacturer, public or private, in Britain. The firm's consolidated turnover in 1969-70 totalled £10,763,943; trading profit reached £1,538,075 giving a trading profit/turnover ratio of 14.3%.[3] The corresponding figures for 1962-63, the year preceding the commencement of production by Scottish Rexco, were £2,225,939, £268,867 and 12.1%[4] respectively. Pre-tax net profit/turnover ratios for 1969-70 and 1962-63 were 7.2% and 6.5% respectively. Return on capital employed in 1969-70 was close to 20% according to the company's own calculations,[4] or almost twice a presumably comparable NCB figure.[5]

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[1]September 1970. See John Fryer, "Why Clean Air Has Gone Up in Smoke," Sunday Times, 27 Sep 70, p.53

[2]Barnsley District Coking Co. Ltd.

[3]The latest figures for Coalite as published in The Times 1000: 1970-71 (pp.34-35) are turnover, £19.9m; net profit before interest and tax/sales ratio, 24.2%; and return on capital employed, 44.1%(47.5% the preceding year). Reasonable comparability presumably exists between the Coalite and NCC data.

[4]NCC, Directors' Report and Accounts, 1970 (Np. 37).

[5]NCB processed fuel plants at the end of the 1960s were showing an average return on invested capital of 10.3%. Cf. "Coal: Topping Up Losses, Lopping Off Profits," Economist, 28 Nov 70, p.75. Of course, the NCC figure relates to more than processed fuel, and accounting conventions may not be exactly the same in the two cases.

Location Factors

Several factors lay behind the NCC decision to locate a production unit in Scotland. While it is difficult to weight the various considerations, perhaps paramount was the need for extra production by 1963 on the part of an expansion-minded management operating in a growth industry. The impetus behind this growth was the Clean Air Act of 1956 and the consequent increase in the number of smokeless zones in Britain.[1] Scotland lacked an indigenous premium smokeless fuel industry. Yet, alone in GB outside the East Midlands, it possessed sizable reserves of coal with non-coking characteristics, a highly desirable attribute from the point of view of a smokeless fuel manufacturer. These reserves were concentrated in Fife and Clackmannanshire. The Chairman of NCC for not entirely economic(indeed, even visionary) reasons was attracted by the idea of a plant 'North of the border', other things being equal. In fact, other things were not equal. Fortunately for Scotland, however, the balance was in its favour. NCC decided that, overall, it was cheaper to build additional capacity there than in the East Midlands with the dearer pithead price of Scottish coal[2] being more than offset by the Development District benefits on offer in Clackmannanshire and Fife,[3] the concomitant availability of labour, and the anticipated increase in rail transport costs as a result of the Beeching Plan made public in March 1963. The increase in transport costs was expected to make it more expensive to continue supplying Scottish customers from the South.

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[1]The Toothill Report (1961) expressed strong disappointment with the rate of progress under the Act in Scotland's industrial belt (p.146). This disappointment was reiterated four years later by the Chairman of NCC; he complained in his report on developments during the fiscal year 1964-65 of the "relatively slow progress being made in Scotland in bringing sorely-needed additional Smokeless Zones into being". NCC Directors' Report and Accounts, No. 32, p.7.

[2]The pithead price is a very important variable representing 79.5% of total NCC manufacturing costs and over 80% in the case of SRL.

[3]SRL received a loan from the Treasury of £300,000. This locational benefit was given considerable stress in NCC, Directors' Report and Accounts for the Year Ended 31st March, 1963 (No. 30). For an account of Development District benefits generally, see McCrone, Regional Policy, ch. V. Further evidence of the importance of regional policy to the manufactured fuel industry was provided recently by Lord Robens, chairman of the NCB, who gave the abolition of investment grants in October 1970, including the differential in favour of the Development Areas, as the reason why a proposed £6m plant may not now be built at Abernant in West Wales. See Rhys David, "Why Wales Is Beating the Adverse Jobs Trend," The Times, 7 Dec 70, p.24.

The selection of a site adjacent to Comrie Colliery reflected a number of considerations not least of which was a desire to minimize inbound transport costs. Perhaps most important, however, was the promise of a long-term supply of coal from what was originally (pre-1939) a 'show' pit. Also, Comrie is closer to the heart of the main Scottish market than pits further east. In addition, the Forth Road Bridge was under construction in 1962-63; its completion in 1964 was expected to facilitate access to the Edinburgh market.

Products, Production Technology & Input/Output Relationships[1]

The Rexco process employed by SRL involves the low temperature carbonisation of coal in cylindrical, firebrick-lined steel retorts 25ft. high and 10 ft. in diameter. It is the only process of its type to survive in commercial use from the many invented following the issuance in 1906 of the patent on what is now known as the Coalite process. The early 1930s in particular was a time of intense experimentation,[2] most of which proved abortive. It was during this period that the patent protecting the Rexco process was purchased in the U.S. by an English firm, Fuel Syndicate Ltd., the predecessor of NCC. The first Rexco works began production at Mansfield in 1933.

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[1]For a detailed treatment, see K. Dutton, "The Rexco Process" (paper presented before the Coal Preparation Society, Scottish Section, Edinburgh, 23 Oct 67), pp.16 + diagrams. Available from SRL. Mr Dutton is General Manager of SRL and a Director.

[2]Cf. the initial report of the Scottish Special Areas Commissioner. He saw the extraction of oil from coal as a potential new industry for the Central Belt and urged additional research effort to overcome the formidable technicological problems being encountered. GB, Secretary of State for Scotland, Commissioner for the Special Areas in Scotland, Report for the Period 21st December, 1934 to 30th June, 1935, Cmd. 4958 (Edinburgh: HMSO, 1935). The Commissioner was well-informed and far from unrealistic in his hopes given prevailing expert opinion. For example, Dr. Carl Bosch, Chairman of I.G. Farbenindustrie, the German chemical giant, told British visitors in March 1926 that the derivation of oil from coal was one of the biggest and most important developments on the immediate horizon. Oil-from-Coal became the largest and most expensive technical project undertaken by ICI between its formation during the last quarter of 1926 and the advent of W.W. II. See William J. Reader, "The Birth of ICI - Oil from Coal: Sir Alfred Mond's Great Dream," The Times, 22 Sep 70, p.23. The dream of oil from coal continues to absorb large quantities of research funds. It was reported recently that the US Interior Department has developed "a broad spectrum" of research programmes directed towards "clean and efficient methods of converting coal to synthetic gas and synthetic oil, and further down the road, conversion to electric power. The budget last year was US$16m." "U.S. Coal to Gas Scheme," Financial Times, 29 Oct 70, p.5.

There are seven retorts at the Comrie works, each of which holds about 40 tons of coal. They are operated continuously 50 weeks a year, seven days a week, three shifts a day. The normal retort cycle is 16 hours. Two hours usually elapse between cycles. Two weeks are allowed per year for maintenance purposes.

The plant was designed to process 1900 tons of screened coal a week but throughput in 1969-70 averaged 2,700 tons a week. Normally, 100 tons of unscreened coal straight from the colliery results in 96 tons of usable coal and 4 tons of 'fines' or 'slack', i.e., coal pieces under ½ inch in size. These fines are sold back to the NCB, the sole supplier of coal to SRL, for the making of smoky briquettes.

Coal carbonisation gives rise to four products: coal gas, ammonia, coal tar and coke. The proportions yielded by the Rexco process are 75% coke (Rexco products), 10% coal tar and 15% coal gas and ammonia.

These input/output relationships are summarised below:

100 tons of colliery coal = 96 tons of screened coal
4 tons of fines

100 tons of screened coal = 75 tons of Rexco products
15 tons of coal gas and ammonia
10 tons of coal tar

The Rexco products are clearly the most valuable component of total output. There are three separate types:

1. Rexco open fire fuel - the largest pieces of processed coal
2. Rexcobrite for room heaters, openable stoves and domestic boilers - the smaller pieces of processed coal
3. Rexco breeze for industrial boiler plants - the very small pieces. Breeze output is now available in briquette form. Eventually briquettes may entirely supplant the traditional sale of breeze to industry.

A rough estimate of total Rexco output in 1969-70 can be derived as follows:

2,700 tons of screened coal input a week x 50 weeks = 135,000 tons of screened input a year,

135,000 x 75% = approx. 101,000 tons.

Alternatively,

SRL Rexco output = approx. 1/6th of NCC Rexco output.
NCC Rexco output in 1969-70 = 602,239 tons

602,239 x 1/6th = approx. 100,000 tons

Actual SRL Rexco output in 1969-70 was approximately 104,000 tons.

About 55% of this quantity was marketed as Rexco, 30% as Rexcobrite, and 15% as breeze (11%)/briquettes (4%). Those proportions are largely dictated by the size distribution of the raw coal pieces and appear to vary within relatively narrow limits. The bigger the pieces, of course, the greater the sales value to SRL. Hence the firm goes to considerable effort to ensure the maintenance of at least a 'normal' size distribution.

Markets & Marketing

Rexco products. SRL markets only in Scotland with 50% of the Rexco products being sold in the Glasgow area alone. There have been sporadic exports to Continental countries, e.g., to Sweden and Yugoslavia, but those may cease, especially if NCC proceeds with plans to build a large new Rexco plant in a "geographically convenient" European country such as Denmark or Holland.[1] NCC plants in England serve the English market. SRL sells mainly to coal merchants and local authorities. An important exception, at least historically, in terms of tonnage has been the sale of breeze to industry, e.g., an Inverkeithing paper mill. However, the purchases by industry have generated relatively little profit.

Coal tar. Coal tar is not a great deal more valuable than coal with the actual price per ton being determined by the price of bitumen, a derivative of crude petroleum. Tar distilleries represent the main market. Distillation yields light oil, carbolic oil and creosote oil from which can be obtained benzene, toluene, xylene, phenol, cresols, xylenols, etc. some of which can be further refined.[2] SRL sells its output to a Falkirk firm. An old adage in the smokeless fuel trade holds that the value of tar sales = total net profit! NCC decided during 1964-65, after a great deal of enquiry and experimentation, not

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[1] Inter alia, such a plant would enable NCC to purchase its coal supplies abroad. Cf. NCC, Directors' Report, 1970, p.16. Recent speculation that the British Government might authorise coal imports again (they have been prohibited since 1959) appeared to relate solely to coking coal. Cf. Colin Chapman, "B.S.C. May Buy Coking Coal from Australia," The Times, 13 Oct 70, p.21. See also "Let the Coal Come In," Economist, 14 Nov 70, pp.68-69; Roger Eglin, "The Cold Facts About Britain's Fuel Crisis," Observer, 8 Nov 70, p.17; "Government Face Strong Pressure to Lift Ban on Coal Imports," Times, 7 Nov 70, p.7. But then came the Government announcement on 3 Dec 70 that imports of all types of coal including smokeless fuel were to be allowed from December 5th. This decision is to be reviewed not later than March, 1972.

[2] Cf. Cousens and Yarsley, Plastics in the Modern World, pp.108-12.

to diversify into the distilling and refining of "tar-oil".[1]

Coal gas and ammonia. The coal gas and ammonia produced by SRL have no sale value. Part of the gas is recycled for use in the production process. The remainder is flared. Ammoniacal liquor from NCC plants in the South is sold to fertiliser manufacturers. However, the return to NCC is negligible. Because of the nature of the coal used, SRL ammoniacal liquor is far too weak to warrant sale, especially since sale involves transport. Also, the liquor contains too much phenol and other elements unsuitable for inclusion in fertiliser.

Purchases and Inbound Transport Costs

SRL's main input of course is raw coal. As mentioned earlier, the NCB is the sole supplier. Minor inputs include: 1) a chemical ash modifier (MLH 271.3-1958 SIC) used to reduce the tendency of Comrie coal to mask[2] towards the end of burning when sold as Roxeo, 2) paper (MLH 483) for bagging briquettes, and 3) items ancillary to briquette production such as a classified briquette binding agent and sellotape (MLH 277) for bag-closing. All of the paper and coal is produced in Scotland.

Initially, only Comrie coal was used by SRL. But the quality of the coal fluctuated beyond acceptable limits[3] and the propensity of the main product, Roxeo, to mask reduced its sales appeal. Eventually the masking problem was minimised by using the ash modifier. However, the quality problem remained. Thus, SRL began experimenting with coal from other Scottish sources. Coal from the Seafield Colliery near Kirkcaldy, 18 miles away, began to be used in 1966. In 1970, SRL's coal mix was 75% Seafield and only 25% Comrie. There was no price difference: both averaged 150s. per ton delivered with the extra transport costs

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[1] Cf. James Poole, "King Coal's Rag-Bag of Riches Is Too Good to Sell Off," Sunday Times, 29 Nov 70, p.53.

[2] Masked ash, because of its lightness, does not fall away from a glowing coal, i.e., it masks it, thereby reducing the amount of heat from an open fire and spoiling its appearance. The ash modifier agglomerates and increases the weight of the ash.

[3] The NCC Directors' Report for 1964-65 refers to the quality problem as the "basic trouble" with the then unprofitable Scottish plant. It states that the lack of consistent quality "has effectively hampered the considerable efforts to establish a satisfactory Scottish market." NCC, Directors' Report, No. 32, p.7.

associated with Scnfield coal being entirely offset by a lower pit-head price. It follows that the SRL works would not be adversely affected by a complete cessation of deliveries from the Comrie Colliery, i.e., its location is not quite so dependent on raw material considerations or so constrained by transport costs as was believed at the time of the location decision.

The great majority of the inbound transport costs incurred by SRL, either directly or indirectly, are associated, not surprisingly, with the major input in terms of both tonnage and value, raw coal. Practically all of the non-coal inputs are purchased on a delivered price basis, and the transport costs involved are not identifiable. Coal transport costs on the other hand are easy to ascertain. They average something less than 12s. a ton with the precise amount being a function of the Comrie/Scnfield mix (see section below on transport costs relative to turnover). At one time transport charges on Comrie coal were costing SRL up to 1s.6d. a ton, i.e., about £1 per coal wagon (the normal payload per wagon is 13 tons). This amount was felt to be excessive leading the firm to purchase its own railway wagons. Their use is confined to Comrie coal. These own-account wagons involve only depreciation charges; operating outlays are negligible. Per ton depreciation charges are not available but for purposes of this analysis we shall assume that they average 1s. No Comrie coal is delivered to the plant by road.

Transport charges on Scafield coal average very close to 12s. a ton. The rail charge is exactly 12s. but sometimes, in emergency situations, delivery is by road; then the transport charge is only 9s. a ton. This dichotomy raises an obvious question, viz., why is rail transport used at all? Three considerations account for the existing situation where rail is the predominant mode. First, the batch processing system used by SRL means that inputs are required at irregular intervals. Coal can be kept waiting in unmanned BR wagons more cheaply than in manned lorries. Second, road delivery on any scale would involve the maintenance by SRL of sizable coal bunkers and the tying up of expensive working capital. Third, the Scafield Colliery lacks proper facilities for loading lorries. The result is excessive breaking when road is used. Breakage reduces the average size of the coal pieces and, as we have seen, smaller pieces mean reduced revenue.

Distribution

Generally, carriage is paid by SRL. The firm's delivered price consists of the ex-works price plus the cost of rail carriage to the 'point of sale' regardless of the transport mode actually used. A zone system is operated in Central Scotland whereby a flat delivery charge of 25s. a ton is levied irrespective of the customer's location. The boundaries of this zone were fixed following advice from the NCB which markets a competitive product in Scotland produced in NE England. As with any zone pricing system, of course, delivery charges will not always be commensurate with delivery costs (indeed, perhaps seldom will they be so). SRL is in a very advantageous position in this regard; its location offers it a degree of protection in the form of lower average transport outlays than those faced by non-Scottish competitors. This advantage is enhanced by the fact that SRL is operating in an oligopolistic market where price competition has been downgraded relative to non-price inducements such as consistent product quality.

An exception to the payment of carriage by SRL was its offer of Rexcobrite, originally to local authorities but later to coal merchants as well, at a discount provided the buyer picked up the material himself at the works. This offer was designed to help launch Rexcobrite, a new product in 1966 and one developed entirely in Scotland. The ploy met with considerable success. Some 8,000 tons of Rexcobrite a year are now sold ex-works. Prima facie, the discount being offered would not appear to be much of a bargain from the buyer's viewpoint. However, many own-transport operators do not seem particularly conscious of the total costs involved in vehicle fleet ownership, undue attention being given to variable outlays but not enough to fixed costs. Also, during the slack summer season, merchants and, to a lesser extent, local authorities are anxious to keep their men and vehicles occupied. Thus, they are more apt to purchase ex-works during the summer than at other times.

Despite the foregoing, SRL is not very enthusiastic about selling ex-works. While it saves a bit on transport by doing so, the irregular and unpredictable arrival of own-transport lorries has proved to be something of a nuisance and indeed a source of extra, albeit minor, costs, especially during busy periods. The explanation for this situation lies in the fact that own-transport vehicles may pre-empt the loading areas and thus keep waiting one or more of the vehicles owned by the road haulage firm to which SRL has subcontracted the transport function. Since loading must be done slowly to minimise breakage, waiting times

cannot profitably be cut by speeding up the loading process.

All tar output and 80% of the Rexco products are distributed by road. BR only handles about 20,000 tons of outbound traffic a year. Customer-owned lorries account for some 10% of total outbound tonnage by road. The remainder is hauled by Walker Bros. of Coudenbeath.

SRL does not operate a vehicle fleet or use NCC vehicles despite the ownership by NCC of a road haulage firm. It is interesting to note the advantages and general experience of ownership cited by NCC in its annual reports and in response to a direct enquiry before returning to the situation at SRL.

NCC purchased J. Clarke (Haulage) Ltd. in 1961 to alleviate an important distribution problem. Because of the firm's complete dependence on commercial hauliers prior to purchase, its Rexco had not been getting to coal merchants in accordance with their time preferences. The new acquisition was run as a separate company, initially under its original name, but a number of the vehicles were repainted so as to advertise the Rexco label. Not all of them were repainted however since the subsidiary also acted as a general bulk haulier. Indeed, NCC freight seldom comprised more than a third of its turnover. NCC shareholders were told in their Directors' Report for 1963-64 that:

> There are already indications of far-reaching changes in the policies of British Railways towards the carriage of our major product and of solid fuel generally, particularly over the shorter distances. Your Board are therefore satisfied in having under our own control an efficient alternative means of delivering our Rexco to customers, and, as our current sales experience demonstrates, being in a position to provide a bulk haulage service to various trades with an enhanced reputation for reliability and scale of tonnage which can be efficiently handled.[1]

In other words, events were amply justifying the Directors' 1961 decision to diversify into bulk transport. The profitability of the transport subsidiary improved more or less steadily from the very low levels of the early years. It also showed a considerable increase in physical size as a result of both internal growth and acquisition, e.g., Phillip W. Smith (Nottingham) Ltd., a 21-vehicle transport concern taken over in 1964-65.

The 1968-69 Directors' Report cited a further advantage of

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[1] NCC, Directors' Report and Accounts, No. 31 (1963-64), p.11.

having one's own vehicle fleet:

> During the past winter, owing to dislocation of rail services, we succeeded in despatching the considerable tonnages of Rexco, both from production and from our stocks. Only by having our own Haulage Company and the efforts of its management and drivers was this possible.[1]

A pioneering containerised bulk freight scheduled delivery service was inaugurated in July 1969 under the name, NCC Bulkliner. Solid fuel and other bulk commodities are collected in the East Midlands and transported via the Freightliner terminals in either Nottingham or Sheffield to destinations in the South-East on a next day delivery basis. Scrap, pig iron, sand, grain, glass, etc. form the return loads. Advantages claimed for the new service are scheduled delivery, elimination of delay, a considerable reduction in breakage of solid fuel, and "an above-average height of tip" plus a social benefit - a contribution towards reduced road congestion. Given sufficient traffic, this service will likely be extended to Liverpool, Newcastle and Glasgow. The feasibility of a South-Wales-London service is currently under study. Clearly, NCC has found the bulk transport business to be a profitable one, both in itself and as an aid to the main corporate activity. Bulk transport contributed 11.1% of total NCC trading profits in 1969-70. On the other hand, it was less profitable than NCC's smokeless fuel and hard coke manufacturing activities on a trading profit/sales ratio basis and both the 1968-69 and the 1969-70 NCC annual reports drew attention to the fact that the prevailing rate of return on investment in haulage activities was not considered acceptable on a long-term basis.

In light of the above, SRL's decision to subcontract the transport function is somewhat understandable but not entirely so. Unfortunately, it has not been possible to authenticate the rationale behind the original judgment. It can be surmised, however, that at least four considerations were present in the mind(s) of the decision-maker(s). First, the NCC vehicle fleet at the time of the initial decision in 1963 was centred in the East Midlands, over 250 miles from Oakley. This existing transport capacity was obviously of little value as a means of serving the Scottish market from a Scottish manufacturing unit. Second, the NCC had not at that stage found its

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[1] NCC, Directors' Report and Accounts, No. 36 (1968-69), p.9.

haulage business to be very profitable. Thus, it was probably reluctant to expand its vehicle fleet without cogent reasons for doing so. Third, a major expansion at NCC's Edwinstowe(Notts.) works was undertaken concurrently with the new facility in Fife imposing a heavy strain on the firm's financial resources. It probably welcomed the opportunity presented by the subcontractor option of avoiding further immediate investment in vehicles. Lending support to this view is the fact that vehicles were excluded from the accelerated depreciation scheme operative in Development Districts from April 1963 to January 1966.[1] Finally, and perhaps most important of all, there is some evidence that the NCC Board revised upwards its assessment of the risk involved in the Scottish venture partway through the construction period. Thereupon, various steps were taken to scale down the total investment wherever possible without, obviously, going so far as to terminate the project completely. One of these steps could easily have been the decision to subcontract the transport function.

In practice, the transport decision has worked out very well. Walker Bros. have proved extremely cooperative and reliable. They employ a better-than-average standard of driver according to SRL and tolerate no corruption. The day-to-day work of the subcontractor for SRL is organised entirely by the latter's Office Manager in consultation with a colleague, the Assistant Works Manager. Thus, SRL to date has had no substantive reason to regret the distributive arrangement adopted at the time of its establishment. It could readily have done so, of course, especially when the various reservations which we have attributed to the NCC management proved in time to be either unfounded or of diminished significance.

SRL does not own depots or generally utilize for-hire space away from the works. It does, however, have an arrangement with one firm, Hargreaves Coal & Shipping Ltd., for the stocking of briquettes at a warehouse in Fairlop.

Transport Costs Relative to Turnover

In the absence of 'hard data' from SRL, both the transport cost and the turnover figures used in this section have had to be estimated.

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[1] See "A Budget to Invest In?" Economist, 31 Oct 70, p.58; GB, Treasury and Department of Trade and Industry, Investment Incentives, Cmnd. 4516 (London: HMSO, 1970), para. 12.

It might be noted that while SRL does not maintain up-to-date aggregate transport cost records or attach much significance to transport cost/turnover ratios, it does keep a close watch on per ton transport charges and costs.

Identifiable transport costs on the input side of the production process relate entirely, as we have seen, to coal. To estimate them, we assume that: 1) the Comrie/Seafield coal mix is 25/75, 2) the transport of Comrie coal to the works costs SRL 1s. a ton, 3) the transport of Seafield coal costs 12s. a ton, and 4) coal purchases total 140,625 tons a year (if 96% = 135,000, then 100% = 140,625). It follows that total inbound transport costs per year equal approximately £65,000. This figure is derived as shown below:

35,156 tons @ 1s.	=	£ 1,758 (all figures are to the nearest £)
105,469 " " 12s.	=	63,281
140,625		65,039

SRL quotes on a delivered price basis. We assume that delivery costs approximate £97,000 a year.[1]

Total identifiable transport costs, in and out, equal approximately £162,000 a year. Some 2/5ths of this amount is represented by the inbound costs.

The NCC annual reports include consolidated figures on production and sales by product group. We assume that value of sales per ton data developed from these figures can be taken as roughly indicative of the situation at SRL. In 1969-70, NCC Group turnover per ton of smokeless fuel and tar was about £10.13s. Assuming that SRL sales of Rexco products and tar totalled 110,000 tons in that year, then turnover approximated £1,171,500 (213s. x 110,000), and the transport cost/turnover ratio was 13.8%. This figure is comparable to the transport cost/gross output ratio of 2.9% for coke ovens and the manufactured fuel industry in the UK from the 1963 Census of Production (MLH 261) and is a striking and thought-provoking indication of the irrevelance of at least one of the Census averages for some individual companies!

Rexco open fire fuel is the most valuable SRL product. It was available from coal merchants in Glasgow on 1 Dec 70 at 458s. 5d. a ton. Estimated outlays on transport by SRL comprised 5.9% of this price.

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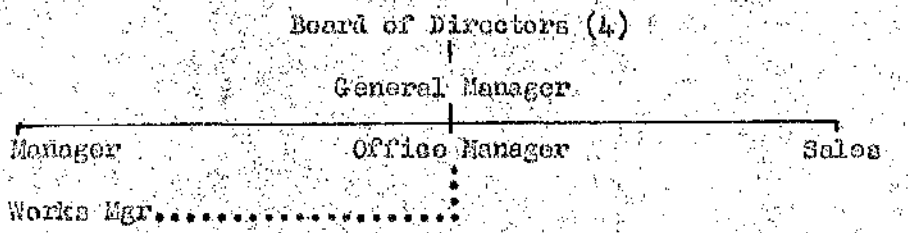
[1] The steps involved in arriving at this estimate have been omitted at the request of SRL.

General Operating Experience

The legal status of SRL has remained unchanged since the formation of the company; it has always been a wholly-owned subsidiary of NCC. In operational terms, however, SRL has experienced almost a sea-change. Whereas in the early days it was treated more like an integrated division than a separate company, today it has complete control within broad guidelines over a wide range of functions including production, purchasing, home sales, distribution, hiring and firing, labour relations, wage negotiations and, unofficially, research and development. Accounting on the other hand and any export queries are still dealt with in Mansfield while financing continues to be arranged in London.

Although it is a separate corporate entity, SRL has no formal structure. The organisation chart below is unofficial; nonetheless, it accurately depicts the most important relationships.

SRL Organisation Chart, 1970



The position of Assistant Works Manager (AWM) can be used to illustrate the informal nature of the structure shown above. Normally, the AWM reports to and receives direction from the Works Manager. On briquetting and some other technical matters, however, he bypasses the Works Manager and deals directly with the General Manager because of the latter's particular interest in these subjects. The General Manager was made a Director of SRL in 1969. He had attended Board meetings for two years previously in an ex officio capacity. The SRL Board, of course, is responsible to the Board of NCC.

Communication difficulties played an important part in the decision by NCC to grant more autonomy to SRL. Initially, the Scottish firm was little more than a production unit. The key sales function for example was retained in Mansfield. SRL employed no sales personnel. Hence, a Scottish coal merchant wishing to buy Rexco from SRL was asked to send his order by post to Mansfield. Telephone orders

were not accepted. The order was processed in England. A copy was then mailed to SRL together with the requisite number of invoice copies, all of them printed on NCC letterhead! Following the execution of the order by SRL, it put the merchant's copy of the invoice in the post at Oakley. SRL's General Manager referred to this procedural triangle in retrospect as "hopeless". It precluded the development of intimate customer relations, presented a psychological barrier to the more nationalist-minded Scottish merchants, and proved to be administratively awkward.

SRL's debut on the Scottish scene was not a profitable one. The winter of 1963-64 was one of the mildest on record. Demand for Rexco proved to have been seriously over-estimated, in part because of the weather, but also because of the beguiling effects of a large volume of exploratory trial orders in conjunction with inadequate market research. Moreover, as explained with just a touch of rancour in the NCC Directors' Report for 1963-64, "the merchant trade were more anxious to meet previous commitments and to clear their stocks than to support a relatively new product."[1] More charitable perhaps is the view held by SRL that Scottish coal merchants are "a race apart", stubborn and self-opinionated. Many are alleged to have welcomed a product made in Scotland but to have been wary of SRL's English affiliations. Others undoubtedly expected SRL to fold within a relatively short period and thus held back their custom awaiting some definite augury of success. However, an explosion at SRL's works in late March 1964 must have confirmed their worst suspicions. It caused extensive damage to the gas disposal section. The ensuing production difficulties were not completely overcome till the end of May, a severe blow for a new venture.

Officially, the NCC Board remained undaunted. Yet it had apparently taken steps even while the Cowie works was under construction to cut back the originally proposed investment by as much as £50,000, a not inconsiderable amount relative to the £280,000 actually spent. Sales continued to fall short of expectations in 1964-65. Part of the problem was an inappropriate marketing strategy. There was no Scottish sales force, the advertising budget was insufficient and orders continued to be processed in Mansfield. As mentioned earlier, the number of smokeless zones in Scotland was fewer than anticipated.

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[1] Op. cit., p.11.

Perhaps most important, however, was the disquieting evidence of sales resistance by the housewife, put off by the high ash content and tendency to mask of Rexco made from Comrie coal. Labour's victory in the 1964 general election proved to be a further source of uncertainty.[1] A firm of management consultants was brought in during 1965 to evaluate NCC's total operation. While the consultants spent no time in Scotland, they recommended to the Board of NCC that it give serious consideration to the likelihood that SRL was never going to be profitable.

In the meantime, SRL was not standing still. Although the firm had no responsibility for sales, the entire staff was urged by the General Manager to become sales-conscious. Pressure (to the extent that one can generate pressure from below in an organisation) was put on the General Manager's official contact at Group HQs, the NCC Production Manager, to support an SRL proposal authorizing the subsidiary to hire its own sales force and to process Scottish orders in Scotland. Eventually logic prevailed and SRL was allowed to employ one sales representative (today there are two). However, he was required to report to the NCC Sales Manager in Mansfield rather than the SRL General Manager. Only gradually was the latter accepted as the immediate superior of the SRL sales rep. Despite the lack of an R & D budget, SRL personnel discovered, after considerable experimentation, a commercially-acceptable ash modifier in 1965 which reduced the tendency of the Comrie coal to mask. Dependence on Comrie coal was reduced in an absolute sense by a change in purchasing policy. It was decided, again after experimentation, to utilize Seafield rather than Comrie coal for the larger part of the firm's total requirements. This change became effective during 1966. Rexcobrite was developed by SRL during the same year. This product does not require an ash modifier. Finally, the Board of SRL shifted its normal 'venue' to Scotland from London/Mansfield evoking a significant increase in local morale. This last change was largely the work of one man, Sir John C. George of Ayr, SRL's current Chairman. Sir John accepted an invitation to join the Board of NCC early in 1963,[2] during the SRL gestation period. An M.P. at the time, a mining engineer, and since a director of several firms, he took a particular interest in the new subsidiary. Following the

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[1] Cf. NCC, Directors' Report, No. 32, p.9.

[2] NCC, Directors' Report (No. 30), p.5.

consultants' report to the NCC Board in 1965, he became head of SRL and insisted for largely psychological reasons that its Board begin meeting 'North of the border'.

The combined effect of these various changes was an increase in sales. SRL earned its first gross profits in 1966-67. By 1967-68, net profits (gross profits minus depreciation and R & D expenditures) began to materialise. It was not until 1969-70, however, that SRL profits grew comparable in size to those being earned by other members of the NCC Group. Today, the firm would appear to be completely accepted by the Scottish coal merchant community. Indeed, its most important problem now is getting enough raw material.[1]

Towards the end of the fiscal year, 1968-69, SRL, in the words of its General Manager, was "out completely free from the South" with the exception of the functions noted previously. This act was both a reward for successful past initiatives and a recognition that SRL was more apt to flourish under autonomous than regimented conditions. Financial targets continue to be set in London but the Board of SRL is now the ultimate authority with respect to budgetary, price and product matters.

An especially interesting aspect of the gradual devolution of power to SRL has been the treatment of the R & D function. NCC owns Rexco Research & Development Co. Ltd., Mansfield but SRL has found this company to be of little help, mainly because of the distance separating the two subsidiaries. At the same time, the existence of Rexco R & D has made it difficult to justify a separate R & D budget for SRL. Like the accounting function in Mansfield, Rexco R & D is seen by NCC as a service to the entire Group, a not unreasonable view *prima facie*. In fact, as we have already suggested, the ash modifier and Rexcobrite, both so essential to the economic viability of SRL, were conceived and developed in Scotland without any special allocation of funds and without substantive assistance from Rexco R & D. Everything was done on a shoestring, cutting corners wherever possible. Moreover, Mansfield was not even informed of the Rexcobrite development until it was well underway. More recently, SRL has been entirely responsible for the development of briquettes from breeze, again without any official R & D

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[1] Cf. NCC, *Directors' Report, No. 36*, p.6.

budget. The importance of this venture can be gauged from the following comment in the 1968-69 NCC Directors' Report:

> We have already entered commercial production in Scotland and are about to put down plant at our English works with a view to briquetting the whole of our Breeze availability before the end of this year. We anticipate this development ultimately will make a significant contribution to our profitability.[1]

Despite this latent achievement, SRL still has no official R & D budget. However, there are no complaints on this score from its management.[2]

External Contacts

Customers. Each member of SRL's managerial staff was asked to indicate the frequency with which he had contact with existing or potential customers and the main contact method used. The results appear below.

Category of Manager	Frequency of Contact	Main Contact Method
General	Daily	Telephone
Office	Daily	Telephone
Works	Monthly or less	Telephone, post, face-to-face away from works[3]
Assistant Works	Infrequently	Face-to-face away from works

Clearly, the telephone is the most important contact method used by managerial personnel at SRL. Also noteworthy is the seeming shield between the two works managers and the customer. The two SRL sales

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[1] Op. cit., p.6.

[2] One might mention as a footnote to this section two relatively minor locational problems that have come to light during the period that SRL has been operating in the Comrie-Oakley area. First, the local female labour pool has proved inadequate. Aggregate supply has been limited, and it has proved difficult to retain the better quality workers at 'normal' wage-rates because of the relative inaccessibility of the works. Thus, above-average wages have had to be paid to widen the pool. Second, both the works and the adjacent Comrie Colliery are served by a 1½ mile spur track rather than a main rail line. The spur is operated for BR by the NCB and is designed to convey loaded coal wagons down to a marshalling yard on the main line and empties back up to the pit. SRL's need to transport 75% of its coal requirements up the spur has given rise to certain "operational difficulties".

[3] It is not clear whether this man was unable to specify a single main method or whether he misunderstood the question and listed all contact methods used by him. This problem occurs several times as will become evident.

reps are not based in Oakley, working out of their homes in Glasgow and East Scotland respectively. Thus, they were excluded from our survey. Their main contact with customers according to the General Manager is the face-to-face visit. The General and Office Managers use the telephone largely for routine matters. In contrast, there are few routine letters to customers except for a company newsletter and announcements of price changes. Most postal contacts with customers in fact are either invoices or confirmations of telephone orders. Customers contacting the works are normally referred to the General Manager. Complaints, however, are looked after by the Office Manager. Face-to-face contacts with customers have increased in importance over time in line with SRL's growing responsibility for sales and the gradual diversification of the product line.

Suppliers of goods/materials. By far the most important supplier, of course, is the NCB. Managerial contacts with suppliers generally are indicated below by frequency and main method. Face-to-face and telephone contacts obviously predominate. Somewhat surprising is the overall frequency of contact; it is rather higher than one might have expected.

Category of Manager	Frequency of Contact	Main Contact Method
General	Daily	Telephone
Office	Weekly	Face-to-face away from works
Works	Daily	Face-to-face at works, face-to-face away from works, telephone, post
Assistant Works	Weekly	Face-to-face away from works, telephone

Suppliers of services. As suggested below, and again as one might expect, suppliers of services are contacted less frequently and normally by fewer managers than suppliers of goods/materials. Presumably, the mostfrequently-contacted supplier is Walker Bros., the road haulier.

Category of Manager	Frequency of Contact	Main Contact Method
General	Weekly	Face-to-face away from works
Office	Weekly	Face-to-face at works
Works	Infrequently	Face-to-face at works, face-to-face away from works, telephone
Assistant Works	Infrequently	Telephone

Suppliers of capital equipment. This group of suppliers is contacted relatively infrequently as evidenced below. Yet the frequency of contact is still greater than might have been anticipated a priori. Particularly striking is the important role played by the General Manager in dealing with equipment suppliers.

Telephone contacts with all types of supplier are frequently followed up or confirmed by post. On the other hand, contacts are seldom initiated by post.

Category of Manager	Frequency of Contact	Main Contact Method
General	Monthly	Face-to-face away from works
Office	Infrequently	Face-to-face at works
Works	Monthly	Telephone, post
Assistant Works	Monthly	Face-to-face away from works, post

Other SRL/NCC personnel (located elsewhere). The main reasons for communicating with the 'South' are: 1) queries concerning cost codings and accounting problems generally, 2) insurance matters, 3) discussions with the NCC managing director. Under NCC's credit control system, invoices are despatched monthly by NCC and its subsidiaries. The accounting department in Mansfield sends a letter daily to the SRL Office Manager setting out SRL's accounts receivable. This procedure gives rise to a considerable volume of telephone traffic, most of it intended to smooth out the inevitable problems. However, the post would do just as well in many instances according to the General Manager. This is a situation where telex might be an economic proposition. Indeed, the possibility of using telex for most SRL-NCC communications was carefully examined in 1968 at the instigation of the NCC General Manager but was dismissed because of insufficient daily routine traffic to make the change worthwhile. The economics may have improved since. Several NCC Group members are already telex-linked and the SRL General Manager in August 1970 felt that it might be time for another traffic and cost review.

Managerial contact information is given below. The importance of the telephone stands out. There is no private telephone line between Oakley and Mansfield however because the traffic volume does not warrant one.

Category of Manager	Frequency of Contact	Main Contact Method
General	Daily-weekly	Telephone
Office	Monthly	Telephone
Works	Daily-weekly	Face-to-face away from works, telephone, post
Assistant Works	Monthly	Face-to-face away from works, post

Interestingly, the SRL General Manager was not aware of the Post Office Confravphone service or of the imminent possibility of commercial Confravision. However, he felt that the former merited further investigation and asked for some literature on the topic.

Overall, the telephone is the most important contact method used by SRL personnel. There are no complaints about the service or indeed about the Post Office generally. The firm does not keep any records of the frequency with which the telephone is used for long-distance calls. External face-to-face contacts by the managerial staff as a whole are more common away from the works than in their own offices. One of the most interesting revelations from our survey of contact frequencies and main contact methods is the unusually wide range of interests on the part of the General Manager. This point is illustrated even more dramatically by the section below on travel. A number of explanations would appear to be relevant including the relatively small size of SRL, the lack of formal structure, the man's strong technical background, the historical emphasis on production, and the continuing absence of certain functions such as accounting.

Communication Costs

The main communication methods used by SRL that might be costed are the telephone and the post. In fact, no information was readily available on the latter, the amounts involved being buried in the office overheads total. However, they were considered to be insignificant. Detailed telephone cost records were not available either but the General Manager was able to estimate the approximate size of the outlays on telephones, i.e., c. £250 a quarter, because he had recently looked up some relevant material motivated by a growing suspicion that the telephone was being used more than was strictly necessary. SRL has two listed telephone numbers plus an ex-directory number for the use of the sales reps and the 'South'.

Taking telephone outlays to be £1,000 a year and adding in a

bit for postage, we can safely conclude that total communication costs are probably less than 0.1% of turnover. This percentage may appear trifling but it should be borne in mind that SRL's net output/turnover ratio is low relative to most industries. It can be hypothesized that, ceteris paribus, the magnitude of the CCNO ratio for most manufacturing firms will vary inversely with the size of the net output/turnover ratio. Since the latter ratio in the case of SRL is very low, it follows that the former or CCNO ratio should be relatively high.

Travel

SRL's managerial staff were asked to indicate the frequency with which they travelled on company business for a variety of specified purposes. The outcome of this part of our survey is set forth in matrix form below. Certain inconsistencies came to light but generally the answers reinforced and extended what had already been revealed by the replies concerning contact frequencies and main contact methods. Clearly, the General Manager travels a great deal; indeed, he estimated that he is away at least part of every day on some mission or other. Furthermore, he encourages his staff to get out and about as required, e.g., to collect vital spare parts or to keep tabs on suppliers. Most of these trips are relatively local. One of their purposes, according to the General Manager, is to impart an occasional sense of urgency to the work of the staff with a view to maintaining enthusiasm and morale.

A company car is the main mode of travel used by the General Manager, in part because he enjoys driving. NCC would like him to fly more but he values highly the flexibility implicit in having his 'own' car when in the 'South', finds it difficult getting to Mansfield when flying, and, for not entirely rational reasons, dislikes paying money to taxi-drivers. Accessibility to Scottish airports is alleged to be excellent from Oakley. The General Manager claims to be able to reach Turnhouse within ½ hour and eastern Glasgow within 40 minutes - getting to Abbotsinch however takes a few minutes longer! He follows no particular travel pattern. Customers are visited when awkward complaints make a face-to-face contact advisable, when Rexco products are being utilized in a novel way, or, occasionally, even for semi-social reasons. He takes a great interest in the technical side of supply, especially equipment supply. This interest has sometimes taken him to the Continent. Travel to the 'South', i.e., to the E. Midlands and London,

has been decreasing. The main reasons for going there today are: 1) attendance when asked at various NCC meetings, 2) membership on the NCC committee on carbonisation development, 3) an annual company-paid medical checkup in London, 4) visits to equipment suppliers. On the latter point, while no expansion of capacity at Oakley is currently underway, relatively frequent visits to suppliers of capital goods are still required for maintenance and replacement purposes. The General Manager himself expressed surprise at the amount of time he was spending on technical matters when the interview questions brought the topic to his attention.

Surveying the entire scope of his activities, the General Manager felt that he was perhaps over-inclined to travel. This predisposition posed a potential but probably minor problem in that he was responsible for initiating and/or approving most travel decisions by Oakley personnel!

We have noted the decline over time in trips by the SRL General Manager to the 'South'. The same thing has occurred with respect to visits by NCC management personnel to Scotland. Indeed, they have now decreased to the point where they must be mutually requested for some specific purpose.

Travel Purpose: To See	Travel Frequency by Category of Manager			
	General	Office	Works	Asst. Works
Customers	Daily	Seldom	Seldom	Seldom
Suppliers of goods/ materials	Daily	Weekly	Monthly[2]	Monthly[2]
Suppliers of services	Weekly[1]	Never	Monthly[2]	Monthly[2]
Suppliers of capital equipment	Monthly[1]	Never	Seldom	Seldom
SRL/NCC personnel located elsewhere	Daily-weekly	Seldom	Seldom	Seldom
Other	" " "	n/s	Monthly**	n/s

*Scottish Home Office, Clean Air Council, NCB, union reps, local authorities, Coal Merchants' Associations, Coal Utilisation Council, Solid Smokeless Fuel Federation, etc.
**Professional contacts and committee meetings.
n/s = not specified but presumably never or very infrequently.

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[1]The original answer to this question was inconsistent with the replies on contact frequency and main contact method. Thus, we have altered the answer to eliminate the inconsistency using as our guideline the query, what seems to be most reasonable in the circumstances?

[2]It was indicated earlier that suppliers of services were contacted infrequently rather than monthly. The latter answer is probably more accurate in that travel frequency is likely easier to recall at short notice than contact frequency but this line of reasoning is pure supposition.

The Outlook

SRL today is a profitable going concern. Demand for its products is extremely strong and it is ready to expand after some years of less than capacity production. However, insufficient raw material supplies pose a major constraint.[1] This situation is not helped by the unprofitability of the NCB's Scottish North Area[2] or the traditional militancy of the Communist-led Scottish membership of the National Union of Mineworkers.[3] On the other hand, expansion would reduce unit costs by enabling the firm to realise additional economies of scale.[4]

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[1]Cf. Andrew Hargrave, "Shortage of Miners Biggest Threat to Scots Coal Output," Financial Times, 15 Dec 70, p.17.

[2]"Let the Coal Come In," op. cit. See also Nora Beloff, "Tod's Choice: Reggie's or Enoch's Way," Observer, 1 Nov 70, p.9; Nicholas Faith, "Coal Facing North Sea Oil Threat," Sunday Times, 25 Oct 70, p.52; William G. Shepherd, "Cross-Subsidization in Coal," in Public Enterprise: Selected Readings, ed. by R. Turvey, Penguin Modern Economics, No. X59(Harmondsworth, Mddx.: Penguin Books, 1968), pp.316-30.

[3]The Scottish miners voted 4-1 in favour of unofficial strike action during the pay dispute between the NUM and the NCB in the autumn of 1970. Their thinking was outlined in some detail by Michael McGahey, President of the Scottish Area of the NUM on "Current Account," Scottish Television, 23 Oct 70, 20.30-21.00 hrs. The proportion of militants was much higher in Scotland than in GB as a whole.

[4]The existing 7-retort batch production unit is above the minimum economic size but below the optimum size of 10 retorts. However, NCC's new RIC(Rexco Improved Continuous) process developed jointly by NCC and Henry Balfour & Co. Ltd. of Levon, Fife promises to reduce average plant size over the long run. See Dutton, op. cit., pp.12ff.

CHAPTER 19

FINAL CONCLUSIONS

> "too much respect for scientific methods means timidity in making positive inferences and bold judgments."
>
> Catherine Bauer Wurster[1]

The Issue

Induced interregional industrial mobility has always dominated the regional policy stage in Britain and will likely continue to do so for many years yet although it is being suggested increasingly[2] that the scope of regional policy should be broadened to encompass the service sector, the preparation of regional accounts, the adoption of regionally-differentiated fiscal measures, etc. However, such matters are beyond our scope here. A dispute has arisen recently over the extent to which industrial mobility is affected by transport and communications considerations and, a related point, the proper role of infrastructure in regional policy. On the one side stands what we have called a de facto academic/civil servant coalition. This is more or less the group which McCrone (1969) must have had in mind when he referred to "some informed circles . . . notably on the left in politics."[3] It maintains: a) that, for most types of industry, transport and communication costs have largely lost whatever locational significance they may once have had, b) that infrastructural expenditure is essentially permissive rather than stimulatory in its effects, and c) that the historical deficiencies in the peripheral areas' stock of transport (though not communications) capital have, with possibly a few picayune exceptions, been eradicated. On the other side stand what we have termed the lobbyists, especially the CBI and the Scottish Council. They hold not only that industrial migrants attach a great deal of importance to the existence of high-quality transport and

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[1] "Introduction," in Webber, et al. (1964), p.11.

[2] E.g., see Donald MacKay and Kevin Allen, "Development Area Policy: Giving a Fair Deal to the Regions," The Times, 7 Sep 71, p.15.

[3] Op. cit. p.180.

communications facilities in the DAs but that regional policymakers have traditionally failed to pay adequate heed to transport and communications matters with the result that the DAs have suffered from a chronic shortage of transport and communications infrastructure and inadequate policy integration. This is the issue which we set out to explore.

The Hypotheses

Three hypotheses were put forward:

1) a good interregional communications network is essential to the success of most long-distance industrial movements, the exceptions being movements by local market-oriented firms
2) private transport and communication (or collectively, distance) costs are not an important constraint on interregional industrial mobility within the UK for most types of manufacturing industry
3) the quality of intra-firm communications and organisational flexibility can often be more critical to the long-term viability of industrial migrants than distance costs.

Findings

The first hypothesis would appear to be virtually self-evident. But, in practice, there was little attempt inside Whitehall prior to 1963 to relate distribution of industry policy to the capacity of the transport or communications systems. Such meshing as did occur was a function of luck rather than design, not least because of the serious lack of coordination, proper investment appraisal and forward planning within the communications sector (broadly defined) but most importantly perhaps on account of a general failure to recognise that transport and communications considerations were highly relevant to the success of a regional policy having as its main feature the encouragement of large-scale movement by private industry. Since 1963, the situation has improved enormously. The desirability of much closer policy integration throughout the apparatus of government, and the removal of departmental blinkers generally, has been accepted, comprehensive planning machinery has been created, an economic rationale has been found for regional policy to replace its previous welfare bias, the number of departments and related bodies directly involved in the formulation of regional and communications policies has been cut, the quantum of economic talent available inside the civil service has been greatly increased, the supply of economic data has been expanded and analytical techniques have been improved. But a key problem remains, to wit, there is no consensus on the most effective role for

transport and communications expenditure in regional policy, a difficulty compounded by the absence of a single communications policy. Consensus is lacking because a viable regional development theory has still not been evolved. And without theory, empirical research is severely hampered. It is worth noting in this regard that neither the return from British regional policy as a whole nor the relative efficacy of the various policy components has ever been satisfactorily evaluated. While the foregoing has primary relevance to Whitehall, mutatis mutandis it applies equally to St. Andrew's House and Stormont.

In sum, government policymakers in Britain came to recognize the need for broadening regional policy to include coordinated transport and communications expenditure only belatedly, recognition has not yet led to a satisfactory level of policy integration, and probably will not do so until economic theorists have provided much better guidelines than exist at present. In the meantime, controversy can be expected to continue over what is a proper level of expenditure on transport and communications from a regional development viewpoint. Neither side in the dispute outlined above has been able to mount a cogent case, in part because of the obfuscatory consequences of the current economic recession with its pronounced dampening effect on the supply of mobile firms. Thus, it will be interesting to see what happens to this supply when prosperity returns, especially since inter-urban road expenditures have been relatively heavy in Britain for almost a decade now in line with lobbyist pressures. There seems little doubt that these expenditures will show up well in any general cost/benefit calculus. But whether they will have a noticeable effect on the volume of interregional industrial mobility is much less certain.

Our second hypothesis embodies the conventional wisdom on the subject of distance costs and industrial mobility. But we discovered that the conventional view is somewhat fallacious, i.e., not in full accordance with the facts, in two ways. First, the evidence upon which it is based, particularly the Toothill Report (1961) and Luttrell (1962), is not as compelling as generally believed. Secondly, the number of industries to which it applies, at least in the case of Scotland and NI, is rather less than originally envisaged. Indeed, a detailed analysis of the effect of distance costs on postwar industrial migration to these two regions, the most peripheral ones in the UK, revealed that transport (but not communication) costs constricted mobility volumes over a wide range of industry.

This finding does not necessarily apply, of course, to the less remote DAs in the kingdom. Neither is it necessarily relevant to the future. Nor does it mean that national market-oriented, transport cost-sensitive industries cannot flourish in Scotland and NI. In fact, they can given the right circumstances suggesting that the reality of economic life at the periphery is much less daunting than the anticipation. But it is the latter that counts when, as has been the situation in Britain, mobility decisions are made privately rather than by edict.

Hypothesis 3 was amply corroborated by our case studies of migrants to Scotland but not proven since our migrant sample (1 transfer, 5 non-transfers) was selected on arbitrary grounds and cannot be considered as representative in any scientific sense. On the other hand, it was sufficiently representative that our findings deserve careful attention. Two points stand out in this regard. First, none of the five non-transfers appeared to anticipate the post-move communications problems which it encountered indicating that intra-firm communications were more or less ignored prior to moving. But once these problems became obvious, four of the companies were able to overcome them by devolving additional functions to their Scottish unit. In the fifth instance, however, the main problem, inadequate telecommunications facilities, was external to the firm and thus beyond its effective control; partly in consequence, it sited a subsequent new manufacturing facility outwith Scotland, a development that may have occurred anyway but which was undoubtedly influenced by the experience of the existing Scottish works. Secondly, no relationship was apparent between the likelihood of an intra-firm communications problem arising and a migrant's organisational status. It seemed immaterial whether a branch, a division or a subsidiary was involved. What did matter was the degree of effective autonomy granted to the migrant and therefore the need for intra-firm communications. These two variables were inversely related; by increasing the former, one reduced the latter, ceteris paribus. This finding is not novel; however, it has never emerged before with such clarity or so convincingly.

A useful by-product of our case studies was the light which they shed on our first two hypotheses. In general, they corroborated them, especially the one pertaining to the quality of the interregional communications network. But equally valuable was the way in which they complemented our other work, breathing life into what was for the most part a relatively dry series of analyses, hopefully objective and innovative but hardly fascinating.

Policy Implications

Several policy implications emerge from our research.

1) The emphasis placed upon improved transport as part of a comprehensive approach to regional development by successive governments since 1963 has not been misplaced. We have found little evidence to suggest either that transport expenditures during recent years have been wildly excessive or that they have been largely unnecessary in developmental terms. That is to say, our findings lend credence to the views of the lobbyists rather than the so-called academic/civil servant coalition. It seems certain, on the other hand, that many potential migrant-generators continue to exaggerate the transport problems involved in operating from the more peripheral parts of the country. It follows that advertisements of the type run by the Department of Trade and Industry during the first half of 1971 entitled "Today the Areas for Expansion are just up the road" are a sound investment. Similarly, it is important that any remaining transport bottlenecks be eliminated as quickly as possible and that the adequacy of the transport network from a regional policy viewpoint be kept under continuous review.

2) Not enough attention has been given to the need for improved communications in the peripheral areas. The adverse consequences of chronically inadequate supply, especially of telecommunications infrastructure, appear to have been underestimated by policymakers. This situation threatens to get worse as communications become increasingly important to industry. It may thus be necessary to step up considerably current levels of communications investment if other forms of regional incentive are not to be more or less nullified across a growing range of industry.

3) Greater efforts should be made to bring about a closer integration between regional, transport and communications policies, and to inject a heightened awareness of regional considerations into the policy-making processes within the transport and communications sectors. For example, the 1968 Transport Act has brought about a pronounced

jump in manufacturers' transport costs.[1] One wonders if the potentially serious implications of this development for regional policy were foreseen. Probably they were not, although it must be admitted that, even if they were, it is unlikely that the Act would have been changed in any way since transport costs were generally considered to have, with limited exceptions, little locational significance. Our findings suggest, of course, that this attitude is no longer tenable.

4) As noted earlier, it is being suggested more and more frequently that regional policy should be broadened to include regionally-differentiated national measures. Transport and communications policies would appear to be suitable candidates in this regard for two reasons: a) most major transport and communications decisions are best taken from a national perspective, i.e., with the exception of intra-regional roads, there is little sensible scope for transport or communications devolution within GB, b) it might prove relatively easier to favour selected regions, and indeed specific locales if growth areas come back into vogue, with above-average levels of transport and communications expenditure or subsidy than to operate spatially-discriminatory monetary or fiscal measures. Air transport and the REP are cases in point. In the former instance, the amount of de facto regional subsidisation in effect at the moment is considerable but it is largely hidden. This situation is not particularly desirable - in our view, subsidies should be transparent - nor is it an intentional part of regional policy. On the other hand, it has escaped political censure. In contrast, the REP, an analogous example of regional subsidisation, is to be terminated by the Conservative Government, apparently on doctrinaire grounds. Clearly, some types of regional subsidisation are more acceptable politically than others.

5) In view of our finding that migrant-generators seem largely unaware that migration will probably give rise to serious intra-firm communications problems unless conscious steps are taken to avoid them, DTI

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[1] One Scottish firm, Stone Manganese Marine Ltd., estimates that its costs have more than doubled: private interview, 12 Mar 71. Good reason exists for believing that this experience is not atypical.

officials in their normal contacts with potential migrants should mention this point, discreetly, but explicitly, in order to shorten the initial loss-making period normally associated with industrial movement and to improve migrants' survival prospects.

Research Implications[1]

Perhaps inevitably, our work has raised as many queries as it has resolved. While a number have already been mentioned, it is useful to cite them all together, though this means a certain amount of repetition, for easy reference and to facilitate comparison. It is evident first that much more research is required, and required quickly in light of the huge sums now being spent in pursuance of regional policy objectives, on the role of transport and communications in regional development and the way in which OC, financial incentives and administrative controls should be admixed, both in timing and quantity, as an inducement to industrial mobility and expansion. Worth developing in this regard are the activist/passivist/agnostic/doubter classificatory scheme put forward in chapter 2 and a cognate French taxonomy, accompagnement/entrainement; the former relates to ideological positions, the latter to specific types of investment. Also germane is the question of why it took so long for British regional policymakers to recognise the importance of transport and communications and to take steps to include them in a comprehensive policy package. We have suggested a number of answers to this problem but they suffer from the common defect of being derived entirely from published sources. What is needed now are some interviews with the chief actors on the regional policy stage, augmented by a first-hand look at attitudes within the departments, etc. concerned with transport and communications. The analyst undertaking this research should be competent, ideally at any rate, not only in regional matters but also in economic history and public administration.

A valuable research task would be the extension to other peripheral areas of our investigation into the effect of transport costs on industrial migrant flows to Scotland and NI. Also, a look might profitably be taken at the role of transport and communications considerations in migrant mortality. Such evidence as we have (it is not very plentiful) suggests that mortality rates are sufficiently high that they constitute a serious

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[1] Cf. Manners (1970).

drain on the resources devoted to regional development. It follows that attempts should be made to determine systematically both the amount of mortality by MLH and the main causes with a view to remedial action. The relative migrant-generating potential of the various industries comprising the SIC warrants probing to enable policymakers to form a much more accurate impression than exists now of the degree to which potential is related to transport cost sensitivity. We have put forward the idea that TCNO ratio data may be of value in the case of certain industries as indicators of local market orientation. The latter, of course, denotes transport cost sensitivity and indeed is probably the best single portent available that transport costs are a serious locational constraint. However, agreement is lacking over the extent to which local market orientation is characteristic of UK industry. While our work in this area is little more than reasoned speculation, it clearly suggests that the general topic is worth pursuing. We have indicated that our findings with respect to Hypothesis 2 may not have equal relevance to domestic and foreign migrants but were unable to develop this theme. Yet it is obviously an interesting one. Mention might be made also of a cognate point, viz., that the ownership status of migrants needs much more attention than it has received heretofore; existing data are considerably less straightforward than they appear *prima facie*.

More research is needed on TCNO ratio temporal trends at the MLH level. Data possibilities in this regard include the post-1965 annual censuses of production in NI and the 1968 UK Census of Production. Signs are mounting that, contrary to the conventional view, transport costs are becoming more rather than less important to industry. We have noted, for example, an observation to this effect by Benjamin Chinitz in the U.S., the NI experience, and the cost consequences for UK manufacturers of the 1968 Transport Act. Richard Casement, in a recent survey of land transport developments commissioned by the *Economist*, argued that "distribution costs are rising dramatically as a proportion of industrial costs,"[1] yet transport generally in his opinion is underpriced, i.e., social costs exceed private outlays. Any trend towards higher TCNO ratios, of course, has important implications for regional policy. But corroborative evidence remains

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[1]Richard Casement, "Pay As You Go - Moving People in the 1970s: A Survey," *Economist*, 27 Mar 71, p. xiii.

patchy; that which exists has not yet had much mass impact - hence the need for a definitive piece of research on the subject.

A number of other worthwhile research topics involving TCNO ratio or analogous data can be stated in the form of questions: 1) to what extent are MLH-level, census-derived TCNO ratios representative of their underlying establishment populations, i.e., are the dispersions around the average figures typically wide or narrow, 2) is it possible to associate specific pricing policies, e.g., ex-works pricing, with specific industries or is the amount of heterogeneity as great (or little) intra-industry as inter-industry, 3) what are the predominant distribution methods in particular industries, 4) how great is the variation in traffic generation by industry per pound(£) of sales, 5) is there any relationship between the volume of traffic generated by an industry and the size of its TCNO ratio, 6) what relationship, if any, exists between transport and communication costs?

Worth noting finally are a number of research possibilities arising out of our case studies, to wit, time trends in CCNO ratios, contact measures, the implications for industrial migration and regional development generally of the new communications technologies such as Confravision, the volume and relative cost of business travel by industry together with an indication of preferred travel modes, the types of corporate organization best able to set up reasonably autonomous offshoots at a distance, the type of corporate structure best suited to the communication needs of the multi-plant firm, and the extent to which this structure is a function of product type.

APPENDIX A

MANUFACTURING MIGRANTS TO SCOTLAND, 1945-69, IN OR SOON TO BEGIN PRODUCTION AS OF JANUARY, 1970: NAME, SCOTTISH ADDRESS, YEAR PRODUCTION BEGAN, SIC CODING (1958 & 1968) AND ORIGIN

Introductory Notes

The list of 'migrant' firms presented in this appendix has been adapted from an unpublished list entitled "Manufacturing Firms Who Have Located Projects in Scotland Since 1945, and Are Still in Production, and Those Who Have Announced Their Intention to Do So But Are Not Yet in Production," January 1970 (photocopied) available from the MinTech (now Department of Trade & Industry) Office in Glasgow. Only one entry (277/12) has been added to the MinTech compilation. Several have been deleted however as explained in the following paragraph.

The Mintech list is believed to be based largely but not entirely on the criteria advanced by Howard[1] in connection with his study of the postwar movement of manufacturing industry in the UK. Briefly, these criteria as they apply here are fourfold:

1) the 'migrant' must represent a new manufacturing establishment in Scotland but not an entirely new firm (using the terms 'establishment' and 'firm' in the same way as the Census of Production), i.e., it (or its parents) must have been in business outside the region prior to 'migrating'

2) the 'migrant' firm must not have been operating a factory in Scotland classified to the same MLH as the new establishment prior to the date of migration (MinTech did not always follow this rule - see for example entries 46, 133, 276/11, 307/42, etc.; in each such deviatory case we have classified the migrant according to the characteristics of the initial establishment and have relegated the succeeding establishment to a footnote)

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[1] Op. cit., pp. 48-49.

3) the new establishment must at some time have employed more than 10 full-time workers

4) it must still have been operating during or about the month of January 1970.

Among the migrants as defined are complete transfers, new subsidiaries, new branches and new divisions. It makes no difference to their status as migrants whether they have occupied newly-built or existing premises. On the other hand, take-overs of existing establishments through acquisition or merger have been excluded.

Five pieces of information about each 'migrant' are contained in the MinTech list, viz.: place of origin, name, Scottish address, main product(s) made in Scotland and year production began. Our list incorporates all of this detail but substitutes SIC codings (1958 and 1968) for product made to facilitate comparisons with the transport cost data from the Census of Production. We have also altered some of the other information received from MinTech, as will become evident, with a view to maximizing its accuracy within the time and other constraints circumscribing our efforts. In addition to the MinTech information, we have included in this appendix:

1) an indication of those migrants still active in January 1970 which replied to the famous Toothill inquiry a decade earlier

2) at least a partial indication of the number of migrant establishments which have closed since the preparation of the MinTech list together (when available) with reasons for closure

3) a partial indication of the number and characteristics of postwar migrants to Scotland which closed prior to to January 1970 again where possible with reasons

4) some indication of the number and characteristics of new migrants to Scotland since January 1970

5) brief mention of four establishments seemingly eligible for inclusion in the MinTech list but omitted by the Ministry either through oversight or for readily explicable reasons.

We turn now to a more detailed examination of each of the items mentioned in the previous paragraph.

Place of Origin. The MinTech list divides the total number of migrants into four categories: England and Wales, the United States, Canada, and Continental and Other Overseas. With regard to the first three categories, it also shows for each migrant the city and/or

county/state/province of origin. In the case of the last category, only country of origin is shown. Our list retains only the general classification, the more detailed information being superfluous to our purposes. However, it is open to serious question whether the MinTech allocation of migrants to even their respective general origins is really very useful as it stands. To elaborate, MinTech appears to have followed the classificatory principles developed by Howard[1] which distinguish between branches originating overseas and branches originating with more or less autonomous British subsidiaries of overseas enterprises with the effect that the latter group of branches is presented in the MinTech list as having originated in England or Wales. It is strongly arguable that such an artificial distinction is of little practical benefit, especially from the viewpoint of public policy, being designed in effect, although no doubt unintentionally, to obfuscate rather than illuminate. Thus, for example, to list companies like Eaton Yale & Towne, Simplicity Patterns, Starch Products, Veeder-Root, etc. under the England and Wales classification is to come close to making a nonsense of the whole exercise. This is not the place and we have not had time to pursue the matter but it clearly warrants further inquiry. Pending such inquiry, we have taken the MinTech allocations as given.

Name. Some of the company names in both this appendix and the MinTech list relate to the parent rather than the migrant even though the two names may not be exactly similar. We have tried to minimise this problem by using in most instances the name given in the relevant local post office telephone directory. Names can change over time (e.g., entry 51). Where this has occurred we have tried to mention the fact in a footnote. It should be noted also that our names do not always agree with those shown by MinTech (cf. entry 375/16). Particularly helpful sources of information on names apart from the telephone directories have been Kelly's Manufacturers and Merchants Directory, 1969-70, Vol. I: United Kingdom[2] and the 1969 UK edition of Who Owns Whom.[3] Less useful because of incompleteness but still of some value for both names and Scottish addresses have been local directories such as the Industrial Index for Ayrshire, 1969 published by the Ayr

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[1] Op. cit., para.7, p.49.

[2] London: Kelly's Directories Limited, 1969.

[3] London: O.W. Roskill & Co. (Reports) Ltd., 1969.

County Council and a directory of estate tenants available from the Scottish Industrial Estates Corporation (SIEC).

Scottish Address. Normally we have used the address given in the relevant telephone directory because occasional inaccuracies in the MinTech address information (e.g., entry 127). Some of our addresses may inadvertantly relate to offices rather than works where the two are geographically separate although we have tried in every case to identify the location of the latter only.

Main Product(s) Made in Scotland. We have used the product information given by MinTech as the basis for our codings.[1] Usually, accurate codings at the MLH level are impossible if the product detail available to the analyst is not highly specific. Thus, it is of little use to know that a manufacturer is in the clothing or the chemical or the vehicle business when what one needs for MLH coding is detail like suspenders, tooth paste or air-to-air missiles. In a large number of instances, the original MinTech list did not provide adequate specification. Rather than filling up the gaps by more or less informed guesswork, we went back to MinTech for additional information. They were very helpful and the overall accuracy of our codings was improved noticeably as a result of their willingness to clarify the many ambiguities which had come to light. Notwithstanding, we alone are responsible for the codings in their final form. It is worth adding at this point that MLHs like company names can alter over time (cf. entry 310/45). The following publications of the Central Statistical Office were used in carrying out the coding exercise:

1) Standard Industrial Classification (2nd ed.; London: HMSO, 1958)
2) Standard Industrial Classification (3rd ed.; London: HMSO, 1968)
3) Standard Industrial Classification: Correlation of 1968 Headings with 1958 Headings and Sub-Divisions (London: Central Statistical Office, 1968)
4) Standard Industrial Classification: Alphabetical List of Industries (1st ed., amended; London: HMSO, 1966)
5) Standard Industrial Classification, Revised 1968: Alphabetical List of Industries (2nd ed.; London: HMSO, 1968)

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[1] Schon argues that "You can't define the firm through its products any more: you can only define it through the peculiar sort of practices in which the firm engages," i.e., it has become more fruitful to conceive the firm as a functional system rather than a producer of specific products. Donald Schon, "The Evolution of the Business Firm" Listener, 3 Dec 70, pp. 772-76. Schon's argument has considerable appeal; nevertheless, we have felt compelled to adhere to the traditional classification scheme. On the coding problem generally, see ch. 1 in Florence (1948).

6) Standard Industrial Classification, Revised 1968: Alphabetical List of Industries - Amendment List 1 (London: HMSO, 1969)

Particularly valuable were the alphabetical lists although they could profitably and with seemingly little effort on the part of their compilers be made much more extensive.

Year Production Began. The date refers to the year that the factory entered commercial production. We have altered some of the MinTech entries (e.g., 220) on the basis of other sources of information.

Toothill Respondents. Given the importance of the Toothill Report in shaping attitudes towards the role of transport costs in regional development both in Britain and beyond and the fact that its principal conclusions on the transport issue were derived from an extensive industrial questionnaire survey, we felt that it was of some interest to indicate those migrant participants in the inquiry which were still active as of January 1970. Of course, our list does not include all of the firms surveyed by the Toothill Committee.

Migrant Closures Since January 1970. There is very little published information on the volume or characteristics of closures and *a fortiori* on the reasons underlying them. What we have done is to assemble as much evidence on the topic as possible[1] in the hope that the general subject will be picked up by others and given the careful study that it obviously deserves. This type of analysis, of course, has been severely hampered heretofore by the lack of or misleading[2] information in the press combined with the understandable reluctance of personnel intimately associated with the causal side of closures to be interviewed. Our assemblage is meant to be illuminatory rather than exclusive.

Migrant Closures Prior to January 1970. The immediately preceding remarks apply equally to this group of establishments. It might be added that the gaps in our records are undoubtedly much wider

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[1] Special mention is warranted here of the invaluable help received from the members of the University of Glasgow research team inquiring into industrial mobility between 1948 and 1968 within the Glasgow conurbation.

[2] Cf. "Steel: The Pipeline Fiasco," Economist, 16 Jan 71, p.69.

in the case of the pre-January 1970 than the post-January closures.

New Migrants Since January 1970. It is important to keep migration trends in Scotland under constant review. Bearing that objective in mind, we have included a section relating to very recent migrants or to planned future developments. Again, however, the collection is not intended to be exclusive.

MinTech Omissions. We uncovered four omissions of seemingly eligible firms or establishments by MinTech. One (entry 277/12) was found early enough for inclusion in our main list. The other three were found after the main list had been analysed. Rather than redo the analysis, we simply put them in a supplementary list.

To sum up, the following information on postwar manufacturing migrants to Scotland active as of January 1970 is meant to be as definitive as possible. We are indebted to MinTech for the essential skeleton but the fleshing-out process as it were has involved a wide variety of sources.

Migrants from England & Wales[1]

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
1	Actid Ltd Blantyre Industrial Estate Glasgow, Lanarkshire	1949	V-322	VI-323
2	Alexandra Overalls Holdings Ltd Greenhill Industrial Estate Coatbridge, Lanarkshire	1969	XII-444	XV-444
3	Algee Wear Ltd Inchyra Rd Grangemouth, Stirlingshire	1965	XII-445	XV-445
4	Alliance Box Co (Scotland) Ltd* 27, Saracen St., Springburn Glasgow N.2, Lanarkshire	1957	XV-482	XVIII-482
5	Antech Ltd[2] Longman Industrial Estate Inverness, Inverness-shire	1969	VI-364	IX-367
6	Associated Portland Cement Manufacturers Ltd Dunbar, East Lothian	1963	XIII-464	XVI-464
7	Ault & Wiborg (Scotland) Ltd* Hillington Industrial Estate Glasgow S.W.2, Lanarkshire	1949	IV-274	V-279
8	Aurora Fabrications (Scotland) Ltd Bothwell Rd Hamilton, Lanarkshire	1965	VI-341	VII-341
9	E. Austin & Sons (Scotland) Ltd Winchester Ave Denny, Stirlingshire	1966	XVI-499	XIX-499

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[1] Listings are in alphabetical order.

[2] Closed November 1970. The company was established in 1965. It transferred from its original location, Leicester, to Inverness four years later. Closure involved the loss of 15 jobs. The reasons for the shutdown were not made public. Cf. "Another Highland Factory in Liquidation," Glasgow Herald, 4 Nov 70, p.1.

*Replied to the inquiry by the Toothill Committee, 1960.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
10	Aviamac (Scotland) Ltd The Brewery Prestonpans, East Lothian	1967	VI-349	VII-349
11	BP Chemicals (UK) Ltd[1] Bo'ness Rd Grangemouth, Stirlingshire	1951	IV-271.3	V-271
12	G. Bache & Son Ltd Hindsland Rd Industrial Estate Larkhall, Lanarkshire	1962	IX-399	XII-399
13	Baelz Equipment Ltd Scottish Industrial Estate Kilwinning, Ayrshire	1948	VI-341	VII-341
14	Banner Textiles Ltd Martyn St Airdrie, Lanarkshire	1948	XII-444	XV-444
15	W. Barratt & Co Ltd Wood St Grangemouth, Stirlingshire	1966	XII-450	XV-450
16	Bata Shoe Co (British) Ltd Main St Cumnock, Ayrshire	1964	XII-450	XV-450
17	Bear Brand Ltd Turfholm Mills Lesmahagow, Lanarkshire	1949	X-417	XIII-417
18	Belmont Shoes Ltd Whitburn Branch Factory Murraysgate Industrial Estate Whitburn, West Lothian	1969	XII-450	XV-450
19	J. Bennett (Scotland) Ltd Inch Works, Blackburn Rd Bathgate, West Lothian	1963	VI-332	VII-332
20	Berlei (UK) Ltd Heather Ave Lomond Industrial Estate Alexandria, Dunbartonshire	1968	XII-499	XV-449

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[1] British Petroleum Chemicals Ltd. was the original 'migrant'. It became British Hydrocarbon Chemicals Ltd. in 1966. This firm was merged with BP Chemicals (UK) Ltd. on 1 Oct 67. Cf. our case study on BXL and A.P. Jenkins, et. al., "Pacemaker '70'," Glasgow Herald, 29 Oct 70, pp. 13-15.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
21	Binder Engineering Co Ltd Kinlooh Rd Campbeltown, Argyllshire	1967	VI-339	VII-339
22	Birmingham Sound Reproducers Ltd College Milton East Kilbride, Lanarkshire	1964	VI-364	IX-365
23	Blue Bell Apparel Ltd Glasgow Rd., Camelon Falkirk, Stirlingshire	1969	XII-444	XV-444
24	Boots Pure Drug Co Ltd* Airdrie, Lanarkshire	1949	IV-272.1	V-272
25	British Lighting Industries Ltd[1]* Marchmont Buckie, Banff	1956	VI-369	IX-369
26	British Reinforced Concrete Engineering Co Ltd Coatbank St Coatbridge, Lanarkshire	1959	V-311	VI-311
27	Broadhead & Graves Ltd Riverside Mill, Galashiels, Selkirkshire	1947	X-414	XIII-414
28	Brook's Fireworks Ltd Gateside Sanquhar, Dumfriesshire	1965	IV-273	V-279
29	Butte Knit of London Ltd 87 Milnbank St Glasgow E.1, Lanarkshire	1966	X-417	XIII-417
30	Cameron Knitwear Ltd Woodlands Terrace Grantown-on-Spey, Moray	1970**	X-417	XIII-417
31	Cape Insulation Ltd* Kerse Rd Stirling, Stirlingshire	1953	XIII-469.2	XVI-469
32	Cardenden Casting Co Ltd Station Rd Cardenden, Fife	1966	V-321	VI-321
33	Caribonum Ltd Markethill Rd Turriff, Aberdeenshire	1967	XVI-495	XIX-495

[1] Now called Thorn Lighting Ltd.

**Not in Production during January, 1970 but assumed to be so before the end of the year.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
34	Celloglas Ltd Greenyards Cumbernauld, Dunbartonshire	1967	XV-481	XVIII-481
35	Cemented Carbine Products Ltd No. 1 Advance Factory Denbeath Industrial Estate Leven, Fife	1969	V-322	VI-323
36	Chard of London Ltd Queenslie Industrial Estate 21 Summerlee St Glasgow E.3, Lanarkshire	1961	XII-444	XV-444
37	Clan Munro Whiskey Ltd 288 Main St Coatbridge, Lanarkshire	1967	III-239.1	III-239
38	J.E. Clarke (Regent St) Ltd Bankend Rd Dumbarton, Dunbartonshire	1966	XII-445	XV-445
39	Classique Juveniles Ltd 28 Abbotsinch Rd Grangemouth, Stirlingshire	1966	XII-442	XV-442
40	Claudgen Ltd 14 Broomloan Rd., Govan Glasgow S.W.1, Lanarkshire	1946	VI-369	IX-369
41	Cleanout Clothiers Ltd Newton Rd., Lochside, Newbridge, Dumfries, Dumfriesshire	1969	XII-442	XV-442
42	John Collier Tailoring Organisation Ltd Whitehall Industrial Estate Bathgate, West Lothian	1966	XII-442	XV-442
43	Concrete Products (Kirkcaldy) Ltd Hayfield Place Smeaton Industrial Site Kirkcaldy, Fife	1959	XIII-469.2	XVI-469
44	Condor (Scotland) Ltd Wardpark Industrial Estate Cumbernauld, Dunbartonshire	1968	VI-341	VII-341
45	Co-ordinators Service (Engineers) Ltd Willowyard Farm Beith, Ayrshire	1965	VI-341	VII-341

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
46	Costain Concrete Co Ltd.[1] Coltness Factory, Newmains Wishaw, Lanarkshire	1948	XIII-469.2	XVI-469
47	Cotswold Confections Ltd Livingston, West Lothian	1966	III-213	III-213
48	Coubro & Scrutton (M & I) Ltd Wholeflats Industrial Estate Grangemouth, Stirlingshire	1968	VI-337	VII-337
49	Craig & Henderson Ltd Pinnaclehill Industrial Estate Kelso, Roxburghshire	1968	XIII-469.2	XVI-469
50	Crosfields & Calthorp Ltd*[2] Broomloan Rd., Govan Glasgow S.W.1, Lanarkshire	1947	III-219	III-219
51	Crown Bedding Co (Scotland) Ltd[3] Nethercommon Works, Inchinnan Rd Paisley, Renfrewshire	1947	XIV-473	XVII-473
52	Cumnock Knitwear Co Ltd Ayr Rd Cumnock, Ayrshire	1960	X-417	XIII-417
53	D.M. Industrial Plastics Ltd Irvine Industrial Estate Irvine, Ayrshire	1961	XVI-496	XIX-496
54	Daleholme System Buildings Ltd Tullooh Works Perth, Perthshire	1970**	XIII-469.2	XVI-469
55	Devon Cold Wave Ltd[4] Hillington Industrial Estate 15 Colquhoun Ave Glasgow S.W.2, Lanarkshire	1967	IV-272.2	V-273

[1] Costain opened a plant at Newarthill, Lanarkshire in 1959

[2] A Scottish market-oriented branch (of a Liverpool firm) set up to reduce delivery costs.

[3] The firm moved to Greenhill Rd., Paisley in 1964. In 1965 it changed its name to Slumberland (Scotland) Ltd.

[4] A transfer from Luton. Now called Devon Hair Aids Ltd.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
56	Displays and Material Developments Ltd Scotia Works, Old School Longcroft, Banknock Bonnybridge, Stirlingshire	1968	XIII-463	XVI-463
57	J. Arthur Dixon Ltd Longman Industrial Estate Inverness, Inverness-shire	1956	XV-489	XVIII-489
58	Doig Springs (Scotland) Ltd Watermill Rd Fraserburgh, Aberdeenshire	1969	IX-399	XII-399
59	Dunlop Rubber Co Ltd Hanger 10 Carfin Industrial Estate Motherwell, Lanarkshire	1962	XVI-491	XIX-491
60	Dunlop Textiles Ltd Victoria Works Pilmuir St Dunfermline, Fife	1948	X-413	XIII-413
61	Duraplex Industries Ltd Inglis Green Rd., Slateford Edinburgh, Midlothian	1948	IV-276	V-276
62	Durastic Bituminous Products Ltd 165 Castlebank St Glasgow W.1, Lanarkshire	1949	XIII-469.2	XVI-469
63	Dynamco Instruments Ltd East Mains Industrial Estate Broxburn, West Lothian	1962	VI-364	IX-364
64	Eaton, Yale & Town Inc.[1] Houston Wood Industrial Estate Livingston, West Lothian	1965	IX-399	XII-399

[1] Eaton, Yale & Towne Inc. is an American company yet the Scottish subsidiary (Yale Locks & Hardware) is listed by MinTech under migrants from England & Wales, presumably in line with Howard's criterion that where a British subsidiary (in this case Eaton, Yale & Towne (UK) Ltd) of an overseas enterprise "appeared to be in complete control of its location policy, that firm was treated separately for the purpose of determining the origin of a move." (op. cit., p. 49, para. 7). On the other hand, as indicated by the notes accompanying this appendix, MinTech did not always follow Howard's criteria in compiling its list of migrants. In any event, we have not altered MinTech's allocation of Eaton, Yale & Towne to England as area of origin because to do so in this one isolated instance would accomplish very little. Our operating assumption has been that it is best to accept the MinTech

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
65	Educational and Municipal Equipment (Scotland) Ltd Sanquhar, Dumfriesshire	1965	XIV-472	XVII-472
66	Elliotts (East Lothian) Ltd Macmerry Industrial Estate Tranent, East Lothian	1967	XIV-471	XVII-471
67	Enfield Standard Power Cables (Scotland) Ltd Westburn, Cambuslang Glasgow, Lanarkshire	1965	VI-362	IX-362
68	Escampi Ltd[***] Irvine Industrial Estate Irvine, Ayrshire	1964	III-214	III-214
69	Everlastic Ltd Grangestone Industrial Estate Girvan, Ayrshire	1965	XII-449.1	XV-449
70	Export Packing Service Ltd Penilee Rd Glasgow S.W.2, Lanarkshire	1967	XIV-475	XVII-475
71	Exquisite Form Brassieres (GB) Ltd 334 Halley St Glasgow W.3, Lanarkshire	1955	XII-449.1	XV-449
72	Falmer Manufacturing Co (Scotland) Ltd Lugar Cumnock, Ayrshire	1966	XII-444	XV-444
73	Ferranti Ltd Dunsinane Ave Dundee, Angus	1950	VI-364	IX-364

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allocations as given unless one is prepared to doublecheck all origins. Such a task is beyond the scope of this thesis.

Yale Locks & Hardware produces locks, padlocks and aluminium hardware for doors and windows. Exports account for 30% of total output. A new 117,000 sq.ft. plant was opened at Livingston in May 1969 indicating that the original 1965 venture either lived up to or exceeded expectations. The main Eaton, Yale & Towne plant in the UK is situated at Willenhall, Staffordshire. Livingston was selected as a location only after a nation-wide survey. Key location factors were good communications and labour availability. Distribution appears to be mainly effected by commercial road haulier. Cf. Dorothy Grace Elder, "Livingston Provides the Key to Success," Glasgow Herald, 3 June 70, p.14.

[***] This name does not appear in the most recent telephone directory. Presumably, either the name has changed or the establishment has closed.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
74	Fescol Ltd* Block 9, Scottish Industrial Estate Port Glasgow, Renfrewshire	1949	IX-399	XII-399
75	Filtrona Textile Products Ltd Myrekirk Rd Dundee, Angus	1968	X-411	XIII-411
76	Fishburn Printing Ink Co (Scotland) Ltd Dunswood Rd., Wardpark East, Cumbernauld, Dunbartonshire	1968	IV-274	V-279
77	J. & R. Fleming Ltd 32 Jopps Lane Aberdeen, Aberdeenshire	1951	VI-351	VIII-354
78	Forth Chemicals Ltd Bo'ness Rd Grangemouth, Stirlingshire	1952	IV-271.3	V-271
79	John Foster & Sons Ltd* Bankend Mills Cumnock, Ayrshire	1948	X-414	XIII-414
80	GEC Electrical Components Ltd*[1] Thermal Conrtols Division Watling St Motherwell, Lanarkshire	1947	VI-351	VIII-354
81	GEC Marooni Ltd[2] Control Valves Division Woodend Cowdenbeath, Fife	1963	VI-364	IX-364
82	General Electric and English Electric Cos. Ltd[3] Mitchelston Industrial Estate Kirkcaldy, Fife and Viewfield Industrial Estate, Glenrothes, Fife	1965	VI-363	IX-363
83	General Electric and English Electric Cos. Ltd[3] Waterloo St Glasgow C.2, Lanarkshire	1970**	VI-361	IX-361

[1] Associated Electrical Industries Ltd was the original migrant; the establishment was initially classified to VI-361 (1958 SIC). AEI was taken over by GEC in the autumn of 1967. See Satchwell Appliance Controls Ltd below.

[2] Elliott-Automation Co Ltd was the original migrant. It was taken over by English Electric Computors Ltd in 1967. English Electric was taken over by General Electric Co Ltd in the autumn of 1968.

[3] Associated Electrical Industries Ltd was the migrant according to MinTech.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
84	Gilbert-Ash (Scotland) Ltd Downiebrae Rd., Rutherglen Glasgow, Lanarkshire	1967	XIII-469.2	XVI-469
85	GKN Reinforcements Ltd* 30 Pinkston Rd Glasgow, Lanarkshire	1954	V-311	VI-311
86	GKN Screws & Fasteners Ltd Hillington Works, 1 Lothian St Glasgow S.W.2, Lanarkshire	1946	IX-393	XII-393
87	Glaxo Laboratories Ltd* Golden St Montrose, Angus	1952	IV-271.3	V-272
88	Thomas Glover & Co Ltd* Blairt[illegible] Caponacre Industrial Estate Queens Cumnock, Ayrshire Glasgo[illegible]	[illegible]7	VI-339	VIII-354
89	Goujon[illegible]96 Harris & Edgar Ltd Calder Inchyra Rd Glasgo Airfield Industrial Estate Grangemouth, Stirlingshire	[illegible]59	XII-445	XV-445
90	Grange Chemicals Ltd Bo'ness Rd Grangemouth, Stirlingshire	1955	IV-271.3	V-271
91	G.R. Designs (Perth) Ltd Crieff Rd Perth, Perthshire	1967	VI-351	VIII-354
92	H.D. Greenwood & Co (HB) Ltd[d] Nevis Works Fort William, Inverness-shire	1966	XII-442	XV-442
93	Charles W. Hall Ltd New Cumnock, Ayrshire	1948	X-417	XIII-417
94	Halmo Engineering (Scotland) Ltd Burngrange Works West Calder, Midlothian	1962	VIII-381	XI-381
95	Handley Page Ltd[1] Caponacre Industrial Estate Cumnock, Ayrshire	1967	VIII-383	XI-383
96	Harris & Edgar Ltd Inchyra Rd Airfield Industrial Estate Grangemouth, Stirlingshire	1964	V-322	VI-322

[1] Taken over by a U.S. firm in 1969; manufacturing ceased in March 1970. Inter alia, the firm was under capitalized.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
97	Havelock Manufacturing Co Ltd Middlefield Rd Middlefield Industrial Estate Falkirk, Stirlingshire	1966	XII-445	XV-445
98	Hayward-Tyler & Co Ltd Nerston Industrial Estate East Kilbride, Lanarkshire	1954	VI-339	VII-333
99	Highland Electronics Ltd Donibristle Industrial Estate Inverkeithing, Fife	1964	VI-364	IX-364
100	Hilger Electronics (Scotland) Ltd*** Haddington, East Lothian	1968	VI-364	IX-364
101	A. Hill & Co (Scotland) Ltd Cheviot Industrial Estate Coldstream, Berwickshire	1969	IX-396	XII-396
102	Richard Hill Ltd*** Whitburn Industrial Estate Whitburn, West Lothian	1968	V-311	VI-311
103	H.J.E. Plastics Ltd PVC Division Abbotsinch Rd Grangemouth, Stirlingshire	1965	XVI-496	XIX-496
104	J.H. Hood Ltd Newbattle Jr. Sec. School Mansfield Rd Dalkeith, Midlothian	1969	XII-444	XV-444
105	Howard Tenens Services (Scotland) Ltd[1] Burnbrae Rd., Elderslie Johnstone, Renfrewshire	1968	XIV-475	XVII-475
106	Huggins Son & Co Ltd[2] 7-9 Main St Kelty, Fife	1962	XII-441	XV-441

[1]This firm was a subsidiary of Howard Tenens Services Ltd., Swindon. It appears to have closed between January and October, 1970. Another subsidiary, Howard Tenens Transport Ltd., conducts a transport and warehousing business in Scotland at 28 Field Rd., Busby, Clarkston, Glasgow.

[2]Huggins took over and later closed the Scottish plant of Swallow Raincoats Ltd (also MLH 441), another migrant firm from England which opened a production unit in Kelty during 1962.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
107	Hulland Products Ltd Auchengeloh Rd., Chryston Glasgow, Lanarkshire	1969	XIII-469.2	XVI-469
108	Ideal Engineering Co Ltd Irvine Industrial Estate Irvine, Ayrshire	1961	VI-351	VIII-353
109	Impetus Building Components Ltd Broomhill Industrial Estate Kilsyth Rd., Kirkintilloch Glasgow, Lanarkshire	1967	XIII-469.2	XVI-469
110	Inter-alia Pharmaceutical Services Grangestone Industrial Estate Girvan, Ayrshire	1969	IV-272.1	V-272
111	International Synthetic Rubber Co Ltd Bo'ness Rd Bo'ness, West Lothian	1964	IV-271.3	V-276
112	Jeltek Ltd Halbeath Industrial Estate Dunfermline, Fife	1962	XII-441	XV-441
113	Jersey Kapwood Ltd High St Dalmellington, Ayrshire	1966	XII-445	XV-445
114	Jig Borers (Scotland) Ltd Bothwell Rd Hamilton, Lanarkshire	1956	VI-333	XII-390
115	David Jonathan Ltd Eastfield Industrial Estate Glenrothes, Fife	1965	XII-444	XV-444
116	Vaughan Jones Ltd 51 Canal St Perth, Perthshire	1963	IX-393	XII-393
117	Kay-Metzeler Ltd Nasmyth Rd Glasgow S.W.2, Lanarkshire	1967	XVI-496	XIX-496
118	Kennings Ltd Blackburn Rd Bathgate, West Lothian	1965	VIII-381	XI-381
119	Kenvale Textiles Ltd 13 Douglas Square Newcastleton, Roxburghshire	1968	XII-444	XV-444

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
120	J. MacA King & Co (Scotland) Ltd 36 Loanend Mills Paisley, Renfrewshire	1967	XVI-496	XIX-496
121	Kleinert's Inc. North Muirton Industrial Estate Perth, Perthshire	1970**	XVI-491	XIX-491
122	Ladybird (Scotland) Ltd Kirkshaws Rd., Shawhead, Coatbridge, Lanarkshire	1963	XII-445	XV-445
123	Lamson Paragon Ltd* Carfin Industrial Estate Motherwell, Lanarkshire	1957	XV-489	XVIII-489
124	Percy Lane Ltd Eastfield Industrial Estate Glenrothes, Fife	1966	IX-399	XII-399
125	Laurence Scott & Electromotors Ltd* Branch Works No. 2, Blantyre Industrial Estate Glasgow, Lanarkshire	1948[1]	VI-361	IX-361
126	Lawtex Ltd Crosslee Factory Johnstone, Renfrewshire	1961	XII-449.3	XV-449
127	Law Textiles (Selkirk) Ltd Forest Mill Selkirk, Selkirkshire	1968	X-414	XIII-414
128	Lee-Cooper Ltd Hillend Industrial Estate[2] Inverkeithing, Fife	1965	XII-444	XV-444
129	Lorose (Scotland) Ltd Linwood Ave., College Milton, East Kilbride, Lanarkshire	1961	X-417	XIII-417
130	Leyland Motors (Scotland) Ltd Bathgate, West Lothian	1961	VIII-381	XI-381
131	Lime-Sand Mortar of Scotland Ltd 250 Alexandra Parade, Glasgow, E.1, Lanarkshire	1954	XIII-469.2	XVI-469

[1] The original Scottish plant was at Thornliebank, Glasgow. It was closed in 1963 because it had become uneconomic. The Blantyre plant was opened in October, 1960. Availability of female labour was the key location factor back in 1948.

[2] The MinTech address for this factory is Livingston, West Lothian.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
132	Lintafoam Ltd*** Dundee Industrial Estate Dundee, Angus	1962	X-423	XIII-423
133	Lloyds British Testing Co Ltd Manse Place Kirkcig, Lanarkshire	1968	VI-337	VII-337
134	Lockwoods Foods Ltd Lochside, Forfar, Angus	1951[1]	III-218	III-218
135	Lord Blair Knitwear Ltd 16 Commercial Rd Hawick, Roxburghshire	1968	X-417	XIII-417
136	Lybro Universal Ltd New Station Rd Dalbeattie, Kirkcudbrightshire	1961	XII-444	XV-444
137	Lynette Lingerie Ltd 52 Victoria Park Irvine, Ayrshire	1965	XII-445	XV-445
138	MacFisheries Ltd Denmark St Fraserburgh, Aberdeenshire	1947	III-214	III-214
139	Neil McGowan Ltd Unit 53, Blantyre Industrial Estate Glasgow, Lanarkshire	1954	XII-445	XV-445
140	McGregor & Alves Ltd* 467 Hillington Rd Glasgow S.W.2, Lanarkshire	1951	VI-333	XII-390
141	Maidrite Novelties (GB) Ltd 3 Winchester Ave Denny, Stirlingshire	1967	XII-449.1	XV-449
142	J. Manger (Manufacturing) Ltd 5 Cathcart Place, Rutherglen, Glasgow, Lanarkshire	1964	IV-275.2	V-275
143	Marchvale Music Ltd Longman Industrial Estate Inverness, Inverness-shire	1963[2]	XVI-499	XIX-499

[1] A second plant was opened two years later at Park Avenue, Carnoustie, Angus.

[2] Closed March 1970. A transfer from Nottingham. 1970 employment: 26.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
144	Marconi-Elliott Micro-electronics Ltd Queensway Industrial Estate Glenrothes, Fife	1966	VI-364	IX-364
145	Marinite Ltd* Germiston Works Petershill Rd., Springburn Glasgow N.1, Lanarkshire	1953	XIII-469.2	XVI-469
146	A. Marlow (Scotland) Ltd Flatted Factory, Seafar Cumbernauld, Dunbartonshire	1965	XII-445	XV-445
147	Marmet (Scotland) Ltd* 11 Sunnybank Terrace Edinburgh, Midlothian	1949	VIII-389	XIX-494
148	Marmite Ltd[1] Block 113, 66 Johnstone Ave Hillington Industrial Estate Glasgow S.W.2, Lanarkshire	1967	III-214	III-214
149	Meredith & Drew Ltd Newhouse Industrial Estate Newhouse, Lanarkshire	1964	III-218	III-218
150	Metal Box Co Ltd Open Top Group Dundee Rd Arbroath, Angus	1961[2]	IX-395	XII-395
151	Metal Powders Ltd Blantyre Industrial Estate Glasgow, Lanarkshire	1949	V-322	VI-322
152	Millard Brothers Ltd Diana Works Carfin Industrial Estate Motherwell, Lanarkshire	1948	VI-342	VII-342
153	H. Miller & Co Ltd Newhouse Industrial Estate Newhouse, Lanarkshire	1949	VI-369	IX-369
154	Mitchell Camus (Scotland) Ltd 101 Main St., Newmains Wishaw, Lanarkshire	1967	XIII-469.2	XVI-469

[1] The Marmite appellation dates from 1968. Formerly Bovril Ltd.

[2] It was announced in March 1970 that Metal Box will open a second can factory in Scotland. It will be located at Cowlairs, Glasgow.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
155	Model Toys Ltd Torbothie Rd Shotts, Lanarkshire	1964	XVI-494	XIX-494
156	Moffat Handloom Weavers* Ladyknowe Moffat, Dumfriesshire	1949	X-414	XIII-414
157	Monotype Corporation Ltd Halbeath Rd Dunfermline, Fife	1961	VI-339	VII-339
158	George A. Moore (Joinery Mfrs) Ltd 3 Dunlop St Strathaven, Lanarkshire	1970**	XIV-471	XVII-471
159	Morfax (Scotland) Ltd Newton Works, Danderhall Dalkeith, Midlothian	1962	VI-332	VII-332
160	T.L.L. Morrison & Partners Henderson Rd Inverness, Inverness-shire	1966	XVI-494	XIX-494
161	Wm. Morrison & Sons (Leith) Ltd Coltswood Rd Coatbridge Industrial Estate Coatbridge, Lanarkshire	1950	IX-394	XII-394
162	Muirhead & Co Ltd Cumbernauld, Dunbartonshire	1970**	VI-332	VII-332
163	Nelbarden (Scotland) Ltd Mitchelston Industrial Estate Kirkcaldy, Fife	1966	XII-445	XV-449
164	Nemo Heat Treatments Murraysgate Industrial Estate Whitburn, West Lothian	1970**	IX-399	XII-399
165	James North & Sons Ltd Queensberry St Annan, Dumfriesshire	1969	XII-444	XV-444
166	Northern Gravure Ltd Alloway Rd Maybole, Ayrshire	1968	XV-489	XVIII-489
167	Nova Cosmetics Ltd Castleblair Works Dunfermline, Fife	1968	IV-272.2	V-273
168	Pagan Ltd Wardpark South Cumbernauld, Dunbartonshire	1964	XII-449.1	XV-449

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
169	Park Bros Ltd Chapelhall Industrial Estate Airdrie, Lanarkshire	1948	VI-369	IX-369
170	Partridge, Wilson & Co Ltd Longman Industrial Estate Inverness, Inverness-shire	1963	VI-361	IX-361
171	Pearce, Duff & Co Ltd Silverlaw Works Annan, Dumfriesshire	1965	IV-272.1	V-272
172	Peerless Fence & Products Ltd George St Johnstone, Renfrewshire	1961	IX-399	XII-399
173	Photo Precision Ltd*** Queensway Industrial Estate Glenrothes, Fife	1967	XV-489	XVIII-489
174	John Player & Sons Ltd*[1] Forthbank Works Stirling, Stirlingshire	1956	III-240	III-240
175	Plyglass Ltd Portland Rd Irvine Industrial Estate Irvine, Ayrshire	1965	XIII-463	XVI-463
176	Hector Powe Ltd Blantyre Industrial Estate Glasgow, Lanarkshire	1946	XII-442	XV-442
177	Precision Gasket Cutters Ltd 5 Atholl Ave Hillington Industrial Estate Glasgow S.W.2, Lanarkshire	1947	XVI-499	XIX-499
178	Presswork & Stampings Ltd Baker St Greenock, Renfrewshire	1963	VIII-381	XI-381
179	Progressive (Metal Products) Ltd Scottish Industrial Estate Port Glasgow, Renfrewshire	1963	VIII-381	XI-381
180	Protethane (Irvine) Ltd*** Irvine, Ayrshire	1967	XVI-491	XIX-491

[1] For an account of the nature of the tobacco industry in Scotland, see the special feature by Jane Yorke in the Glasgow Herald, 30 Oct 70, pp. 11-12.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
181	Pye Scottish Telecommunications Ltd* Victoria Place Airdrie, Lanarkshire	1955	VI-364	IX-364
182	Rediation Ltd North St Peterhead, Aberdeenshire	1962	VI-365	IX-368
183	Richard I. Racke Ltd Inchyra Rd Grangemouth, Stirlingshire	1968	XII-445	XV-445
184	Rank Audio Visual Ltd Mitchelston Industrial Estate Kirkcaldy, Fife	1967	VI-351	VIII-354
185	Redditch Hosiery Needles Ltd[1] Block 7, Scottish Industrial Estate Port Glasgow, Renfrewshire	1948	IX-399	XII-399
186	Redland Tiles Ltd Station Rd Cowie, Stirlingshire	1969	XIII-461	XVI-461
187	Regent Tyre & Rubber Co Ltd Clark St Johnstone, Renfrewshire	1951	XVI-491	XIX-491
188	Research Consultants Port Glasgow, Renfrewshire	1970**	XVI-495	XIX-495
189	Revel Engineering (Scotland) Ltd Blairtummock Rd Queenslie Industrial Estate Glasgow E.3, Lanarkshire	1961	VI-341	VII-341
190	Revel Industrial Products Ltd*** Thornliebank Industrial Estate Glasgow, Lanarkshire	1967	XIV-472	XVII-472
191	Revertex Ltd Hawbank Rd., College Milton East Kilbride, Lanarkshire	1967	IV-271.3	V-276

[1]Redditch Hosiery Needles Ltd is the Hosiery Needle Division of Needle Industries Ltd., Studley, Warw. While the telephone directory lists Redditch and Needle Industries separately, both entries have the same telephone number.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
192	Rin Services Ltd Kelty, Fife	1970**	XIII-469.2	XVI-469
193	Rists Wires & Cables Ltd Bothwell Park Industrial Estate Bellshill Rd., Uddingston Glasgow, Lanarkshire	1969	VI-362	IX-362
194	Rootes Motors (Scotland) Ltd* Linwood Rd Paisley, Renfrewshire	1948[1]	VIII-381	XI-381
195	Rotary Precision Ltd Kingussie, Inverness-shire	1968	VI-351	VIII-354
196	Rubery Owen (Scotland) Ltd Blairlinn Industrial Area Cumbernauld, Dunbartonshire	1962	VIII-381	XI-381
197	Ryeside Mills Ltd* Dalry, Ayrshire	1946	XII-445	XV-445
198	Thomas Salter Ltd Woodside Rd Glenrothes, Fife	1966	XVI-494	XIX-494
199	Satchwell Appliance Controls Ltd[2] Glenburn Rd., College Milton, East Kilbride, Lanarkshire	1962	VI-351	VIII-354
200	Scottish Mechanical Light Industries Ltd* 42-44 Waggon Rd Ayr, Ayrshire	1946	VI-331	VII-331
201	Scottish Pulp & Paper Mills Ltd[3] Corpach, Inverness-shire	1966	XV-481	XVIII-481

[1] Pressed Steel Co. of Cowley, Oxon. opened a branch at Paisley in 1948. The works was taken over by Rootes in 1963. During 1970 the name of the Scottish company was changed from Rootes to Chrysler (Scotland) Ltd.

[2] Part of the GEC Group. It was announced in October 1970 that the Satchwell works will be closed over a 9-12 month period due to inadequate demand. Production will be transferred to Motherwell (see entry 80 above). Ian Imrie, "Factory at East Kilbride to Close," Glasgow Herald, 14 Oct 70, p.8.

[3] A division of the Wiggins Teape Group. For insight into the location decision and the economics of the investment, see Patrick O'Leary, "£15m Stimulus for the Highlands," The Times, 19 Dec 69, p.V and "Monopoly: The Paper Test," Economist, 2 Jan 71, p.50.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
202	Scottish Repetition Ltd Torbothie Rd Shotts, Lanarkshire	1964	VIII-381	XI-381
203	Scottish Rexco Ltd Comrie Colliery Oakley, Fife	1963	IV-261	IV-261
204	Scottish Weyroc Ltd Carlisle Rd Annan, Dumfriesshire	1955	XIV-471	XVII-471
205	James Seddon (Scotland) Ltd Linlithgow Rd Bo'ness, West Lothian	1968	XII-444	XV-444
206	Senga Textiles Ltd Northend Industrial Estate Cowdenbeath, Fife	1964	XII-445	XV-445
207	Silcock & Lever Feeds Ltd*[1] Kings Inch Rd Renfrew, Renfrewshire	1954	III-219	III-219
208	Simplicity Patterns Ltd* Blantyre Industrial Estate Glasgow, Lanarkshire	1947	XV-483	XVIII-484
209	A.J. Siris Products Ltd Coldingham Rd Eyemouth, Berwickshire	1968	XVI-496	XIX-496
210	Sketko Ball Bearing Co Ltd Shewalton Rd Drybridge, Ayrshire	1962	VI-349	VII-349
211	Smith Brothers (Quinton) Ltd Bridgeness Rd Bo'ness, West Lothian	1962	XIV-475	XVII-475
212	SOM Plastics Ltd Factory No. 4, Winchester Ave Denny, Stirlingshire	1967	XVI-496	XIX-496
213	South Wales Switchgear Ltd Moodiesburn, Chryston, Glenboig Coatbridge, Lanarkshire	1956	VI-361	IX-361
214	Louis Speelman & Co Ltd* Newhouse Industrial Estate Newhouse, Lanarkshire	1948	XII-443	XV-443

[1] Formerly R. Silcock & Sons Ltd.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
215	R.E. Spence & Co (Scotland) Ltd Regent Works Linlithgow, West Lothian	1966	XII-442	XV-442
216	Square Grip Reinforcement (Scotland) Co Ltd*[1] Newhouse Industrial Estate Newhouse, Lanarkshire	1947	V-311	VI-311
217	Stanton & Staveley Ltd Addiewell Works West Calder, Midlothian	1964	XIII-469.2	XVI-469
218	Starch Products (Scotland) Ltd Port Downie Works, Camelon Falkirk, Stirlingshire	1961	III-229.2	III-229
219	Steel Barrel Scammells (Scotland) Ltd Carluke Industrial Estate Carluke, Lanarkshire	1966	VIII-381	XI-381
220	Steel Products (Coventry 1954) Ltd Commercial Rd Leven, Fife	1968	VI-339	VII-333
221	Steel Radiators Ltd[2] Edingham Works Dalbeattie, Kirkcudbrightshire	1961	VI-339	VII-339
222	John Stephen of London Ltd 40 Coltness St Queenslie Industrial Estate Glasgow E.3, Lanarkshire	1965	XII-442	XV-442
223	Stephens (Plastics) Ltd Sinclair St Halkirk, Caithness-shire	1959	XVI-496	XIX-496
224	Stephenson Mills Ltd[3] Caledonian Works 34 Shuna Place Glasgow N.W, Lanarkshire	1951	IX-399	XII-399
225	Stowe Woodward BTR Ltd Viewfield Industrial Estate Glenrothes, Fife	1964	XVI-491	XIX-491

[1]Square Grip opened a plant at the Eastfield Industrial Estate, Glenrothes, Fife in 1968.

[2]This firm was the subject of an extensive and informative advertising feature in the Scotsman, 13 Nov 70, pp.16-17.

[3]Formerly Joseph Stephenson & Co Ltd.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
226	Strathleven Bonded Warehouses Ltd Barloan Dumbarton, Dunbartonshire	1963	III-239.1	III-239
227	Super Metal Stampings Ltd Unit 3 Advance Factory Whitehill Industrial Estate Blackburn Bathgate, West Lothian	1966	IX-399	XII-399
228	Switchgear & Equipment Ltd Unit 51, Blantyre Industrial Estate Glasgow, Lanarkshire	1950	VI-361	IX-361
229	G. Sydney & Son Ltd* Heyday House, High Blantyre Glasgow, Lanarkshire	1947	XII-442	XV-442
230	A. Talwith & Co Ltd 10a Blairlinn Industrial Estate Cumbernauld, Dunbartonshire	1964	XII-441	XV-441
231	Tamworth Industrial Fabrics Ltd Forres, Moray	1970**[1]	XII-444	XV-444
232	Taskers Trailers Ltd[2] No. 4 Factory Blairlinn Industrial Estate Cumbernauld, Dunbartonshire	1963	VIII-381	XI-381
233	C.F. Taylor & Co Ltd* Dalquhurn Works Alexandria, Dunbartonshire	1948	X-414	XIII-414
234	S. Taylor & Co Ltd Block 1, Western Rd Kilmarnock, Ayrshire	1968	XII-443	XV-443
235	Taylor Instrument Companies (Europe) Ltd Auchterran Rd Lochgelly, Fife	1969	VI-351	VIII-354
236	Teloon-Magnetic Cores Ltd Chapelhall Industrial Estate Airdrie, Lanarkshire	1952	VI-364	IX-364
237	Telehoist Ltd Blairlinn Industrial Estate Cumbernauld, Dunbartonshire	1962	VI-337	VII-337

[1] Cf. "Move to Forres by English Firm," Glasgow Herald, 11 Jul 69, p.16.

[2] Formerly Taskers of Andover Ltd.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
238	Telephone Manufacturing Co Ltd*** Houston Wood Industrial Estate Livingston, West Lothian	1969	VI-363	IX-363
239	Thames Case Ltd[1] Greenyards Cumbernauld, Dunbartonshire	1961	XV-482	XVIII-482
240	Thermalite Scotland Ltd Ferry Rd South Alloa, Stirlingshire	1967	XIII-469.2	XVI-469
241	Thorpe Bros (Scotland) Ltd 41 James Watt Place East Kilbride, Lanarkshire	1968	VI-337	VII-337
242	Tilgate Sawmills Ltd[2] Whitequarries South Queensferry, West Lothian	1964	XIV-479	XVI-479
243	Trade Coaters (Scotland) Ltd Nest Factory Unit 17a, Carbrain Cumbernauld, Dunbartonshire	1967	IV-274	V-274
244	Triplex Safety Glass Co Ltd Carlisle Rd Larkhall, Lanarkshire	1964	XIII-463	XVI-463
245	Ronald Trist & Co Ltd Blairlinn Industrial Estate Cumbernauld, Dunbartonshire	1965	VI-349	VII-349
246	Trist Mouldings & Seals Ltd Houston Rd Livingston, West Lothian	1967	XVI-491	XIX-491
247	Turner Bros (Birmingham) Ltd* Blantyre Industrial Estate Glasgow, Lanarkshire	1958	VI-333	XII-390
248	Universal Highways Ltd[3] Greendykes Industrial Estate Broxburn, West Lothian	1968	IV-274	V-274
249	Veeder-Root Ltd* Wester Gourdie Industrial Estate Dundee, Angus	1948	VI-351	VIII-354

[1] Formerly Thames Board Mills Ltd.

[2] Formerly Tilgate Pallets Ltd.

[3] Now called Prismo Universal Ltd.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
250	Venoel Products Ltd 160 East Wellington St Glasgow E.1, Lanarkshire	1968	XVI-496	XIX-496
251	Venetian Vogue Ltd 15 Kelvin Ave Hillington Industrial Estate Glasgow S.W.2, Lanarkshire	1958	XIV-473	XVII-473
252	Victory Kidder Ltd Ingleston St Greenock, Renfrewshire	1962	VI-339	VII-339
253	Water Heating Systems Ltd* 4 Pratt St Kirkcaldy, Fife	1945	V-322	VI-322
254	Waterlow & Sons Ltd Peel Park Place, College Milton East Kilbride, Lanarkshire	1956	XV-486	XVIII-486
255	Welch, Margetson & Co Ltd Kilwinning Industrial Estate Kilwinning, Ayrshire	1965	XII-444	XV-444
256	H. Wheeler (Scotland) Ltd Victoria Park Industrial Estate Irvine, Ayrshire	1967	XII-444	XV-444
257	S.S. White Dental Manufacturing Co (GB) Ltd Unit 19a, 93 Glentanar Rd Balmore Industrial Estate Glasgow N.2, Lanarkshire	1968	VI-351	VIII-353
258	Wilkinson & Co (Patternmakers, Scotland) Ltd 6 Watt Rd Hillington Industrial Estate Glasgow S.W.2, Lanarkshire	1960	V-313	VI-313
259	Willerby Tailoring Advance Factory, Lang Stracht Mastrick Aberdeen, Aberdeenshire	1966	XII-442	XV-442
260	W.D. & H.O. Wills*[1] 368 Alexandra Parade Glasgow E.1, Lanarkshire	1953	III-240	III-240

[1] Cf. the footnote to entry 174 above.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
261	M. Wiseman & Co Ltd* Haugh Rd Mauchline, Ayrshire	1946[1]	VI-351	VIII-353
262	Jonas Woodhead Ltd Chapelhall Industrial Estate Airdrie, Lanarkshire	1947	IX-399	XI-381
263	Woolly Mill Co Ltd* Ford Mills Langholm, Dumfriesshire	1949	XII-442	XV-442
264	Wovenair Ltd Scottish Industrial Estate Port Glasgow, Renfrewshire	1953	XII-445	XV-445
265	York Trailers Ltd 2105 London Rd Glasgow E.2, Lanarkshire	1961	VIII-381	XI-381

[1] Wiseman opened a works in 1949 at the Vale of Leven Industrial Estate, Alexandria, Dunbartonshire.

Migrants from the United States

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
266/1	Air Products Ltd[1] Bargeddie, Baillieston, Glasgow, Lanarkshire	1964	IV-271.3	V-271
267/2	Aircraft-Marine Products (GB) Ltd* Scottish Industrial Estate Port Glasgow, Renfrewshire	1956***	VI-369	IX-369
268/3	Allart Ltd[2] Eastfield Industrial Estate Glenrothes, Fife	1967	IX-396	XII-396
269/4	Andrew Antenna Systems Ltd The Avenue Lochgelly, Fife	1966	VI-364	IX-367
270/5	Avery Label Systems Ltd Factory 5a Blairlinn Industrial Estate Cumbernauld, Dunbartonshire	1964	XV-489	XVIII-489
271/6	Baby Deer Ltd[3] Commerce Rd Scottish Industrial Estate Stranraer, Wigtownshire	1964	XII-450	XV-450
272/7	Bakelite Xylonite Ltd[4] Polyethylene Division Inchyra Rd Grangemouth, Stirlingshire	1958	IV-276	V-276

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[1]For an account of recent transport developments in the UK industrial gas industry, see John Fryer, "Lorries Line Up for the Great Gas War," Sunday Times, 13 Dec 70, p.41. Air Products and British Oxygen are the two major producers.

[2]Appears as Sarah Coventry/Allart Jewellery in MinTech list.

[3]Trimfoot Co., St Louis has sold its share (90% of the total) in this maker of baby shoes to a Manchester firm, Phillips Patents, it was announced in the Glasgow Herald, 30 Jan 71, p.3.

[4]Formerly General Metallurgical & Chemical Co (Gemec Co) and then Union Carbide Ltd.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
273/8	Beckman Instruments Ltd*[1] Queensferry Industrial Estate Glenrothes, Fife	1958	VI-351	VIII-354
274/9	Berg Manufacturing (UK) Ltd Blairlinn Industrial Estate Cumbernauld, Dunbartonshire	1965	VI-369	IX-369
275/10	Bonny Forge International Ltd[2] Kyle Rd Irvine Industrial Estate Irvine, Ayrshire	1962	IX-399	XII-399
276/11	Bourns (Trimpot) Ltd Hillend Industrial Estate Inverkeithing, Fife	1967	VI-364	IX-364
277/12	Burroughs Machines Ltd*[3] Vale of Leven Industrial Estate Alexandria, Dunbartonshire	1950	VI-338	VII-338
278/13	Burroughs Machines Ltd[4] Viewfield Industrial Estate Glenrothes, Fife	1969	VI-364	IX-366
279/14	Butler Buildings (UK) Ltd Mitchelston Industrial Estate Kirkcaldy, Fife	1967	VI-341	VII-341
280/15	Cameron Iron Works Houston Wood Industrial Estate Livingston, West Lothian	1966	V-311	VI-311
281/16	Caterpillar Tractor Co Ltd* Tannochside, Uddingston Glasgow, Lanarkshire	1958	VI-336	VII-336

[1]Beckman was profiled by the Board of Trade in its promotional brochure, Room to Expand; What the Development Areas Offer (2nd rev. ed.; London: BOT and Central Office of Information, 1969), pp.19-21. Inter alia, the brochure notes that the firm has experienced "few difficulties in communications". See also John Fryer, "Electronics: A Switched-On Scottish Scene...", Sunday Times, 1 Nov 70, p.54.

[2]For an account of the origin and progress of the Scottish operation, see "Emphasis Is on Exports," Glasgow Herald, 23 April 69, p.14.

[3]A second office machinery production unit was opened in 1958 at Cumbernauld. It is now 1½ times the size of the original factory in terms of employment. Cf. Andrew Hargrave, "Burroughs to Lay Off 450 in Scotland," Financial Times, 18 Aug 70, p.32.

[4]Not included in the MinTech list. An interesting commentary on this new manufacturing venture is included in Andrew Hargrave, "Report from Scotland: Electronics Expansion," Financial Times, 18 Dec 69, p.22.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
282/17	Cessna Industrial Products Ltd Eastfield Industrial Estate Glenrothes, Fife	1961	VI-339	VII-333
283/18	Cincinnati Shaper Co Ltd* Peel Park Place, College Milton East Kilbride, Lanarkshire	1958	VI-332	VII-332
284/19	Cleveland Twist Drill (GB) Ltd* Station Rd Peterhead, Aberdeenshire	1956	VI-333	XII-390
285/20	Cummins Engine Co Ltd[1] Shottskirk Rd Shotts, Lanarkshire	1957	VI-334	VII-334
286/21	Dayco Rubber (UK) Ltd Balgray St Dundee, Angus	1957	VI-335	VII-335
287/22	Devro Ltd Moodiesburn, Chryston, Glenboig Coatbridge, Lanarkshire	1965	III-214	III-214
288/23	Diamond Power Specialty Ltd Glasgow Rd Dumbarton, Dunbartonshire	1965	VI-339	VII-333
289/24	Dictaphone Co Ltd Colvilles Rd Kelvin Industrial Estate East Kilbride, Lanarkshire	1966	VI-364	IX-365
290/25	Don & Low Ltd Abbey Works Arbroath, Angus	1965	XV-482	XVIII-482
291/26	Emihus Microcomponents Ltd Queensway Industrial Estate Glenrothes, Fife	1960	VI-364	IX-364
292/27	Fabri-Tek UK Inc 7 Central Ave Blantyre Industrial Estate Glasgow, Lanarkshire	1966	VI-364	IX-366
293/28	Famoo Automatic Linkers Ltd Mill Rd Newmilns, Ayrshire	1965	VI-339	VII-339

[1]This diesel engine manufacturer has apparently found Scotland to be a very propitious location. Cf. "180 Extra Jobs at Shotts Factory," Glasgow Herald, 9 Mar 70, p.10.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
294/29	Flow Laboratories Ltd Victoria Park, Heatherhouse Rd Irvine, Ayrshire	1967	IV-272.1	V-272
295/30	General Instrument Microelectronics Ltd Eastfield Industrial Estate Glenrothes, Fife	1968	VI-364	IX-364
296/31	General Motors (Scotland) Ltd*[1] Newhouse Industrial Estate Newhouse, Lanarkshire	1950	VI-336	VII-336
297/32	General Motors (Scotland) Ltd*[1] Peterhead Gear Plant Peterhead, Aberdeenshire	1951	VI-349	VII-349
298/33	General Time Ltd* Vale of Leven Industrial Estate Alexandria, Dunbartonshire	1948	VI-352	VIII-352
299/34	Goodyear Tyre & Rubber Co (GB) Ltd* 2366 Great Western Rd Glasgow W.5, Lanarkshire	1956[2]	XVI-491	XIX-491
300/35	Gordos Corporation Grangestone Industrial Estate Girvan, Ayrshire	1969	VI-364	IX-364
301/36	W.L. Gore & Associates (UK) Ltd Inglis St Dunfermline, Fife	1967	VI-364	IX-364
302/37	Gray Tool Co Ltd Douglas Industrial Estate Douglas, Lanarkshire	1968	VI-339	VII-339
303/38	Hewlett-Packard Ltd South Queensferry, West Lothian	1966	VI-364	IX-364
304/39	Hobart Manufacturing & Co Ltd 73 Dykehead St Glasgow E.3, Lanarkshire	1963	VI-339	VII-339
305/40	Holo-Krome Ltd* Kingsway West Dundee, Angus	1957	IX-393	XII-393

[1] Formerly Euclid Ltd. See James Thomson, "General Motors Plan £1.8m Expansion in Lanarkshire," Scotsman, 10 Dec 69, p.20.

[2] Goodyear has also occupied a factory on the Carfin Industrial Estate since 1956.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
306/41	Honeywell Information Systems Ltd[1] Newhouse Industrial Estate Newhouse, Lanarkshire	1948	VI-364	IX-366
307/42	Honeywell Ltd[2] Temperature Controls Group Bellshill Industrial Estate Bellshill, Lanarkshire	1967	VI-364	VIII-354
308/43	Hull Corporation Grangeston Industrial Estate Girvan, Ayrshire	1968	VI-339	VII-339
309/44	Hyster Ltd Portland Rd Irvine Industrial Estate Irvine, Ayrshire	1956	VI-337	VII-337
310/45	IBM United Kingdom Ltd* Spango Valley Greenock, Renfrewshire	1951	VI-364[3]	IX-366[4]
311/46	International Packaging Corp Cassillis Rd Maybole, Ayrshire	1967	XV-482	XVIII-482

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[1]Re the corporate name, see Kenneth Owen, "Up Among the Computer Leaders," The Times, 21 Sep 70, p.20. Honeywell told the 1970 enquiry into the computer industry by a Select Committee of the House of Commons that it started manufacturing in the UK "because early after the war it became impossible for American companies to grow in Britain unless they manufactured in this country". Scotland was chosen as a location following a recommendation by the Board of Trade. Also, labour was plentiful and valuable government incentives were available. Honeywell's initial labour force in Scotland was 60; today, it exceeds 5,000. Automatic control equipment was the first product. Computer production began in 1964; in 1970, the Newhouse plant was supplying almost all Honeywell customers outside the U.S. and Japan. The company's total floor space in Scotland is currently about 1,100,000 sq.ft. Supplies are purchased from over 800 British firms; the UK content of the computers made in Scotland is now over 71%. Like IBM, Honeywell has located its UK R & D facilities, not in Scotland, but in the South (Hemel Hempstead). See H.C.137(1969-70), pp.89-108.

[2]Honeywell's Industrial Products Group moved into a SIEC factory on Bellshill Rd., Uddingston, Glasgow, in 1968. Cf. "Honeywell Expansion at Scottish Plants," The Times, 4 Feb 70, p.22. Since the Temperature Controls and Industrial Products Group appear to fall within the same MLH, we have not treated the Uddingston development as a separate move.

[3]Formerly VI-338

[4]Formerly VII-338.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
312/47	Inverhouse Distillers Ltd Moffat Distilleries Tower Rd Airdrie, Lanarkshire	1964	III-239.1	III-239
313/48	Joy Manufacturing (UK) Co Ltd* Coppielow Factory Greenock, Renfrewshire	1948	VI-339	VII-339
314/49	Walter Kidde Co Ltd 455 Hillington Rd Hillington Industrial Estate Glasgow S.W.2, Lanarkshire	1966	VI-339	VII-339
315/50	King & Co (Sports Products) Ltd 237 High St Cowdenbeath, Fife[1]	1963	XVI-494	XIX-494
316/51	M.D. Lee Co Inc Larkfield Industrial Estate Greenock, Renfrewshire	1970**	XII-444	XV-444
317/52	Levi Strauss (UK) Ltd Murraysgate Industrial Estate Whitburn, West Lothian	1970**	XII-444	XV-444
318/53	Long John Distillers Ltd Advie, Moray	1960	III-239.1	III-239
319/54	Luminisers Ltd Overburn Ave Dumbarton, Dunbartonshire	1951	VI-352	VIII-352
320/55	Arthur G. McKee Co Ltd***[2] Buckhaven, Fife	1967	VI-332	VII-332
321/56	Marbon Chemical Division of Borg-Warner Ltd Bo'ness Rd Grangemouth, Stirlingshire	1963	IV-276	V-276
322/57	Mine Safety Appliances Co Ltd* Coltness St Queenslie Industrial Estate Glasgow E.3, Lanarkshire	1949	VI-351	VIII-353
323/58	Monsanto Textiles Ltd[3] Craigons Rd Cumnock, Ayrshire	1966	X-411	XIII-411

[1]The MinTech address for this factory is Galashiels, Selkirkshire.

[2]It may be that this firm is now called McKee Process Machinery Co (Scotland) Ltd. McKee Process is located near Buckhaven on Methilhaven Rd., Leven, Fife.

[3]Monsanto produces nylon at Dundonald, Ayrshire. Cf. "Monsanto Scots Scheme," The Times, 7 Feb 70, p.13.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
324/59	Motorola Semiconductors Ltd[1] 21 Hawbank Rd East Kilbride, Lanarkshire	1969	VI-364	IX-364
325/60	National Cash Register Co Ltd* Dundee, Angus (3 factories)	1946	VI-338	VII-338
326/61	National Semi-Conductor (UK) Ltd 22-24 Napier Place Wardpark Industrial Estate Cumbernauld, Dunbartonshire	1969	VI-364	IX-364
327/62	Niboo Inc (UK Division) Elizabeth St Dundee, Angus	1963	VI-339	VII-333
328/63	No-Sag Spring Co (GB) Ltd Overburn Ave Dumbarton, Dunbartonshire	1964	IX-399	XI-381
329/64	Ocli Optical Coatings Ltd[2] Hillend Industrial Estate Inverkeithing, Fife	1967	VI-351	VIII-354
330/65	Parke, Davis & Co Ltd Carfin Industrial Estate Motherwell, Lanarkshire	1954	IV-272.1	V-272
331/66	Personna International UK Ltd*[3] Colquhoun Ave North Cardonald Industrial Estate Glasgow S.W.2, Lanarkshire	1946	IX-392	XII-392
332/67	Phillips Drill Co (UK) Ltd Blairtummock Rd Queenslie Industrial Estate Glasgow E.3, Lanarkshire	1966	IX-393	XII-393
333/68	Playtex Ltd*[4] Scottish Industrial Estate Port Glasgow, Renfrewshire	1955	XII-449.1	XV-449

[1]The location decision is explained in "Motorola Picks Scotland for £1m Semiconductor Plant," The Times, 18 Apr 69, p.23.

[2]For an explanation of the location decision, see Ronald Banel, "Fife Company Running in the Space Race," Scotsman, 29 Oct 69, p.22.

[3]Formerly Pal Personna Blades Ltd. Taken over by Ever-Ready Razor Products Ltd in 1955.

[4]Playtex opened a factory in Johnstone, Renfrewshire in 1961. It was announced in December 1969 that Playtex had signed a 2-year contract worth over £100,000 with British Rail for the distribution of its entire UK output "by Nationwide express delivery". See The Times, 16 Dec 69, p.21.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
334/69	Polaroid (UK) Ltd[1] Vale of Leven Industrial Estate Alexandria, Dunbartonshire	1965	VI-351	V-279
335/70	Ranco Ltd*[2] Old Edinburgh Rd., Uddingston Glasgow, Lanarkshire	1950	VI-351	VIII-354
336/71	Ranco Motors Ltd Hospital Rd Haddington, East Lothian	1958	VI-361	IX-361
337/72	Sandusky Ltd Viewfield Industrial Estate Glenrothes, Fife	1964	V-311	VI-311
338/73	Sangamo Weston Ltd Scottish Industrial Estate Port Glasgow, Renfrewshire	1949	VI-369	IX-369
339/74	Gilbert Shaw Ltd Campbeltown, Argyllshire	1970**	VI-335	VII-335
340/75	Signetics International Corporation Preston Rd Linlithgow, West Lothian	1969	VI-364	IX-364
341/76	Spectra-Physics Ltd[3] Queensway Industrial Estate Glenrothes, Fife	1967	VI-364	IX-367
342/77	Standard Telephones & Cables Ltd College Milton, East Kilbride, Lanarkshire	1962	VI-363	IX-367

[1] Featured by the SIEC in an advertisement on the inside front cover of the Economist, 24 Oct 70.

[2] Formerly Ranco (Motors) Ltd. The subsidiary has been hit hard by the current recession in the U.S. See "Ranco to Reduce Labour Force by a Third," Glasgow Herald, 24 Sep 70, p.20.

[3] Closed at the end of 1969. A California firm, Spectra-Physics is reportedly "the world's biggest civilian laser manufacturer" but the Glenrothes factory employed only 12 people. "According to ... Spectra-Physics' UK general manager, the decision to close the factory was taken because it has proved difficult to co-ordinate the manufacture of such a rapidly developing product between California and Scotland, while the factory has not been as good a base for exporting to the Continent as hoped and the British market is still too small." Timothy Johnson, "Top Laser Firm Pulls Out of UK," Sunday Times, 12 Oct 69, p.25.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
343/78	L.S. Starrett & Co Ltd[1] Oxnam Rd Jedburgh, Roxburghshire	1959	VI-333	XII-390
344/79	Stratoflex (UK) Ltd 5 Watt Rd North Gardonald Industrial Estate Glasgow S.W.2, Lanarkshire	1960	V-312	VI-312
345/80	Sunbeam Electric Ltd* Nerston Industrial Estate East Kilbride, Lanarkshire	1954	VI-365	IX-368
346/81	Thiokol Chemicals Ltd Fibres Division Canmore Works, Don St Forfar, Angus	1968	X-411	XIII-411
347/82	Timex Corporation[2] Milton of Craigie Factory Kingsway East Dundee, Angus	1947	VI-352	VIII-352
348/83	Tokheim Corporation (UK) Division Unit J, Eastfield Industrial Estate Glenrothes, Fife	1965	VI-339	VII-333
349/84	Trane Ltd Donibristle Industrial Estate Inverkeithing, Fife	1964	VI-339	VII-339
350/85	Varian Associates Ltd Donibristle Industrial Estate Inverkeithing, Fife	1967	VI-364	VIII-354
351/86	Vesuvius Crucible Co Ltd Irvinebank Factory Newmilns, Ayrshire	1963	XIII-461	XVI-461
352/87	Wilson Sporting Goods Co Ltd Ayr Rd., Irvine Industrial Estate Irvine, Ayrshire	1961	XVI-494	XIX-494
353/88	Wyllie-Young Ltd 44-46 Milton Rd., College Milton East Kilbride, Lanarkshire	1964	XVI-496	XIX-496

[1] Various aspects of this establishment are discussed at some length in an article by Mr A. McKay, the general manager, in the Glasgow Herald, 2 Apr 70, p.12.

[2] A second Timex factory is located on Harrison Road, Camperdown, Dundee.

Migrants from Canada

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	SIC Order & MLH 1968
354/1	Babygro Ltd[1] Gateside Industrial Estate Cowdenbeath, Fife	1962	XII-445	XV-445
355/2	Electrolite Lamps Ltd*** Thornliebank Industrial Estate Glasgow, Lanarkshire	1963	VI-369	IX-369
356/3	Massey-Ferguson (UK) Ltd*[2] Moorfield Industrial Estate Kilmarnock, Ayrshire	1949	VI-331	VII-331
357/4	Nuclear Enterprises Ltd* Bankhead Crossway Edinburgh,11, Midlothian	1956	VI-364	VIII-354
358/5	Richardson Manufacturing (Scotland) Ltd Donibristle Industrial Estate Inverkeithing, Fife	1963	XVI-496	XIX-496
359/6	Robson-Lang Leathers Ltd Scottish Division Glenburn Rd., College Milton East Kilbride, Lanarkshire	1967	XI-431	XIV-431

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[1] Babygro opened a factory in 1966 on the Hayfield Industrial Estate, Kirkcaldy.

[2] Formerly Massey-Harris Co Ltd and then Massey-Harris-Ferguson Ltd. For an account of the location decision, see E.P. Neufeld, A Global Corporation: A History of the International Development of Massey-Ferguson Limited (Toronto: University of Toronto Press, 1969), pp.80-84.

Migrants from Continental Europe & India

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
360/1	Arkana Ltd[1] Glasgow Rd., Camelon Falkirk, Stirlingshire	1966	XVI-496	XIX-496
361/2	Atlas Hydraulic Loaders Ltd Vere Rd Blackwood, Lanarkshire	1964	VI-337	VII-337
362/3	J. Bobbins Ltd Inchyra Rd Grangemouth, Stirlingshire	1965	VI-335	VII-335
363/4	British Olivetti Ltd*[2] 115 Summerlee St Queenslie Industrial Estate Glasgow E.3, Lanarkshire	1947	VI-338	VII-338
364/5	Ganda Manufacturing Co Ltd Block 2, Coltness St Queenslie Industrial Estate Glasgow E.3, Lanarkshire	1948	XII-443	XV-443
365/6	Chemtec N.V. Willowyard Rd Beith, Ayrshire	1966	VI-341	VII-341

[1]Available information reveals major discrepancies with regard to the origin of this firm. According to MinTech, it originated in Switzerland. In contrast, the Grangemouth/Falkirk Regional Survey and Plan (1968) research team determined that the firm was of American origin. Who Owns Whom (UK Edition) 1969 states that Arkana is owned by Yatton Furniture Ltd., London. In a private communication during September 1970, the general works manager for Arkana writes: "We have undergone major changes in our organisation since October 1969 and the main activity of our business is now centred at Bath, Somerset. Our factory at Falkirk is a small production unit manufacturing components for our Bath headquarters." While we have followed the MinTech allocation, the foregoing suggests that it may be inaccurate.

[2]For insight into the location decision, see Harvard Graduate School of Business Administration, Ing. C. Olivetti & C., S.p.A.: A Case Study (Cambridge, Mass.: Harvard Business School, 1967). On the typewriter industry more generally, see Edmund P. Learned, et al., Business Policy: Text and Cases (Homewood, Ill.: Richard D. Irwin, Inc., 1965), pp.183-333.

No.	Name & Scottish Address	Year Production Began	SIC Order & MLH 1958	1968
366/7	Gleno Asbestos Ltd Grange Rd Livingston, West Lothian	1966	XIII-469.2	XVI-469
367/8	Habasit (GB) Ltd 89 James St., Bridgeton Glasgow S.E, Lanarkshire	1965	VI-337	VII-337
368/9	Interoase Ltd Edinburgh Rd Harthill, Lanarkshire	1968	XI-432	XIV-432
369/10	A. Johnson Construction Co Ltd Balmore Colliery Torrance, Stirlingshire	1965	XIII-469.2	XVI-469
370/11	Organon Laboratories Ltd* Newhouse Industrial Estate Newhouse, Lanarkshire	1946	IV-271.3	V-272
371/12	Philips Hamilton Wellhall Rd Hamilton, Lanarkshire	1945	VI-369[1]	IX-369[2]
372/13	Philips Dunfermline Dunfermline, Fife	1965	VI-364	IX-365
373/14	Roche Products Ltd* Drakemyre Dalry, Ayrshire	1956	IV-271.3	V-272
374/15	SGS / Societe Generale Semiconduttori / (UK) Ltd Middlefield, Grangemouth Rd Falkirk, Stirlingshire	1966	VI-364	IX-364
375/16	Shetland Norse Preserving Co Mid Yell, Shetland	1970**[3]	III-214	III-214
376/17	Voith Engineering Ltd[4] Queen's Park Works, Polmadie Glasgow S.2, Lanarkshire	1962	VI-339	VII-339

[1]Formerly VI-364. Cf. C.A. Oakley, ed., Scottish Industry: An Account of What Scotland Makes and Where She Makes It, with a Foreword by Lord Bilsland (n.p.: Scottish Council (Development and Industry), 1953), p.95.

[2]Formerly IX-365. Cf. Oakley, op. cit.

[3]Cf. "Shellfish Cannery," The Times, 25 Jun 70, p.20. In the MinTech list, this firm appears under the name Bjerde Johnsen.

[4]Voith ceased manufacturing in Scotland during 1970. See Andrew Hargrave, "Voith to End Production at Glasgow Factory," Financial Times, 21 Jan 70, p.21.

Some Migrant Closures Prior to January 1970

1 British Federal Welder and Machine Co Ltd., a West Midlands firm, manufactured machine tools (1958 SIC: VI-332; 1968 SIC: VII-332) at Irvine from 1960 to 1964.

2 Clearex Products Ltd*., a Middlesex firm, manufactured plastic refrigerator fittings (1958 SIC: XVI-496; 1968 SIC: XIX-496) for sale to Astral Domestic Equipment Ltd., Dundee in a branch plant located in the same city from 1959 to 1964.

3 Constructors (Scotland) Ltd., a subsidiary of a Birmingham firm, engaged in manufacturing (1958 SIC: IX-399; 1968 SIC: XII-399) at 161 Helen St., Govan, Glasgow S.W.1 from 1962 to 1966.

4 Graham-Enock Manufacturing Co Ltd. of Thetford, Norfolk began producing dairy equipment (1958 SIC: VI-339; 1968 SIC: VII-339) in Edinburgh at the Admiralty Factory, Marine Gardens, Portobello in 1945. The firm no longer appears to manufacture in Edinburgh but maintains premises there at 53 Frederick St.

5 Imperial Chemical Industries Ltd. opened a plant in Dumfries during 1951 for the manufacture of 'Ardil', a fibre made from ground nuts. (1958 SIC: X-411; 1968 SIC: XIII-411). The plant had an annual capacity of 22m. lbs. 'Ardil' did not prove to be very popular with consumers and the works was shut in September 1957.

6 Kenneth Marsh Ltd*., a manufacturer of fancy wax candles (1958 SIC: IV-275.2; 1968 SIC: V-275) from Buffalo, N.Y. opened a factory at 443 Hillington Rd., Hillington Industrial Estate, Glasgow S.W.2 in 1958 but closed it in 1967.

7 Moffats (Ontario) Ltd. opened a branch at Bellshill Rd., Uddingston, Glasgow in 1963 for the manufacture of domestic electric appliances (1958 SIC: VI-365; 1968 SIC: IX-368). It was taken over and shut by Thorn Electrical Industries Ltd., London in 1967 as part of a rationalisation scheme. Honeywell moved into the vacated factory which was owned by the SIEC.

8 Remington Electric Shaver Ltd*. opened a branch at Thornliebank, Glasgow c. 1952 to manufacture electric shavers (1958 SIC: VI-365; 1968 SIC: IX-368) but closed it in March 1968 because of chronic labour problems and Britain's failure to join the EEC.

9 Remington Rand Ltd*. opened a branch on the Hillington Industrial Estate, Glasgow in 1948 for the manufacture of standard manual, portable and electric typewriters (1958 SIC: VI-338; 1968 SIC: VII-338) but closed it in October 1968 because of chronic labour problems.

10 Rex Trueform (GB) Ltd., the British subsidiary of a South African clothing manufacturer, opened a factory on the Greenhill Industrial Estate, Coatbridge for the making of men's and boy's tailored outerwear (1958 SIC: XII-442; 1968 SIC: XV-442) in 1960. In 1967 the name of the Scottish operation was changed to Coatbridge Clothing Manufacturers Ltd. Later the same year this firm was taken over by S. Collier & Co Ltd., London and renamed Ricoman Tailors Ltd. Ricoman was closed in January 1969 allegedly because of high labour turnover and lack of support from Collier.

11 Swallow Raincoats Ltd., Kelty: see the footnote to entry 106 above.

12 Torloch Knitting Mills Ltd.* (1958 SIC: X-417; 1968 SIC: XIII-417), a Leicester firm, opened a branch at Lesmahagow, Lanarkshire in 1957 but ceased production in January 1963.

13 Valor Co Ltd.* (1958 SIC: IX-399; 1968 SIC: XII-399), a Birmingham firm, opened a branch at the Chapelhall Industrial Estate in 1947 to manufacture domestic oil burning appliances but closed it in March 1962 due to a recession in the domestic market for oil heating stoves and a falloff in export orders. Three Middle Eastern countries - Iran, Iraq and Kuwait - are alleged to have taken over 85% of the branch's output at one point.

14 T. Wall & Sons (Ice Cream) Ltd.* (1958 SIC: III-215; 1968 SIC: III-215), with HQs in London, opened a branch (Craigmillar Creameries) at Edinburgh in 1949 but closed it during the 1960s.

15 Wall-Colmonoy (Canada) Ltd.* (1958 SIC: V-322; 1968 SIC: VI-322), the Canadian subsidiary of a U.S. firm, opened a branch on the Carfin Industrial Estate c. 1953 for the manufacture of various alloys. It located in Scotland due to managerial preference, i.e., it was essentially footloose. Closure occurred in July 1964. Only 12 workers were employed in 1960.

Addenda[1]

1 Border Chemicals Ltd. was formed in 1963 to manufacture acrylonitrile (1958 SIC: IV-271.3; 1968 SIC: V-271). A 40,000-ton plant was opened in Grangemouth during 1965, the first such works in the UK. Ownership was divided equally between BP, ICI and Distillers. BP purchased Distillers's interest in 1967.

2 Educational Supply Association Ltd.," an English firm, assembled school furniture (1958 SIC: XIV-472; 1968 SIC: XVII-472) first at Bellshill then at Carfin, Lanarkshire from 1945 to 1964. The branch was Scottish market-oriented and was set up to reduce delivery costs. According to government records, Educational Supply closed its Carfin works in March 1964 and ceased manufacturing in Scotland. In fact, according to the team of researchers at the University of Glasgow mentioned earlier, the firm in 1963 took over James D. Bennett Ltd., a furniture manufacturer at 121 Avenue St., Bridgeton, Glasgow S.E. In 1964 Bennett was closed and Educational Supply moved from Carfin to the newly-vacated Bridgeton factory where it continues to manufacture to this day. Apparently, this move was not recorded by the Board of Trade and thus Educational Supply does not appear in the MinTech list of migrants active as of January 1970.

3 Nuway Enamelling & Manufacturing Co Ltd. of Birmingham opened a branch at Carfin, Lanarkshire in 1962. The works was taken over by Millard Brothers Ltd. of Carfin in 1968. Millard began manufacturing in Scotland in 1948 (see entry 152 above). Nuway also opened a branch at Taynuilt, Argyllshire about 1962. This operation, contrary to its Carfin counterpart, is still in existence. Hence, it is not clear why MinTech has excluded Nuway from its list of migrant firms. Nuway would appear to fall into MLH 399 according to both the 1958 and the 1968 SICs.

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[1] Firms seemingly eligible for inclusion in the MinTech list but omitted by the Ministry either through oversight or for not readily explicable reasons and discovered by us too late for inclusion in the main list.

Some New Migrants Since January 1970

1 It was reported in April 1970, i.e., too late for inclusion in the MinTech list of migrants, that the Beecham Group, one of the largest pharmaceutical concerns in the UK, will invest £7m. in a new factory at Irvine. Semi-synthetic penicillins will be one of the main products (1958 SIC: IV-271.3; 1968 SIC: V-272). Operations are expected to begin during 1972. Employment could rise to about 800 by 1974. Irvine was selected following an intensive investigation of Development Areas throughout the nation. Beecham's Pharmaceutical Division has an existing plant at Worthing, Sussex. Giles Smith, "Beecham to Build £7m. Ayr Plant," The Times, 20 Apr 70, p.20.

2 It was announced in January 1971 that Continex International Ltd., a new company owned jointly by International Synthetic Rubber from England and Continental Carbon from (Houston) Texas, is building a 30,000 ton a year carbon black (1958 SIC: IV-271.3; 1968 SIC: V-271) works at Bo'ness to be opened before the end of the year. See John Trafford, "Intl. Synthetic Rubber to Boost Capacity by 23%," Financial Times, 12 Jan 71, p.11.

3 Dexter Corporation from Connecticut is to renovate and reopen a paper mill in Chirnside, Berwickshire which closed early in 1970. Dexter manufactures tea bags, vacuum cleaner bags, stencil paper and surgical masks (1958 SIC: XV-483; 1968 SIC: XVIII-482). See "U.S. Firm Will Invest £3m. in Borders Venture," Glasgow Herald, 14 Jan 71, p.4; Frances Cairncross, "New Tea Bags Save Old Mill," Observer, 17 Jan 71, p.3.

4 Imhof-Bedco Ltd. of Harpenden, Herts. announced early in 1970 that it was going to open a 27,500 sq.ft. factory at Chapelhall, Lanarkshire to produce precision, custom-built sheet metal enclosures and accessories (1958 SIC: IX-399; 1968 SIC: XII-399) for the electronics and related industries.

5 Michelin is to build a tyremaking plant (1958 SIC: XVI-491; 1968 SIC: XIX-491) in Dundee to be ready for occupancy early in 1972 and a steel wire-drawing plant (1958 SIC: IX-394; 1968 SIC: XII-394) in Aberdeen to come into operation in 1973. See Andrew Hargrave, "Michelin to Build Plants at Dundee and Aberdeen," Financial Times, 3 Jul 70, p.13; "Michelin's New Plant in Britain," The Times, 3 Jul 70, p.19.

6 Mullard Ltd., London, a subsidiary of the Dutch giant, Philips, is to begin making electronic components by 1971 in Aberdeen. The key location factors relative to Dundee and Irvine were the availability of large supplies of female labour and proximity to a university and technical education facilities. Eventually, the new factory will be the largest electronics production facility north of the Central Belt. See Andrew Hargrave, "Philips Planning Big Factory at Aberdeen," Financial Times, 5 Mar 70, p.1.

APPENDIX B

MANUFACTURING MIGRANTS TO NORTHERN IRELAND, JANUARY 1945-JULY 1969, IN PRODUCTION AT THE END OF THE PERIOD: NAME, ADDRESS, DATE PRODUCTION BEGAN, ORIGIN AND 1958 SIC CODING

Introductory Notes

Practically all postwar industrial migrants to NI have received assistance of one sort or another from MinCom. Thus, the roneoed list, Government-Sponsored Industry, freely available from the Ministry can be taken as inclusive of every migrant firm still in production as of the date shown on the cover of this periodically-revised document.[1] The July 1969 'edition' forms the basis for this appendix.

MinCom's roneoed register does not distinguish between migrant firms and firms established by local interests. Our first task therefore was to weed out the latter. Mr W.J. Burns of the Ministry was most helpful in this respect. Out of the 257 firms listed by MinCom, 68 or over 26% were local in nature. Also weeded out was a non-manufacturing entry, B.K.S. Survey Technical Services Ltd(XXII-879). The residual register appears below. We assumed initially that it conformed by and large to Howard's criteria (as outlined in the introduction to the appendix (A) showing migrants to Scotland). Now we are not so sure for two reasons. First, it became clear that some firms, e.g., entry 13, already had a plant in Ulster classified to the same MLH at the time of their establishment. We have not been able to determine the extent to which this observation applies. Secondly, a detailed

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[1] One exception to this general rule is noted below - see entry 156. It should also be mentioned that five of the 192 migrants (in our list) alleged to have been in business as of Jul.69 do not appear in the 1970 PO Telephone Directory for NI. At least four seem to have ceased manufacturing altogether; one may simply have changed its name.

inquiry into the characteristics of entries 124 and 125 revealed that the latter was a take-over rather than a genuine case of migration. This inquiry was motivated by the closure of a sister plant in Scotland; the take-over revelation was a by-product. One is left wondering how many other take-overs there might be in our list. Despite the foregoing, it seems probable that the bulk of the firms listed below qualify as genuine migrants, if only inadvertantly. Certainly, MinCom does not claim to have adhered to Howard's criteria.

MinCom's roneoed list gives six pieces of information about each firm, to wit: name, NI address, date production began, product(s), ownership status of premises (government or non-government) and factory area (government factories only). A second roneoed periodical, Foreign Firms Manufacturing in Northern Ireland, available from the Ministry enables one to segregate British from non-British migrants.[1] Our list incorporates most of this detail with the exception of ownership status and factory area; we mention the more interesting of these two items in footnotes but without any attempt at comprehensiveness. The product information has been converted into codings using the 1958 SIC.[2] In addition to the MinCom information, we include in this appendix:

a) available information on post-Jul. 69 closures
b) available " " " migrants[3]
c) random references to pre-Jul. 69 migrants based on various published sources and personal correspondence.

A number of detailed points with regard to the foregoing appear in the following paragraphs.

Migrant Origins. We make four distinctions: GB(140 establishments), USA(32), other foreign(12) and refugee(8).[4] MinCom practice has been followed throughout with the exception of entry 184.

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[1] Curiously, entry 184, a subsidiary of a Cork firm, is not considered by MinCom to be a foreign company.

[2] Owing to time constraints, we have not added a 1968 SIC coding as was done in the case of Scotland. However, it will be evident from the previous exercise that, for many firms, the MLH coding is not affected by the change in SIC.

[3] Sources include p.21 of Government-Sponsored Industry and another roneoed MinCom periodical, Facts and Figures About Industrial Development in Northern Ireland(Mar. 70 ed.).

[4] A complete list of refugee firms was provided by Mr Burns of MinCom in a personal letter dated 27 Aug 70.

Names. The Telephone Directory has been used as our principal guide to names. Discrepancies between this Directory and the roneoed MinCom register are noted in footnotes.

Addresses. Again, the Telephone Directory has been our primary guide. The addresses given below relate to works rather than offices where the two are spatially separate. An attempt was made initially to follow the Directory's postal address recommendations (see op. cit., pp.12-16) but some of them proved nonsensical for our purposes, e.g., Killyleagh and Saintfield in Co. Down were assigned to the Belfast postal district; thus, we abandoned the attempt. Also noteworthy is the complete absence of the place-name, Newtownabbey, from the MinCom list. According to the 1966 edition of the AA's Illustrated Road Book of Ireland, Newtownabbey is: "A New Town, formed out of parts of the Belfast suburbs of Glengormley, Whitewell, Whiteabbey, Jordanstown, Cavehill, Carnmoney and Whitehouse . . ." The name appears in the Telephone Directory; why then the lack of recognition by MinCom?

SIC Codings. MinCom helped with the classification of a number of migrants for whom the product information in its roneoed register was insufficient to permit an accurate coding. Nonetheless, we remain responsible for all codings shown below. Use was made during the coding exercise of the relevant HMSO publications listed in the appendix (A) pertaining to Scotland.

To sum up, this list of postwar manufacturing migrants to NI is considered to be comparable to its Scottish counterpart although it is not quite as definitive in terms of Howard's criteria.

Migrants from Great Britain

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
1	A.E.I. Turbine-Generators Ltd[1] Larne, Co. Antrim	Sep.53	VI-334.2
2	Abbey Meat Packers Ltd Glenville Rd Newtownabbey, Co. Antrim	Oct.47	III-214
3	Adria Knitting Mills Ltd Beechmount Rd Strabane, Co. Tyrone	Apr.62	X-417
4	Air Conditioning & Engineering (NI) Ltd Laurelvale Tandragee, Co. Armagh	Apr.48	VI-339.4
5	Aircraft Furnishing Ltd Moor Rd Kilkeel, Co. Down	Mar.67	VIII-383
6	Jeremiah Ambler (Ulster) Ltd Carrickfergus, Co. Antrim	Jan.47	X-414.2[2]
7	Ambler of Ballyclare Ltd Hillhead Rd Ballyclare, Co. Antrim	Apr.61	X-412
8	Ambrosia Ltd Magheralin, Co. Down	Dec.47	III-215
9	Andrews-Weatherfoil Ltd Lambeg Mills Lisburn, Co. Antrim	Mar.48	VI-339.4

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[1] Listed by MinCom as Associated Electrical Industries Ltd. This firm was taken over by the General Electric Co. Ltd. during the autumn of 1967. Ironically, GEC did not want AEI's turbo-generator interests but got them anyway as part of a package deal. The Larne complex has 612,000 sq.ft. of floor space; the annual rental to the NI Government is £300,000 a year! A considerable proportion of total output is exported. Cf. Robert Jones and Oliver Marriott, "How English Electric Came to Weinstock," The Times, 29 Oct 70, p.27.

[2] MinCom has assigned this worsted spinner to X-412 (personal letter from Mr Burns of MinCom, 16 Jul 70) but erroneously so in our judgment since worsted spinning is clearly part of X-414.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
10	Antrim Precision Engineering Ltd New Park Industrial Estate Antrim	Jul.68	VI-333
11	Sir Richard Arkwright & Co. (English Sewing Ltd) Drumhew Lisnaskea, Co. Fermanagh	Jan.56	X-412
12	Associated Feed Manufacturers Ltd York Rd Belfast	Mar.60	III-219
13	Associated Portland Cement Mfrs. Ltd Cookstown, Co.Tyrone	Sep.68[1]	XIII-464
14	B.M.C. Metal Products Ltd Clady Works Dunadry, Co. Antrim	May 46	VI-333
15	BP Refinery (NI) Ltd Airport Road West Belfast	Apr.64	IV-262

[1]This firm has a plant at Magheramorne near Larne which predates the Cookstown works. Thus, it does not qualify as a migrant according to Howard's criteria.

Associated Portland is by far the largest UK cement producer with about 62% of the market in 1960. The industry is very transport-sensitive; 1963 TCNO ratios ranged from 12.6% for the UK as a whole to 24.1% for Scotland. A NI figure is not available. Cement making involves considerable weight loss and, contrary to McCrone (1969, p.54), is raw material-oriented; the main inputs are calcium carbonate, alumina and silica. It is also highly fuel-intensive; some 800 lbs. of coal, the largest single manufacturing cost item, are used per ton of output. Production is very capital-intensive. Distribution is widely, but by no means exclusively, carried out by own-account road transport (cf. the ambiguous transport payments/total transport cost ratio for the industry in Appendix C). In 1961, the ex-works price of ordinary cement in the UK ranged from £5.57½ to £6.37½ a ton. An industry-wide market pricing arrangement was employed to mitigate price competition. At each delivery point, all brands of cement were offered at the same price. Prices varied however between points, usually at 4- to 5-mile intervals. Distribution costs averaged close to 20% of the delivered prices according to the Cement Makers' Federation (the UK TCNO ratio computed from 1963 Census of Production data was only 6% - the difference between these 2 figures is not readily explicable). Under the market pricing arrangement, each plant's economic market area was 20-30 miles in radius. See "A Note on the Manufacture and Distribution of Portland Cement in the United Kingsom," in Learned, et al. (1965), pp.868-77 and the accompanying case study of the Rugby Portland Cement Co. Ltd., pp.878-903.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
16	B.S.C. Footwear Ltd[1] Springtown Industrial Estate Londonderry	Sep.68	XII-450
17	B.V.C. Industries (NI) Ltd[2] Lisnahairagh Castlereagh Industrial Estate Belfast	Sep.46	VI-365
18	Bairns-Wear Ltd[3] Abbey Park Armagh	Jun.51	X-417
19	Ballantyne Sportswear Co. Ltd Ballycastle Rd Coleraine, Co. L'derry	Aug.58	X-417
20	Banner Textiles Ltd Portadown Rd Lurgan, Co. Armagh	May.60	XII-444.2
21	Beecham Foods Ltd Falls Rd Belfast	Jul.53	III-239.2/3
22	Bessbrook Products Ltd[4] Bessbrook Station Works Newry, Co. Down	Jul.58	VI-362
23	J. Bibby Agriculture Ltd Knockmore Mill Lisburn, Co. Antrim	Feb.60	III-219

[1] Not listed in the 1970 Telephone Directory. A B.S.C. (Shoe Repairs) Ltd., 22 Pottingers Entry, Belfast is listed. Either this firm has superseded B.S.C. Footwear or the latter has disappeared entirely. Shoe repairing, of course, is not manufacturing.

[2] B.V.C. is derived from the name, British Vacuum Cleaner & Engineering Co. Ltd.

[3] It was announced on 4 Jul 70 (The Times, p.21) that Bairns-Wear, a Courtaulds subsidiary, will begin production about mid-1971 of fully-fashioned knitwear (X-417) in a new 70,000 sq.ft. government factory located between Newry and Bessbrook. Close to 400 workers will be employed. The Armagh plant suffered considerable riot-damage in 1969 but has since been re-opened.

[4] A subsidiary of British Insulated Callender's Cables Ltd. The works is physically in Co. Armagh.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
24	British Oxygen Chemicals Ltd[1] Maydown Industrial Estate Londonderry	Jul.60	IV-271.3
25	G.B. Britton & Sons Ltd[2] Paradise Ave Ballymena, Co. Antrim	Feb.59	XII-450
26	Colin J. Brook & Co Ltd Antrim St Carrickfergus, Co. Antrim	Nov.64	VI-333
27	Brookhaven Shirt (Mfg.) Co. Ltd 36 Foyle St Londonderry	1964	XII-444.2
28	Carreras of NI Ltd[3] Sea Park Carrickfergus, Co. Antrim	1964	III-240
29	H.R. Carter & Son Ltd Culcavey Hillsborough, Co. Down	Mar.66	XV-481

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[1] BOC's £3m (Wulff) acetylene plant pipes the gas directly to the adjoining Neoprene synthetic rubber works owned by Du Pont. Initially, BOC used a carbide process to make acetylene but later changed to the Wulff process based on the thermal cracking of naphtha (Union Carbide is the patentee) for 2 reasons: 1) reduced production costs as a result of less electric power and less labour, 2) the ready availability of liquid naphtha. Ethylene is a by-product of the Wulff process. Ideally, only one part is produced for every 2 parts of acetylene but BOC has had major difficulties, including an unexpected outlay of £500,000 on top of the original £3m, in achieving this goal. Another by-product of the Wulff process is tar; BOC has been getting about a ton for every ton of acetylene. The design capacity of the Wulff plant is 30,000 tons of acetylene a year. Apart from its long-term contract with Du Pont, BOC exports ethylene dichloride from Londonderry to Norsk Hydro in Norway. Cf. Kenneth Owen, "Why BP Chemicals Closed the Wulff Plant," The Times, 18 Dec 70, p.28.

[2] An 84,000 sq.ft. footwear plant (XII-450) was opened on Ballycastle Rd., Coleraine in Jan.67. Britton is based in Bristol. It markets through wholesalers and independent retailers. During the mid-1960s, the firm was making over £1m profits pre-tax a year. But too little attention was given to product quality and style; consequently, its main brand, Tuf, fell into growing disrepute. The abolition of RPM on shoes was the last straw. Some £361,000 was lost in 1969, there has been an extensive management shake-up, and the government-owned Coleraine factory has been closed. See Michael Braham, "Why Tuf Was Down At Heel," Observer, 21 Mar 71, p.18.

[3] This government factory has 278,000 sq.ft. of floor space.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
30	Cigarette Components Ltd[1] Alanbrooke Rd Castlereagh Industrial Estate Belfast	Oct.65	XV-483.4
31	J. & J. Colman Ltd[2] Newry, Co. Down	Apr.46	III-218.2
32	K.G. Corfield Ltd Ballymoney, Co. Antrim	Feb.59	VI-349
33	Coubro & Scrutton (M & I) Ltd 153 Glenville Rd Newtownabbey, Co. Antrim	Sep.58	VI-337
34	Courtaulds Ltd[3] Belfast Rd Carrickfergus, Co. Antrim	Jun.50[4]	X-411
35	Courtaulds Ltd Processing Division Church Rd Carnmoney Industrial Estate Newtownabbey, Co. Antrim	Mar.69	X-412
36	Crittall-McKinney Metal Window Co. Ltd Monarch Parade Belfast	May 51	IX-399.2
37	Daily Mirror Newspapers Ltd Suffolk Rd Belfast	Apr.66	XV-486

[1]Cigarette Components has filter rod-making factories in Jarrow and Bletchley as well as Belfast. It is in a high-risk industry and consequently aims at a return of 20% on sales. One-third of its UK output is exported. Customers are supplied directly and there are no published output prices. However, the price of a filter rod represents about 0.6d per packet of 20 cigarettes. Inputs include creped paper, cellulose acetate tow, and glue. Rod-making machines are supplied mainly by Molins Machine Co. Ltd. Manufacturing operations are not subject to significant economies of scale, nor are they especially complicated. Cigarette Components was recently investigated by the Monopolies Commission but no serious criticisms resulted. See Monopolies Commission, H.C. 130(1967-68) and H.C. 335(1968-69).

[2]Not listed in the 1970 Telephone Directory.

[3]See our earlier in-depth examination of this migrant.

[4]According to the MinCom list, this plant commenced production during Jul.48. Garnsey(1965) gave Jun.50 as the starting date. A check with the Ministry confirmed that Garnsey's date is the correct one.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
38	A. De Pol & Co. Ltd 1a Lawrence St Belfast	1966	XIII-469.2
39	Deyong Golding Ltd Maydown Industrial Estate Londonderry	Sep.68	XII-445.2
40	Doltone Hosiery Co. Ballymena Rd Ballymoney, Co. Antrim	Aug.63	X-417
41	Donaghadee Carpets Ltd[1] High Bangor Rd Donaghadee, Co. Down	Dec.68	X-419
42	Down Shoes Ltd[2] Newry Rd Banbridge, Co. Down	Jan.47	XII-450
43	Dunellen Ltd Advance Factory No. 8, Derriaghy Dunmurry Industrial Estate Belfast	Apr.65	VI-349
44	Dunlop Textiles Ltd Pennyburn Londonderry	Nov.54	X-413
45	S. Dwek & Sons Ltd Oaks Rd Dungannon, Co. Tyrone	Oct.68	IX-399.7
46	Dynadrive Ltd Advance Factory S. Circular Rd Bangor, Co. Down	1968	VI-351
47	F.M.C. (Newry) Ltd[3] Warrenpoint Rd Newry, Co. Down	Aug.67	III-214

[1]This government-owned plant has a floor space of 346,000 sq.ft. Cyril Lord was the original occupant. Viyella took over in Dec.68 upon the collapse of the Lord empire. Viyella sells to retailers. Lord initially sold carpets directly to individual housewives. See Gwen Nuttall, "How Viyella Is Making a File Out of Carpets," Sunday Times, 20 Sep 70, p.49.

[2]A second government factory was occupied at Banbridge in Jan.68.

[3]F.M.C. was formerly called the Fatstock Marketing Corporation. It is the largest member of the British Bacon Curers' Federation, accounting for some 40% of UK bacon-curing capacity.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
48	Fenwick Watson Ltd Albert St Lurgan, Co. Armagh	Aug.58	XII-445
49	Fisons Foods Ltd[1] Coleraine, Co. L'derry	Mar.46	III-229.2
50	Flexibox Ltd Queen St Ballymena, Co. Antrim	Apr.57	IX-349
51	Wm. Franklin & Son (NI) Ltd Soarva Rd Banbridge, Co. Down	Oct.61	X-421
52	Franklin Mills (Ulster) Ltd[2] Union St Lurgan, Co. Armagh	Jun.64	X-417
53	Thomas French & Sons Ltd[3] Springtown Industrial Estate Londonderry	Oct.68	X-421
54	Gainsborough Rathgael Ltd Newtownards Rd., Rathgael Bangor, Co. Down	1968	X-417
55	Gammon Pritchett Ltd 28 Steel Dickson Ave Portaferry, Co. Down	Nov.60	X-418
56	Gascoignes (Reading) Ltd Derriaghy, Dunmurry Industrial Estate Belfast	Jan.61	VI-331
57	Grayson Fabrics Ltd Saul Rd Downpatrick, Co. Down	Jun.64	X-422.1
58	Greenings (Ulster) Ltd Portadown Rd Lurgan, Co. Armagh	Mar.62	IX-394
59	T. Grieve & Co. Ltd Glenmanus Works Portrush, Co. Antrim	Apr.66	IX-399.7

[1] Not listed in the 1970 Telephone Directory.

[2] A 33,000 sq.ft. government factory was occupied at Newry in Apr.69.

[3] A branch plant.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
60	L.G. Harris & Co. Ltd The Harbour Ardglass, Co. Down	Jan.68	XVI-493
61	Harris Engineering Co. Ltd Killowen St Coleraine, Co. L'derry	Jan.62	VI-341.2
62	Harrison, Barber & Co. Ltd The Mill Saintfield, Co. Down	Dec.52	III-214
63	Heating Controls & Devices Ltd Carrowreagh Rd Dundonald, Co. Down	Jan.64	VI-339.4/5
64	Hemline Co 6 Antrim Rd Lurgan, Co. Armagh	May 63	X-422.1
65	John Henning (Engineering) Ltd Unicorn Works Waringstown, Co. Down	Oct.60	IX-399.7
66	Hicking, Pentecost & Co. (NI) Ltd Leighinmohr Ave Ballymena, Co. Antrim	Nov.50	X-423
67	Homa Engineering Ltd Mourne Works, Castlewellan Rd Newcastle, Co. Down	Aug.64	IX-399
68	I.C.I. Fibres Ltd[1] Kilroot Works Carrickfergus, Co. Antrim	Jan.63	X-411
69	Ira Ickringill & Co. Ltd[2] Killylea Rd Armagh	Oct.58	X-414.2
70	International Computers Ltd[3] Montgomery Rd Castlereagh Industrial Estate Belfast	Apr.49	VI-364.2

[1]Listed by MinCom as Imperial Chemical Industries Ltd. Almost 50% of ICI's Terylene (polyester) filament yarn production comes from the 802,000 sq.ft. government-owned Kilroot plant. The rest is made at the company's Wilton Works(Yorks.).

[2]A small (7,000 sq.ft.) government factory on Culloville Rd., Crossmaglen, Co. Armagh was occupied by Ickringill in Sep.68.

[3]Initially, tabulating machines (VI-338) were made in this 562,000 sq.ft. government factory by one of ICL's corporate ancestors.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
71	Jersey Kapwood Co. Ltd Kitchen Mill Lurgan, Co. Armagh	Jan.59	X-417
72	Kallerton Ltd Rosemount Factory Londonderry	Feb.66	XII-444.2
73	Keady Carpet & Spinning Co. Ltd[1] Annvale Works Keady, Co. Armagh	Feb.46	X-412
74	Richard Kew & Son Ltd Talmak Factory, Quoile Rd Downpatrick, Co. Down	Jul.48	XII-449.4
75	King Packaging Ltd Gilford Rd Portadown, Co. Armagh	Sep.63	XVI-496
76	Klinger Manufacturing Co. Ltd[2] Wakehurst Rd Ballymena, Co. Antrim	Dec.63	X-412
77	Lagenod Ltd 4 Exchange Place Belfast	Jan.67	XII-444.2
78	Langford Lodge Engineering Co. Ltd Aerodrome Crumlin, Co. Antrim	Oct.59	VIII-383
79	Lockhart Boxmaking Co Marfield Factory, Drumbo Lisburn, Co. Antrim[3]	Mar.66	XV-482
80	Lord Roberts Memorial Workshop Castlereagh Industrial Estate Belfast	Aug.48	XIV-472
81	McNeill Roola Pipes Ltd[4] Creagh Industrial Estate Toomebridge, Co. Antrim	Dec.64	XIII-469.2

[1]This 150-employee firm was taken over by Carpet Yarn Spinners, a Templeton subsidiary, in Jun.70.

[2]Klinger occupied a 75,000 sq.ft. government factory at Antiville, Larne, in Dec.68.

[3]Drumbo (and presumably Lockhart) is actually in Co. Down.

[4]McNeill also has a works on Dunorue St., Belfast according to the 1970 Telephone Directory.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
82	Magee & Co. (Belfast) Ltd[1] Monarch Parade Belfast	Jun.46	XII-442
83	Peter Marsh & Sons (NI) Ltd Cornmarket Newry, Co. Down	Jul.61	X-422.2
84	Matbro Ltd Derriaghy Dunmurry Industrial Estate Belfast	Nov.65	VI-337
85	Metal Box Co. Ltd[2] Brownstown Rd Portadown, Co. Armagh	Apr.46	IX-395
86	Miles-Ashanco Engineering Co. Ltd Ellis St Carrickfergus, Co. Antrim	Jan.54	IX-399
87	Milwata Weatherproofs Ltd Seapatrick Banbridge, Co. Down	Oct.63	XII-441
88	Molins Machine Co. Ltd[3] Maydown Industrial Estate Londonderry	Oct.66	VI-339.8
89	Morris, Wilkinson & Co. (Lurgan)Ltd Robert St Lurgan, Co. Armagh	Dec.48	XIV-472
90	Morris Wilkinson (Plastics) Ltd[4] Lurgan, Co. Armagh	Nov.60	XVI-496
91	Moss Lane Spinning Co. Ltd Annsborough Castlewellan, Co. Down	Mar.48	X-412
92	Moulds, Tools & Dies (NI) Ltd Kiltonga Factory, Belfast Rd Newtownards, Co. Down	Nov.64	VI-333
93	Mulmac Clothing Co[5] 27 Main St Keady, Co. Armagh	Jul.67	XII-443

[1] Magee employs about 300 workers.

[2] See our earlier in-depth examination of this migrant.

[3] Cf. Monopolies Commission, H.C. 218(1960-61).

[4] Not listed in the 1970 Telephone Directory.

[5] Listed as Mulmac Stitching Co. by MinCom.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
94	B. & P. Nicholson[1] 48 York St Belfast	Jul.46	X-422.1
95	Northern Brick Co. (Belfast) Ltd Toomebridge, Co. Antrim	Jun.47	XIII-461
96	Omagh Shirt and Collar Co. Ltd Kevlin Rd Omagh, Co. Tyrone	Sep.47	XII-444.2
97	G.H. Patents Ltd Aughrim Rd Magherafelt, Co. L'derry	May 68	XIV-474
98	Pedigree Westline Ltd[2] Castlereagh Industrial Estate Belfast	Feb.46	XVI-494.1
99	Sir Isaac Pitman & Sons Ltd Alanbrooke Rd Castlereagh Industrial Estate Belfast	Oct.51	XV-489
100	Plessey Telecommunications Ltd[3] Ballynahinch, Co. Down	Jan.53	VI-364.4
101	L.E. Pritchett & Co. Ltd Kiltonga, Belfast Rd Newtownards, Co. Down	Feb.53	III-229.2

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[1]Listed as B. & B. Nicholson by MinCom.

[2]Not listed in the 1970 Telephone Directory as such. Four seemingly cognate companies are listed however, all of them in Belfast and three at the same address, 407 Castlereagh Road. Their names are Pedigree Cars (10a Ravenscroft Ave), Pedigree Soft Toys, Rovex Tri-ang Ltd and Triang Pedigree Ltd. Also listed at 407 Castlereagh is the Lines Bros. Social & Sports Club. A firm called Pedigree Prams laid off 300 workers in Belfast about the end of 1969 and seems to have closed entirely. Cf. John Elliott, "Ulster's Search for a New Prosperity," Financial Times, 26 Jan 70, p.19. Perhaps this firm is the missing Pedigree Westline. If so, it should be noted that prams are classified to VIII-389. It was reported on 9 Jan 71(The Times, p.5), i.e., after the issuance of the 1970 Telephone Directory, that: "Lines Brothers are to close their Rovex Triang factory in Belfast next Friday. It employs 230 people. The company say /sic/ the closure is part of the group's plan for rationalizing United Kingdom production. Two Triang factories in England have already been shut down." (Cf. our case study of Model Toys.) We have not pursued this matter further but it would be imprudent to conclude that Pedigree Westline Ltd has gone out of business entirely; it may still be in operation, despite the Pedigree Prams and Rovex closures, as Pedigree Cars, Pedigree Soft Toys or Triang Pedigree.

[3]Listed by MinCom as Plessey (NI) Ltd.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
102	R.F.D. (NI) Co. Ltd[1] Seymour Hill Dunmurry Industrial Estate Belfast	Dec.52	XVI-491.2
103	Reed Corrugated Cases Ltd Newry Rd Warrenpoint, Co. Down	Apr.48	XV-482
104	Reliance Cords & Cables Ltd[2] Carnmoney Industrial Estate Newtownabbey, Co. Antrim	Feb.59	VI-362
105	Rolls Royce Ltd Aero Engine Division Dundonald, Co. Down	Nov.66	VIII-383
106	Ross Chicken (Armagh) Ltd Loughgall Rd Armagh	Oct.67	III-214
107	Saracen Ltd Queen St Lurgan, Co. Armagh	Jan.47	X-417
108	Saracen Ltd Star Factory, Foyle Rd[3] Londonderry	1969	XII-445.2
109	Scandridge Ltd Bachelors Walk Lisburn, Co. Antrim	Jul.67	XII-442
110	Scott & Newman (Ireland) Ltd Artikelly Limavady, Co. L'derry	Sep.58	III-218.2
111	Scottish Animal Products Ltd Malone Belfast	Oct.61	III-219

[1] A plant was opened at The Green, Lambeg, Lisburn in Feb.66.

[2] Like Bessbrook Products, a subsidiary of British Insulated Callender's Cables. But Reliance is not listed in the 1970 Telephone Directory. The name appears to have changed to Belfast Cables Ltd whose address is Church Road, Newtownabbey. Lord McFadzean, BICC chairman, warned on 1 Jul 70 that, while plans existed to double his firm's operations in NI, they were being shelved until stability returned to the province. Contemporary employment in the 2 BICC-'owned' plants already in Ulster was in excess of 1,000. See R.W. Shakespeare, "Industry Chiefs Warn Against Spread of Ulster Unrest," The Times, 2 Jul 70, P.17.

[3] Listed by MinCom at Bligh's Lane, Londonderry.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
112	Seaborn (NI) Ltd North Quay Ardglass, Co. Down	Jun.63	III-214
113	Setright Registers Ltd 460 Donegall Rd Belfast	Oct.64	VI-338
114	Sigma Instant Print[1] 12 Bedford St Belfast	Mar.64	XV-489
115	Slack & Parr Ltd Killyhevlin Works Enniskillen, Co. Fermanagh	Jul.67	VI-349
116	Southern Chemicals Ltd Glenville Rd Newtownabbey, Co. Antrim	Mar.66	XVI-496
117	Springco (NI) Ltd 33 Woodhouse St Portadown, Co. Armagh	May 54	IX-399.4
118	Stark Bros. (Salford) Ltd Elstar Works, Cornmarket Newry, Co. Antrim	Jun.46	XII-441
119	T.P.T. Ltd Factory 4, Portadown Rd Craigavon, Co. Armagh	Sep.69	XV-483.4[2]
120	Tennants Textile Colours Ltd 35 Ravenhill Rd Belfast	Nov.49	IV-271.1
121	Tern-Consulate Ltd Queen St Coleraine, Co. L'derry	Apr.55	XII-444.2
122	Tilley Lamp Co. Ltd[3] Derriaghy Dunmurry Industrial Estate Belfast	Oct.61	IX-399.7

[1] Listed by MinCom as Sigma Services (Belfast) Ltd.

[2] MinCom has assigned this paper tube manufacturer to XV-482 (personal letter from Mr Burns, 16 Jul 70). However, the 1968 SIC classifies paper tubes to XVIII-484.2 which is comparable to XV-483.4.

[3] A transfer from GB. Tilley occupied a second government factory (32,000 sq.ft.) on the Dunmurry IE in Mar.67.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
123	Towler Bros. (Patents) Ltd Maydown Industrial Estate Londonderry	Feb.66	VI-337
124	Turners Asbestos Cement (NI) Ltd[1] Hillhead Rd Ballyclare, Co. Antrim	Apr.67	XIII-469.2
125	Turner Bros. Asbestos Co. Ltd[2] Beechvalley Mill Dungannon, Co. Tyrone	Sep.47	X-413

[1] Listed by MinCom and the 1970 Telephone Directory as Turners Asbestos Cement Co. Ltd. This was the name of the original migrant, a branch of Turner & Newall Ltd., Manchester. The current company was set up during 1968-69 and is registered in NI. It is owned jointly by Turner & Newall (51%) and Cement Ltd., Eire's largest public company in terms of capital employed and the only producer of cement in the Republic. Also during 1968-69, Turner & Newall acquired a 49% interest in 2 Cement-controlled Eire companies, Asbestos Cement Pipes Ltd and Asbestos Cement Ltd. All 3 joint ventures made a "satisfactory overall net profit" according to Turner & Newall's Report and Accounts for the year ended 30 Sep 69. Their main customer was the construction industry. Turners Asbestos Cement Co. had 7 plants in GB during 1969. The only Scottish one, at Dalmuir(Clydebank), closed in 1970 with the loss of 200 jobs. Over-supply was given as the reason. Cf. Ian Imrie, "Cement Firm in Clydebank to Cut Production," Glasgow Herald, 1 Aug 70, p.14. The asbestos and asbestos products industry was referred to the Monopolies Commission in 1969. Turner & Newall is the largest UK producer. Turners Asbestos Cement Co. was merged with another Turner & Newall subsidiary, J.W. Roberts Ltd., effective 1 Oct 70, to form T.A.C. Construction Material Ltd; see The Times, 2 Oct 70, p.21.

[2] This firm has its HQs in Rochdale and is a branch of Turner & Newall. Its Glass Fibre Division had 3 plants as of Feb.70 at Dungannon, Hindley Green(near Wigan) and Camberley. TBA did not 'move' to Dungannon; it purchased an existing glass fibre production unit there. Thus, it does not qualify as a migrant company according to Howard's criteria. All material inputs to the Dungannon plant are purchased outside NI and the vast majority of the output, continuous glass filaments and glass fibre textiles, is shipped to Hindley Green for marketing and distribution by Division HQs in Rochdale. The approximate market value per ton of these products is £400. They are used principally as the reinforcing agent in the production of reinforced plastics. TBA is the largest manufacturer of continuous glass filament in the UK. Transport costs equal 1-3% of product costs depending on product type. The Dungannon plant is completely dependent on the cross-channel shipping services. Communication problems are negligible, especially since the plant does not deal directly with customers and has little direct contact with suppliers. Personal correspondence with Robin Small, Group Economist for Turner & Newall, Aug-Sep.70; Turner & Newall's Report and Accounts, 1968/9; a T & N advertising feature in the Financial Times, 3 Feb 70; and Couzens & Yarsley(1968), passim.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
126	Tyrone Shoe Co. Ltd[1] Mountjoy Rd Omagh, Co. Tyrone	Jul.68	XII-450
127	Ulster Chipboard Co. Ltd Castleroe Coleraine, Co. L'derry	Nov.59	XIV-471.1
128	Ulster Clay Products Co. Ltd Coalisland Rd Dungannon, Co. Tyrone	Nov.48	XIII-461
129	Ulster Meats Ltd Portadown, Co. Armagh	Jul.55	III-214
130	Ulster Vitamins Ltd Glenarm, Co. Antrim	Mar.49	III-218.2
131	Unidare Engineering Ltd Seagoe Portadown, Co. Armagh	Oct.57	VI-365
132	United Kingdom Optical Bausch & Lomb Ltd[2] Lurgan, Co. Armagh	May 45	VI-351.3
133	Utility Products Ltd Lismore Factory, Shillington St Portadown, Co. Armagh	Aug.55	XII-445
134	Vestric Ltd Belfast Branch, Prince Regent Rd Belfast	Jun.59	IV-272.1
135	Wade (Ulster) Ltd[3] Watson St Portadown, Co. Armagh	Feb.47	XIII-462
136	Wandleside Warren Wire Co. Ltd Dunmurry Industrial Estate Belfast	Jul.60	VI-362

[1] A producer of ladies' fashion shoes.

[2] Listed by MinCom as United Kingdom Optical Co. Ltd. McGovern (1963) mentioned (p.41) a spectacle lense manufacturer who moved to NI because of restrictions on expansion in the London area. Almost certainly, this firm was UK Optical.

[3] Listed by MinCom as Wade (Ireland) Ltd. This firm is almost certainly the manufacturer of porcelain tiles and pottery mentioned by McGovern(ibid.) that came to NI after being refused permission to expand at Stoke-on-Trent.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
137	Wm. Warne & Co. Ltd Portadown Rd Lurgan, Co. Armagh	Sep.62	XVI-491.2
138	Welrex Ltd[1] Clandeboye Rd Bangor, Co. Down	Sep.58	X-417
139	West Ulster Studio Industries Ltd Springtown Industrial Estate Bunorana Rd Londonderry	Sep.67	XIII-462
140	Wetherdair (NI) Ltd Greyabbey Rd Ballywalter, Co. Down	Apr.49	XII-441

[1] Welrex occupied a 38,000 sq.ft. government factory on Armagh Rd., Newry in Aug.63.

Migrants from the United States

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
141/1	A.M.F. International Ltd[1] Beaird Belfast Division Airport Rd Belfast	Jun.68	VI-341.2
142/2	Autolite Motor Products Ltd Finaghy Rd Belfast	Oct.65	VIII-381
143/3	Ballymoney Manufacturing Co. Ltd Balnamore Rd Ballymoney, Co. Antrim	Oct.66	X-412
144/4	Berkshire International (UK) Ltd Donaghadee Rd Newtownards, Co. Down	Dec.47	X-417
145/5	Bridgeport Brass Ltd Ballinderry Rd Lisburn, Co. Antrim	Oct.61	VI-349.3
146/6	Camco Ltd Doagh Rd Carnmoney Industrial Estate[2] Newtownabbey, Co. Antrim	Feb.59	VI-339.7
147/7	S.H. Camp & Co. Ltd Lisnarick Rd Irvinestown, Co. Fermanagh	Sep.67	VI-351.4
148/8	Centralab Ltd Monkstown Industrial Estate[3] Newtownabbey, Co. Antrim	Aug.65	VI-364.2
149/9	Ceramic Products Ltd Ballyoraigy Rd Muckamore, Co. Antrim	Aug.66	XIII-462.1

[1]Listed by MinCom as A.M.F. Beaird (Belfast).

[2]Production was later transferred to bigger premises on the nearby Monkstown IE, Co. Antrim.

[3]The Monkstown plant was a pilot unit. Production was transferred to Greystone Rd., Antrim in 1966.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
150/10	Du Pont Co. (UK) Ltd Maydown Industrial Estate Londonderry	Jun.60	IV-271.3
151/11	Du Pont Co. (UK) Ltd[1] Maydown Industrial Estate Londonderry	Nov.63	X-411
152/12	Fafnir Bearing Co. Ltd Ballinderry Rd Lisburn, Co. Antrim	Mar.64	VI-349.1
153/13	Goodyear Tyre & Rubber Co. (GB) Ltd[2] General Products Division Craigavon, Co. Armagh	Feb.68	XVI-491.2
154/14	Hughes Tool Co. Ltd Montgomery Rd Castlereagh Industrial Estate Belfast	Nov.54	VI-333
155/15	Kent Plastics UK Ltd Derrychara Enniskillen, Co. Fermanagh	May 67	XVI-496
156/16	Mamco International Ltd[3] Greencastle Rd Kilkeel, Co. Down	1968	VI-364.2
157/17	Mission Manufacturing Co. Ltd Castlereagh Industrial Estate Belfast	May 56	VI-339.7
158/18	Monsanto Textiles Ltd Somerset Park Coleraine, Co. L'derry	May 58	X-411
159/19	Nichols (Fibres) Ltd Glenwell Mill, Glengormley Newtownabbey, Co. Antrim	Apr.66	X-412
160/20	Norton Abrasives Ltd 405 Castlereagh Rd Castlereagh Industrial Estate Belfast	Apr.53	XIII-469.1

[1] Du Pont opened additional man-made fibre plants on the Maydown IE in Dec.68 and Aug.69.

[2] This government factory has 606,000 sq.ft. of floor space! It makes, not tyres, but industrial rubber products such as transmission belts and rubber hose.

[3] Mamco is not included in MinCom's official list of government-sponsored industry. It has received government assistance however; according to Mr Burns of MinCom, its exclusion from the list reflects "esoteric departmental reasoning" rather than oversight. Personal letter, 27 Aug 70.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
161/21	Oneida Silversmiths Ltd[1] 111 Bloomfield Rd Bangor, Co. Down	Jun.61	IX-392
162/22	Plastic Capacitors Ltd Maydown Industrial Estate Londonderry	Oct.68	VI-361
163/23	Ric-Wil (UK) Ltd[2] Beechill Rd Belfast	Feb.67	VI-341
164/24	Sherwood Medical Instruments (UK) Ltd Dunloy Rd Ballymoney, Co. Antrim	Oct.66	VI-351.4
165/25	A.G. Spalding & Bros. Ltd[3] Doagh Rd Monkstown Industrial Estate Newtownabbey, Co. Antrim	Dec.61	XVI-494.2
166/26	Standard Telephones & Cables (NI) Ltd[4] Doagh Rd Monkstown Industrial Estate Newtownabbey, Co. Antrim	Mar.62	VI-363

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[1]Oneida Ltd of Oneida, N.Y., the largest tableware manufacturer in the world, closed its Sheffield plant in 1960 in favour of NI. Its UK production increased by 500% during the decade ending in 1970 as a result of a shift from a jeweller-based, domestic distribution network into mail order sales, exports and premium offers. Oneida now has over a fifth of the British market and sells more than a quarter of its £1.4m+ output abroad. On the other hand, it accumulated losses of £975,000 between 1961 and 1968 on its Bangor operation, partly because of stiff Japanese competition. Productivity per worker (total employment is about 250) is estimated by the Federation of European Cutlery Manufacturers to be U.S. $9,400 a year or 4th-highest in the world after the U.S. ($18,800), Sweden ($16,800) and W. Germany ($10,700). Japan is 5th in the productivity league at $7,500. Average productivity in the UK as a whole is only $4,500! See Richard Milner, "Japan Points a $20m Knife at Sheffield," Sunday Times, 24 Jan 71, p.44.

[2]Ric-Wil produces insulated steel piping for underground heating systems. Government factories were occupied on the Dunmurry Industrial Estate, Belfast and at Dromore, Co. Down in Jan.69 and Feb.71 respectively.

[3]A transfer from London.

[4]This government factory has 458,000 sq.ft. of floor space. STC occupied additional government factories in Jul.65 and Nov.65 at Enniskillen (52,000 sq.ft.) and Larne (184,000 sq.ft.) respectively.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
167/27	Ulster Hosiery Ltd Carrowreagh Rd Dundonald, Co. Down	Jun.59	X-417
168/28	Ulster Swift Ltd Kilmacormack Enniskillen, Co. Fermanagh	Oct.66	III-214
169/29	Ulster Textile Mill Ltd Warrenpoint Rd Newry, Co. Down	Apr.62	X-412
170/30	Walker (UK) Division Newtownbreda Rd Belfast	Oct.65	VIII-381
171/31	Warner Bros. (NI) Ltd Mount St Dromore, Co. Down	Apr.63	XII-449.1
172/32	Worcester Valve Co. Ltd[1] Loughgall Rd Armagh	Dec.64	VI-339.5

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[1] Closure was announced on 16 Dec 70; 80 jobs were involved. The firm manufactured ball valves. Closure was attributed to the uncertainty surrounding the supply of electric power in NI. See R.W. Shakespeare, "N. Ireland Bitter as Power Returns," The Times, 17 Dec 70, p.23.

Other Foreign Migrants[1]

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
173/1	Arntz Belting Co. Ltd Pennyburn Pass Londonderry	Apr.69	X-421
174/2	Belzer Works (NI) Ltd Rathgael Bangor, Co. Down	Apr.66	IX-391
175/3	British Enkalon Ltd[2] Randalstown Rd Antrim	Mar.63	X-411
176/4	Canadian Technical Tape (UK) Ltd S. Circular Rd Bangor, Co. Down	Jan.66	IV-277.2
177/5	G.E.A. Airexchangers (NI) Ltd Rathgael Bangor, Co. Down	Jun.68	VI-341.2
178/6	Grundig Works (NI) Ltd Dunmurry Industrial Estate Belfast	Jul.60	VI-364.2
179/7	Michelin (Belfast) Ltd[3] Derry Rd., Mallusk Newtownabbey, Co. Antrim	Oct.64	XVI-491.1
180/8	R.W. Rumble (GB) Ltd Coastguard Rd Larne, Co. Antrim	Jun.63	VI-369.5
181/9	Sperrin Textiles Co. Ltd Ballycastle Rd Coleraine, Co. L'derry	Jan.66	X-417

[1] Excluding firms established by W.W.II refugees from Continental Europe (see below).

[2] This nylon-and-polyester-producing subsidiary of the Dutch firm, AKZO, now employs close to 2,000 workers and has been a major stimulus to the growth of Antrim. Dennison(1961) suggested that it might well have located in Scotland except for the superior pulling power of NI's financial and related inducements.

[3] Michelin makes car tyres at Newtownabbey. A truck tyre plant was opened on Broughshane Rd., Ballymena, Co. Antrim during the latter half of 1969. It will employ 1,100 workers.

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
182/10	Stubbe (NI) Ltd Lurgan Rd Portadown, Co. Armagh	Apr.67	VI-339.8
183/11	Thorer (UK) Ltd The Green Mill Muckamore, Co. Antrim	Nov.65	XI-433
184/12	Vita Cor-Tex (NI) Ltd[1] Advance Factory No 2, Derriaghy Dunmurry Industrial Estate Belfast	Nov.68	XVI-496

[1] Listed as Cor-Tex (NI) Ltd by MinCom.

Firms Established by W.W.II Refugees[1]

No.	Name & NI Address	Date Production Began	Order & MLH (1958 SIC)
185/1	Belart Ltd Adelaide Industrial Estate Belfast	Oct.46	XII-445
186/2	Crepe Weavers Ltd Comber Rd Newtownards, Co. Down	Nov.48	X-413
187/3	I.J. Fisher & Co. Ltd Drum Rd Cookstown, Co. Tyrone	Mar.49	XII-446.1
188/4	Irex Ltd Belfast	Oct.46	XI-432
189/5	Jersella Ltd Roughfort, Co. Antrim	Oct.45	X-417
190/6	Leather Productions (NI) Ltd Plantation St Killyleagh, Co. Down	May 45	XI-432
191/7	Jan Pick Ltd Clabby Rd Fivemiletown, Co. Tyrone	Mar.47	X-422.1
192/8	Ulster Pearls Ltd Dunmurry Industrial Estate Belfast	Jan.46	XVI-499.2

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[1] Thirteen such firms exist in NI. All can be viewed as transfers, i.e., genuine migrants, rather than entirely new operations. Five were set up in 1939 however and thus are ineligible for inclusion in our list of migrant companies. Their names and locations are Daintifyt Brassiere Co. Ltd., Cookstown; Anny Dewinter Ltd., Newtownards; Orlo Leather Goods Ltd., Belfast; Ulster Laces Ltd., Portadown; and United Chrometanners Ltd., Killyleagh.

Migrants Since July 1969[1]

1 Essex International Inc., a division of the Essex Wire Corporation, Fort Wayne, Indiana, USA, commenced production of automotive wire assemblies (VI-362) at Bligh's Lane, Londonderry during the latter half of 1969.

2 Exquisite Knitwear Ltd., a Courtaulds subsidiary, has taken possession of 2 government factories at Craigavon, one during the latter part of 1969, the other late in 1970, for the manufacture of jersey knitted fabric (X-417) from Courtelle, Courtaulds's acrylic fibre, and bulked Tricel, an acetate yarn. Employment ultimately should approach 750. See Hugh O'Neill, "Courtaulds to Set Up Another N. Ireland Knitting Plant," Financial Times, 24 Sep 70, p.21.

3 Fermanagh Creameries Ltd., a Unigate subsidiary, is to open a cheese factory (III-215) with an output of 2,000 tons a year, and offering employment to 100 workers, at Lisnaskea, Co. Fermanagh at the beginning of 1972.

4 Furzebrook Knitting Co. Ltd., another Courtaulds subsidiary and reportedly Europe's largest warp knitting company, announced in Jun.70 that it was setting up a fully-integrated plant at Carrickfergus involving warping, knitting, dyeing and finishing (X-417). Operations will be continuous. Output will consist of outerwear fabrics for home and export markets. Furzebrook's other factories are located in England and Wales. See "Courtaulds' N. Ireland Expansion," The Times, 4 Jun 70, p.21.

5 Hoechst Fibre Industries (UK) Ltd., a subsidiary of the W. German firm, Fabwerke Hoechst A.G., opened a polyester fibre plant (X-411) at Limavady, Co. L'derry about the end of 1969. A £2.5m expansion programme involving a 45% increase in capacity was announced on 20 May 70.

6 Wm. Hutchinson (Yarns) Ltd., yet another Courtaulds subsidiary, has recently opened a £3m synthetic yarn finishing plant (X-423) on Coolkeeragh Rd., Maydown IE, Londonderry.

7 International Rectifier Co. (GB) Ltd., a subsidiary of International Rectifier Corp., El Segundo, California, began producing semiconductors (VI-364.1) on Camlough Rd., Newry, Co. Down during the latter half of 1969.

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[1]The ensuing list is not intended to be inclusive.

8 A. Kirkland Ltd., Courtaulds's machine-building subsidiary, is to begin production of circular knitting machine components (VI-335) during 1971 in a government factory at Omagh, Co. Tyrone. Employment ultimately will reach almost 200 bringing total Courtaulds employment in Ulster to over 10,000! The components will be shipped to existing Kirkland plants in Leicestershire for assembly into complete machines. In due course, as skills increase at Omagh, complete machines will be made in NI. See Peter Hill, "New Ulster Plant for Courtaulds," The Times, 17 Feb 70, p.19.

9 Leo Refrigeration Ltd of Bognor Regis, Sussex began production of refrigerators (VI-339.3) about the end of 1970 on the Maydown IE, Londonderry.

10 Metal Spinners (Newcastle) Ltd (est. 1955), in its first manufacturing venture outside Newcastle-upon-Tyne, moved into an 18,000 sq.ft. government factory on the Greenbank Industrial Estate, Newry in 1970. Employing about 100 workers, mostly men, the firm produces spun metal products for use in fans, storage tanks, etc. It appears to be Ireland market-oriented. Cf. "Factory for N. Ireland," The Times, 5 Dec 69, p.22.

11 Olympia Business Machines Manufacturers (GB) Ltd began producing adding and calculating machines (VI-338) in 1970 on Apollo Rd., Adelaide Industrial Estate, Belfast. This operation is Olympia's first manufacturing venture outside W. Germany. Some 600 jobs are involved.

12 Appleby & Ireland Ltd., Strabane, Co. Tyrone (VI-351)

13 English Sewing Ltd., Bligh's Lane, Londonderry (X-421.3)

14 Northern Ireland Carpets Ltd., Comber Rd., Newtownards, Co. Down (X-419)

15 Voltax Ltd., Rathgael Trading Centre, Balloo Ave., Bangor (VI-333)

16 Wright Industries Ltd., Armagh Rd., Newry (X-419)

APPENDIX C

TRANSPORT PAYMENTS AS A PROPORTION OF TOTAL TRANSPORT COSTS, UK MANUFACTURING INDUSTRIES (LARGER* FIRMS ONLY), 1963

1958 SIC Order	MLH	Industry	%
III	211-240	Food, drink & tobacco	41.7
	211	Grain milling	64.1
	212	Bread & flour confectionery	5.7
	213	Biscuits	43.1
	214	Bacon curing, meat & fish products	38.2
	215	Milk products	70.6
	216	Sugar	96.1
	217	Cocoa, chocolate & sugar confectionery	65.1
	218	Fruit & vegetable products	65.2
	219	Animal & poultry foods	64.4
	229.1	Margarine	90.5
	229.2	Starch & miscellaneous foods	63.6
	231	Brewing & malting	20.5
	239.1	Spirit distilling & compounding	82.0
	239.2/3	Soft drinks, British wines, cider & perry	18.4
	240	Tobacco	78.1
IV	261-277	Chemicals & allied industries	70.5
	261	Coke ovens & manufactured fuel	97.5
	262	Mineral oil refining	55.7
	263	Lubricating oils & greases	49.0
	271.1	Dyestuffs	86.9
	271.2	Fertilisers & chemicals for pest control	90.0**
	271.3	General chemicals	68.9
	272.1	Pharmaceutical preparations	58.3
	272.2	Toilet preparations	72.0
	273	Explosives & fireworks	50.1
	274	Paint & printing ink	48.9
	275.1	Vegetable & animal oils & fats	61.8
	275.2	Soap, detergents, candles & glycerine	63.1
	276	Synthetic resins & plastics materials	82.3
	277.1	Polishes	62.6
	277.2	Gelatine, adhesives, etc.	66.5

* Firms employing $\geq$ 25 persons.
** 89.98% for tabular purposes in main text.

1958 SIC Order	MLH	Industry	%
V	311-322	Metal manufacture	84.5
	311	Iron & steel (general)	91.8
	312	Steel tubes	85.1
	313	Iron castings, etc.	78.3
	321, 322	Non-ferrous metals	63.7
VI	331-369	Engineering & electrical goods	52.4
	331	Agricultural machinery (exc. tractors)	62.5
	332	Metal-working machine tools	56.4
	333	Engineers' small tools & gauges	39.8
	334	Industrial engines	70.3
	335	Textile machinery & accessories	45.7
	336	Contractors' plant & quarrying machinery	63.8
	337	Mechanical handling equipment	55.1
	338	Office machinery	44.3
	339	Misc. non-electrical machinery	54.0
	341	Industrial plant & steelwork	56.1
	342	Ordnance & small arms	27.2
	349	General mechanical engineering	46.0
	351	Scientific, surgical & photographic instruments, etc.	35.2
	352	Watches & clocks	62.0
	361	Electrical machinery	57.6
	362	Insulated wires & cables	65.6
	363	Telegraph & telephone apparatus	28.7
	364	Radio & other electronic apparatus	43.7
	365	Domestic electrical appliances	52.1
	369	Misc. electrical goods	47.2
VII	370	Shipbuilding & marine engineering	43.3
VIII	381-389	Vehicles	48.6
	381	Motor vehicle manufacturing	52.0
	382	Motor cycle, 3-wheel vehicle & pedal cycle mfg.	58.5
	383	Aircraft manufacturing & repairing	23.7
	384	Locomotives & railway track equipment	59.1
	385	Railway carriages, wagons & trams	62.5
	389	Perambulators, hand-trucks, etc.	48.8
IX	391-399	Metal goods n.e.s.	51.8
	391	Tools & implements	69.6
	392	Cutlery	36.5
	393	Bolts, nuts, screws, rivets, etc.	56.6
	394	Wire & wire manufactures	72.9
	395	Cans & metal boxes	76.4
	396	Jewellery, plate & precious metal refining	36.9
	399	Misc. metal manufactures	51.8

1958 SIC Order	MLH	Industry	%
X	411-429	Textiles	59.1
	411	Production of man-made fibres	73.4
	412	Spinning & doubling of cotton, flax & man-made fibres	59.7
	413	Weaving of cotton, linen & man-made fibres	63.9
	414	Woollen & worsted	50.2
	415	Jute	70.1
	416	Rope, twine & net	84.4
	417	Hosiery & other knitted goods	66.7
	418	Lace	63.4
	419	Carpets	73.2*
	421	Narrow fabrics	58.3
	422.1	Household textiles & handkerchiefs	68.8
	422.2	Canvas goods & sacks	57.7
	423	Textile finishing	39.9
	429.1	Asbestos	51.0
	429.2	Misc. textile industries	50.3
XI	431-433	Leather, leather goods & fur	53.7
	431	Leather tanning & dressing & fellmongery	52.9
	432	Leather goods	64.0
	433	Fur	31.9
XII	441-450	Clothing & footwear	55.0
	441	Weatherproof outerwear	48.2
	442	Men's & boys' tailored outerwear	46.1
	443	Women's & girls' tailored outerwear	49.8
	444	Overalls, men's shirts, underwear, etc.	74.8
	445	Dresses, lingerie, infants' wear, etc.	48.0
	446	Hats, caps & millinery	57.2
	449.1/3/4	Corsets, umbrellas & misc. dress industries	60.5
	449.2	Gloves	45.9
	450	Footwear	60.2

*Census of Production Report 83, Carpets, contains conflicting figures on payments to other organisations for transport. The entry in Table 2(£1,561,000) is obviously different from the purportedly identical entry in Table 11(£1,631,000). Report 131, a summary volume, repeats the latter figure but ignores the discrepancy in Report 83. Yet the former figure struck us as being the more accurate of the two. This impression was confirmed during a visit to the BOT's Business Statistics Office in Ruislip, Middx. on 23 April 1970. Accordingly, we used £1,561,000 as the numerator in computing the percentage shown above for MLH 419.

1958 SIC Order	MLH	Industry	%
XIII	461-469	Bricks, pottery, glass, cement, etc.	71.4
	461	Bricks, fireclay & refractory goods	75.3
	462	Pottery	81.6
	463	Glass	71.9
	464	Cement	87.0
	469.1	Abrasives	68.9
	469.2	Misc. building materials, etc.	64.6
XIV	471-479	Timber, furniture, etc.	37.4
	471	Timber	40.2
	472	Furniture & upholstery	35.6
	473	Bedding & soft furnishings	29.3
	474	Shop & office fittings	25.7
	475	Wooden containers & baskets	39.4
	479	Misc. wood & cork manufactures	49.1
XV	481-489	Paper, printing & publishing	68.8
	481	Paper & board	80.8
	482	Cardboard boxes, cartons & fibreboard packing cases	63.2
	483	Misc. paper & board manufactures	72.0
	486	Printing & publishing of newspapers & periodicals	70.0
	489	General printing, publishing, bookbinding, engraving, etc.	46.9
XVI	491-499	Other Manufacturing Industries	64.5
	491	Rubber	66.6
	492	Linoleum, leatheroloth, etc.	80.5
	493	Brushes & brooms	50.6
	494	Toys, games & sports equipment	64.1
	495	Pens, pencils & misc. stationers' goods	54.9
	496	Plastics moulding & fabricating	57.3
	499	Musical instruments & misc. manufacturing industries	53.4
III-XVI	211-499	All Manufacturing Industries	57.9

Source: Derived from 1963 Census of Production.

APPENDIX D

TRANSPORT PAYMENTS AS A PROPORTION OF TOTAL TRANSPORT EXPENDITURES BY INDUSTRY,[a] LARGER MANUFACTURERS, NI AND THE UK, 1963.

			(1)	(2)	(3)
				Northern Ireland	
Order	1958 SIC MLH	Industry	UK %	%	NI as a proportion of UK
III	211,219	Grain milling & animal feed mixing	64.2	23.8	37
	214	Bacon curing, meat & fish products	38.2	73.3	192
	215	Milk products	70.6	37.0	52
	216	Fruit & vegetable products	65.2	19.6	30
	239.2/3	Soft drinks, wine & cidor	18.4	8.1	44
X	412	Spinning & doubling of non-wool materials	59.7	71.4	120
	413	Weaving of non-wool materials	63.9	52.9	83
	414	Woollen & worsted	50.2	69.9	139
	417	Hosiery & other knitted goods	66.7	47.2	71
	419	Carpets	73.2	76.5	105
	422.1	Household textiles & handkerchiefs	68.8	82.3[a]	120
	422.2	Canvas goods & sacks	57.7	44.6	77
	423	Textile finishing	39.9	52.7	132
XII	445	Dresses, lingerie, infants' wear	48.0	81.0	169
XIII	469.2	Misc. bldg. materials	64.6	15.8	24
XIV	471,475,479	Sawmilling, doors, crates	40.8	28.4	70
	472-474	Furniture, mattresses, office fittings	33.1	15.1	46
XV	486	Printing & publishing newspapers & periodicals	70.0	25.6	37
	489	General printing, bookbinding	46.9	32.1	68

[a]All industries in NI for which separate figures are available plus three MLH groupings based on: a) similarity of product, b) relative lack of dispersion in UK percentages.

[a]Includes part of MLH 610.4.

Sources: Derived from NI and UK censuses of production, 1963.

APPENDIX E

PAYMENTS FOR TRANSPORT OUTWARDS AS A PERCENTAGE OF TOTAL PAYMENTS FOR TRANSPORT BY 1948 SIC GROUP AND SELECTED INDUSTRY, MANUFACTURING, NI, 1951-57.

Industry Group		1951	1952	1953	1954	1955	1956	1957
Order	Name	%	%	%	%	%	%	%
XIV	Timber & furniture	54.5	42.2	48.6	63.6	14.2	20.3	17.6
V-VIII	Engineering & metal	58.1	54.9	54.6	51.3	50.1	44.5	42.8
X	Textiles	66.2	71.7	68.3	64.5	68.7	69.9	70.8
XIII	Food, drink & tobacco	71.5	68.6	69.5	73.7	74.5	76.2	74.9
IV,IX, XI,XVI	Leather, chemical, misc.	73.4	42.0	42.0	46.6	53.6	44.8	63.9
III	Mineral products	75.2	72.3	74.6	81.2	72.9	77.6	81.4
XV	Paper, printing, etc.	82.5	80.2	85.0	83.8	87.5	88.8	85.5
XII	Clothing	83.9	84.6	89.9	91.4	94.1	93.7	93.8
Total Manufacturing		69.3	67.4	67.7	66.9	68.4	69.4	69.4
	Selected Industries							
III	Bricks & fireclay	81.7	75.3	73.2	82.4	61.6	67.4	54.5
IV,IX XI,XVI	Leather	50.0	54.9	53.3	63.2	80.0	81.0	86.7
	Chemical & allied trades	71.2	26.7	28.2	29.4	33.0	27.5	51.8
V-VIII	Mechanical engineering	76.8	76.5	80.6	83.7	75.9	71.7	73.7
	Electrical engineering	60.9	55.2	40.0	31.6	56.8	35.6	22.3
X	Spinning	24.5	41.5	23.1	22.2	31.5	30.1	35.2
	Weaving	40.3	45.6	44.3	46.5	44.6	60.2	62.5
	Woollen & worsted	77.3	76.5	60.7	64.9	71.4	77.8	75.6
	Hosiery	81.3	78.6	73.7	86.7	82.6	85.2	80.6
	Carpets	81.8	72.7	78.6	85.7	78.6	80.0	85.7
	Canvas goods & sacks	61.5	66.7	62.5	66.7	66.7	68.0	69.2
XII	Boots & shoes	71.4	70.0	68.8	75.0	66.7	53.8	52.9
XIII	Bacon curing & sausages	84.3	90.1	89.4	91.8	93.1	94.3	96.0
	Milk products	32.3	12.7	23.2	58.7	70.5	66.0	61.8
	Sugar confectionery	90.0	67.7	65.2	44.4	57.1	64.7	62.7
XIV	Timber	45.8	30.6	28.6	46.4	6.7	9.1	8.2
	Furniture & upholstery	76.9	81.8	72.7	83.0	70.0	72.7	75.0
	Soft furnishings	100.0	75.0	80.0	71.4	100.0	100.0	100.0

Sources: NI, MinCom, 1951-57 censuses of production (Belfast: HMSO, 1954-59).

APPENDIX F

THE TECHNICAL QUALITY OF TELEPHONE CALLS TO POINTS WITHIN THE GLASGOW CONURBATION FROM AN OFFICE AT THE UNIVERSITY OF GLASGOW, 21 Oct 70 - 12 Nov 70 (14 days)[a]

Call Quality			No. of Calls		%
OK			118		67.8
Dead line[b]			23		13.2
Line deficiency[c]					
Severe	12			6.9	
Mild	8		20	4.6	11.5
Interrupted dialling[d]			12		6.9
Other[e]			1		0.6
			174		100.0

Call Quality	No. & (%) Distribution of Calls by Weekday				
	Monday (2 days)	Tuesday (2 days)	Wednesday (3 days)	Thursday (4 days)	Friday (3 days)
OK	17(70.8)	18(72.0)	28(63.6)	31(67.4)	24(68.6)
Dead line	5(20.8)	2(8.0)	3(6.8)	6(13.0)	7(20.0)
Line deficiency	1(4.2)	3(12.0)	9(20.5)	5(10.9)	2(5.7)
Severe	1	2	4	4	1
Mild	0	1	5	1	1
Interrupted dialling	1(4.2)	2(8.0)	4(9.1)	4(8.7)	1(2.9)
Other	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(2.9)
	24(100.0)	25(100.0)	44(100.0)	46(100.0)	35(100.1)

a Most of the calls were made in connection with an intra-urban industrial mobility research project.

b Silence after completion of dialling.

c Faintness, noise, other voices, etc.

d Unable to complete dialling due to some form of interference other than standard engaged or number unobtainable tones.

e Connected with PO Speaking Clock service (tel. 123) by dialling '9' to obtain outside line at the university.

APPENDIX G

INTERREGIONAL INDUSTRIAL MIGRANTS TO SCOTLAND, 1945-JANUARY 1970, BY MINIMUM LIST HEADING (1968 SIC)

Order	MLH	Industry	No.	%
III	211-240	Food, drink and tobacco	17	4.5
	211	Grain milling	-	-
	212	Bread and flour confectionery	-	-
	213	Biscuits	1	0.3
	214	Bacon curing, meat & fish products	5	1.3
	215	Milk & milk products	-	-
	216	Sugar	-	-
	217	Cocoa, chocolate & sugar confectionery	-	-
	218	Fruit & vegetable products	2	0.5
	219	Animal & poultry foods	2	0.5
	221	Vegetable & animal oils & fats	-	-
	229	Food industries n.e.s.	1	0.3
	231	Brewing & malting	-	-
	232	Soft drinks	-	-
	239	Other drink industries	4	1.1
	240	Tobacco	2	0.5
IV	261-263	Coal & petroleum products	1	0.3
	261	Coke ovens & manufactured fuel	1	0.3
	262	Mineral oil refining	-	-
	263	Lubricating oils & greases	-	-
V	271-279	Chemicals & allied industries	26	6.9
	271	General chemicals	4	1.1
	272	Pharmaceutical chemicals	8	2.1
	273	Toilet preparations	2	0.5
	274	Paint	2	0.5
	275	Soap & detergents	1	0.3
	276	Synthetic resins & plastic materials	5	1.3
	277	Dyestuffs & pigments	-	-
	278	Fertilizers	-	-
	279	Other chemical industries	4	1.1

Order	MLH	Industry	No.	%
VI	311-323	Metal manufacture	14	3.7
	311	Iron & steel (general)	6	1.6
	312	Steel tubes	1	0.3
	313	Iron castings, etc.	1	0.3
	321	Aluminium & aluminium alloys	1	0.3
	322	Copper, brass & other copper alloys	3	0.8
	323	Other base metals	2	0.5
VII	331-349	Mechanical engineering	53	14.1
	331	Agricultural machinery	2	0.5
	332	Metal-working machine tools	5	1.3
	333	Pumps, valves & compressors	6	1.6
	334	Industrial engines	1	0.3
	335	Textile machinery & accessories	3	0.8
	336	Construction earth-moving equipment	2	0.5
	337	Mechanical handling equipment	7	1.9
	338	Office machinery	3	0.8
	339	Other machinery	12	3.2
	341	Industrial plant & steelwork	7	1.9
	342	Ordnance & small arms	1	0.3
	349	Other mechanical engineering	4	1.1
VIII	351-354	Instrument engineering	22	5.9
	351	Photographic & related equipment	-	-
	352	Watches & clocks	3	0.8
	353	Surgical instruments & appliances	4	1.1
	354	Scientific & industrial instruments, etc.	15	4.0
IX	361-369	Electrical engineering	50	13.3
	361	Electrical machinery	6	1.6
	362	Insulated wires & cables	2	0.5
	363	Telegraph & telephone apparatus	2	0.5
	364	Radio & electronic components	18	4.8
	365	Broadcast receiving equipment, etc.	3	0.8
	366	Electronic computers	4	1.1
	367	Radio, radar & electronic goods	4	1.1
	368	Domestic electric appliances	2	0.5
	369	Other electrical goods	9	2.4
X	370	Shipbuilding & marine engineering	-	-
XI	380-385	Vehicles	14	3.7
	380	Wheeled tractor manufacturing	-	-
	381	Motor vehicle manufacturing	13	3.5

Order	MLH	Industry	No.	%
	382	Motor cycle & tricycle manufacturing	-	-
	383	Aerospace equipment manufacturing	1	0.3
	384	Locomotives & track equipment	-	-
	385	Railway carriages, wagons trams	-	-
XII	390-399	Metal goods not elsewhere specified	25	6.6
	390	Engineers' small tools & gauges	5	1.3
	391	Hand tools & implements	-	-
	392	Cutlery, plated tableware, etc.	1	0.3
	393	Bolts, nuts, screws, rivets, etc.	4	1.1
	394	Wire & wire manufactures	1	0.3
	395	Cans & metal boxes	1	0.3
	396	Jewellery & precious metals	2	0.5
	399	Metal industries n.e.s.	11	2.9
XIII	411-429	Textiles	17	4.5
	411	Production of man-made fibres	3	0.8
	412	Spinning & doubling of cotton, etc.	-	-
	413	Weaving of cotton & man-made fibres	1	0.3
	414	Woollen & worsted	5	1.3
	415	Jute	-	-
	416	Rope, twine & net	-	-
	417	Hosiery & other knitted goods	7	1.9
	418	Lace	-	-
	419	Carpets	-	-
	421	Narrow fabrics	-	-
	422	Made-up textiles	-	-
	423	Textile finishing	1	0.3
	429	Other textile industries	-	-
XIV	431-433	Leather, leather goods, fur	2	0.5
	431	Leather & fellmongery	1	0.3
	432	Leather goods	1	0.3
	433	Fur	-	-
XV	441-450	Clothing & footwear	59	15.7
	441	Weatherproof outerwear	3	0.8
	442	Men's & boys' tailored outerwear	10	2.7
	443	Women's & girls' tailored outerwear	3	0.8
	444	Overalls, men's shirts, etc.	17	4.5
	445	Dresses, lingerie, infants' wear	14	3.7
	446	Hats, caps & millinery	-	-
	449	Dress industries n.e.s.	8	2.1
	450	Footwear	4	1.1

Order	MLH	Industries	No.	%
XVI	461-469	Bricks, pottery, glass, cement	25	6.1
	461	Bricks, fireclay, etc.	2	0.5
	462	Pottery	-	-
	463	Glass	3	0.8
	464	Cement	1	0.3
	469	Abrasives & misc. bldg. materials	17	4.5
XVII	471-479	Timber, furniture, etc.	11	2.9
	471	Timber	3	0.8
	472	Furniture & upholstery	2	0.5
	473	Bedding, etc.	2	0.5
	474	Shop & office fittings	-	-
	475	Wooden containers & baskets	3	0.8
	479	Miscellaneous wood manufactures	1	0.3
XVIII	481-489	Paper, printing, publishing	13	3.5
	481	Paper & board	2	0.5
	482	Packaging products of paper, etc.	4	1.1
	483	Manufactured stationery	-	-
	484	Manufactures of paper & board n.e.s.	1	0.3
	485	Printing, publishing newspapers	-	-
	486	Printing, publishing serials	1	0.3
	489	Other printing, publishing, etc.	5	1.3
XIX	491-499	Other manufacturing industries	29	7.7
	491	Rubber	7	1.9
	492	Linoleum, plastics floor-coverings	-	-
	493	Brushes & brooms	-	-
	494	Toys, games, prams, sports equipment	6	1.6
	495	Miscellaneous stationers' goods	2	0.5
	496	Plastics products n.e.s.	11	2.9
	499	Misc. manufacturing industries	3	0.8
Totals			376	100.0

Source: Appendix A.

APPENDIX H

WILLIAM COLLINS, SONS & CO. LTD. - A PILOT STUDY

Summary

Location: 144 Cathedral Street, Glasgow C.4.

Order & MLH: XV-489 (1958 SIC).

Established: 1819.

Capital employed, 1969: £8,490,925.

Profit after tax, 1969: £962,327.

Return on investment, 1969: 11.3%.

Turnover, 1969: £9,569,000.

Employment, 1969: 3,500.

Products: all sorts of books, commercial stationery, diaries.

Type of production: batch.

Main markets: UK, 'old' Commonwealth, Caribbean, U.S.

Ownership and organisational status: a wholly-owned subsidiary of William Collins & Sons (Holding) Ltd., Glasgow.

Assessment of transport factor: outbound transport costs/turnover ratio = 1.3% in 1969. Inbound transport cost records are not maintained by the company. The distribution function is entirely subcontracted. Collins is at a transport cost disadvantage relative to most British publishers but feels that cost savings elsewhere offset it. Net disadvantage = nil. In general, the firm is not particularly concerned about transport costs. Transport arrangements, on the other hand, are kept under periodic review.

Assessment of communications factor: communication costs (postage + telecommunications)/turnover ratio = 0.8% in 1969. Outlays on intra-UK business travel/home sales ratio = 0.6%. Outlays on extra-UK business travel/export sales ratio = 0.7%. Post Office services, while they vary in quality and reliability, and while there have been problems in the past, are now considered to be generally satisfactory. Business travel presents no problems peculiar to Glasgow/Scotland. Collins is communications cost-conscious.

Organisational Structure

Collins in 1969 had eight Directors (including a Chairman, a Vice-Chairman and three Managing Directors) and 16 Executive Directors.

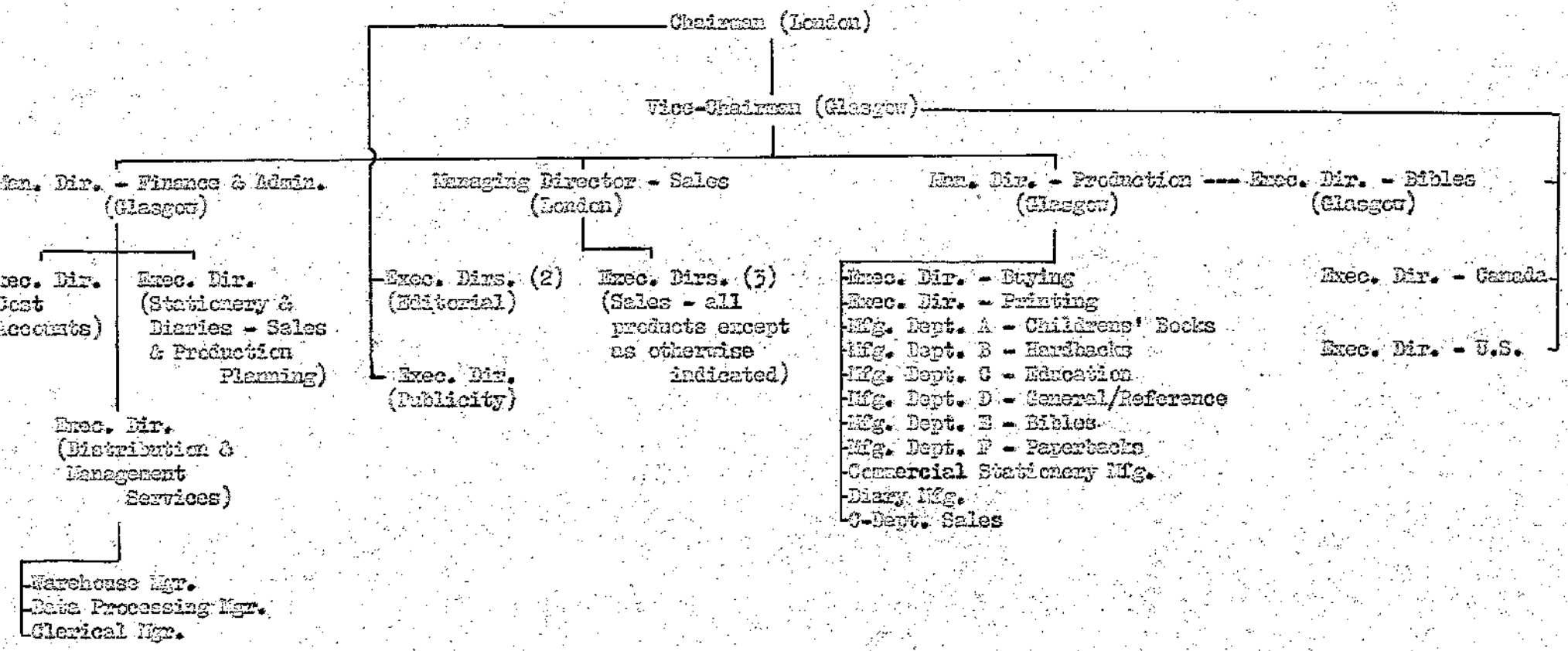
As indicated by the organisation chart below, the Chairman, the Managing Director (Sales) and the editorial function were based in London. The Vice-Chairman and the other two Managing Directors worked out of Glasgow, the financial and main production centre. Decisions on what was to be published and royalty levels were generally made in London since that was where most authors' agents resided. The firm had 14 direct subsidiaries, a number of them overseas. In addition, it had a branch in New York comprising a sales office and a depot. The only manufacturing done overseas was in New Zealand where 150 employees were engaged in the production of commercial stationery. Transport costs on stationery exports to NZ from Glasgow were simply too onerous for exporting to be worthwhile, mainly because of the low-value products involved. In contrast, higher priced items such as books, could stand the transport charges. Thus, there was no pressing economic reason for manufacturing them abroad.

With the exception of its printing function which was based three miles away in Bishopbriggs, Collins Glasgow at the end of the 1960s was housed on Cathedral Street, near the heart of the city. This situation will shortly be changed however. Plans have been announced for the transfer of bookbinding to the Bishopbriggs plant. About 1,000 Cathedral Street employees will be affected. The purpose of the move is to eliminate the delays and expense involved in running the current shuttle service between the printing and binding departments.

Markets and Marketing

Roughly 60% (£5,694,000) of total sales in 1969 (£9,569,000) were accounted for by the home market. The major export markets were Canada, Australia, NZ, South Africa, the U.S. and the Caribbean. UK orders were generally delivered carriage paid, an exception being made in the case of those under £2 in value which were subjected to a 20% service charge or a levy of 20p, whichever was greater. Surprisingly, such minuscule orders were not uncommon. Transport charges on export orders were usually absorbed only up to the UK point of export. Beyond that point, transport costs were billed separately unless competitive conditions dictated otherwise.

Collins Organisation Chart, June 1970 (approximate & partial)



Distribution

Home Market. Collins owns no vehicles, preferring instead to contract out the transport function, in part probably because its business is subject to pronounced seasonal influences making it difficult to run an own-account vehicle fleet economically. From a huge warehouse on Cathedral Street, goods are despatched by the rail-oriented Tartan Arrow and Freightliner services, by road haulier and by parcel post. Day-to-day transport arrangements are decided on the basis of general guidelines laid down by the responsible Executive Director (see organisation chart). The guidelines reflect the corporate experience and currently proscribe, for example, the use of British Rail and BRS due to excessive delays in the past. These interdictions have been imposed even though the transport alternatives involve higher direct charges. This finding, of course, corroborates other evidence to the effect that transport costs, narrowly defined, are not always a good index of transport sensitivity.

Exports. Collins despatches 600 shipments abroad per month. Most are containerised and go by sea. Air freight is used only infrequently, i.e., in emergencies and "special customer situations". Overseas depots are maintained in New York, Toronto, the Caribbean, Australia, NZ and South Africa. Extensive use is made of London-based forwarding agents. Thus, the firm loses direct control over export shipments once they have been despatched. To counteract the defects inherent in this arrangement, a special customer relations department has been formed within the company to respond to all complaints allegedly within 24 hours of their being received, regardless of the costs of doing so.

Outbound transport costs in aggregate are really very low relative to turnover despite the transport and pricing policies being pursued in the home market. The firm's estimated TCGO ratio (outbound transport costs only since inbound costs are not recorded - see below) in 1969 was 1.3%. More or less comparable 1963 Census of Production data (MLH 489) for the UK and Scotland were 1.9% and 1.8% respectively.

Purchases and Inbound Transport Costs

Paper is the main item purchased. Most of it is imported and Collins pays the freight charges. UK paper mills, in contrast, deliver carriage paid. Other inputs of note include leather, cloth and binding materials; all originate in the UK and are priced on a delivered basis. Suppliers handle the transport arrangements. Collins does not record inbound transport costs presumably because only the charges associated with paper imports are identifiable and they are largely outwith the firm's control. Also, the Census of Production requires respondents specifically to exclude from their returns sea transport charges on imports. Thus there would be no external reason for Collins to keep track of the transport costs involved in importing paper.

Communications

No attempt was made to obtain a complete communications profile of Collins's Glasgow operations but some more selective findings are of interest. For example, our questions pertaining to intra- and extra-company communications were tested on the executive director in charge of distribution and management services. While some of his answers were based largely on his own personal experience, others related to the company as a whole. With regard to long-distance intra-firm communications, he used the post more than any other communications method followed by the telephone, telex and cables in that order. Datel was not used at all, either by himself or anyone else in Collins. Face-to-face contacts were important only when non-routine problems had to be solved. Both he and Collins generally were communications cost-conscious; normally, he utilized the least-cost communications method for the purpose at hand. There was a tendency to restrict the use of the telephone and cables to urgent matters. At one time, STD calls to London were often delayed due to traffic congestion but this problem had been largely overcome by the installation of additional trunk facilities. The postal service was uneven. But overall he had no serious complaints to make about the communications facilities extant in the Glasgow area. With regard to extra-firm communications, most of his contacts were local in nature. The face-to-face type probably predominated with hauliers, etc. coming to see him rather than the other way round. He was aware of new communications techniques such as Confraphone (conference calls) and

Confravision but was rather sceptical as to their value. Conference calls, he felt, were often wasteful with too many people spending too much time trying to impress one another rather than getting on with the task before them. Confravision might curtail his need for travel somewhat but most of his trips (see below) involved essential face-to-face contacts for which there was no substitute, i.e., the issues inducing travel were typically emotive and demanded "eyeball-to-eyeball handling".

At the direct instigation of the managing director responsible for finance and administration, Collins Glasgow about the beginning of 1969 installed meters on its new 3-operator switchboard (the previous switchboard had required only 2 operators) and started recording all STD and operator-connected long-distance telephone calls. For each, the switchboard girls noted the name of the caller, his/her department, the number called, its geographic location, and the quantity of time units used (under the prevailing Post Office tariff structure, one unit cost 2d.). This information was periodically analysed by (or for) the managing director (finance & administration). It led inter alia to a decision to install a second telex machine in the Glasgow offices with a view to reducing the number of telephone calls to London.

About the mid-1960s, a special count had determined that Collins Glasgow was generating about 800 external telephone calls per working day but this total was not broken down into local and long-distance. When metering began in 1969, every long-distance call was recorded initially but the volume of work implicit in this routine (Collins has 20 telephone lines) proved excessive; the switchboard girls could not handle it all. Thus a decision was made by the managing director concerned, after studying the call time distributions recorded up to that point, to leave unrecorded all calls totalling less than 30 units, i.e., costing less than 60d. (5s). But, in the opinion of the switchboard girls, the new ruling had no significant effect on the call patterns being uncovered.

As it turned out, most of the calls recorded were either STD or ISD rather than operator-connected reflecting the relative ubiquity of the STD system in Britain by 1969 and ISD access to seven European countries. Table H-1 illustrates some of the analytical possibilities

inherent in call metering. Unfortunately, the assembly of the underlying data, which relate only to a single month, was very time-consuming, taking almost a week. We had to do the job manually because of the temporary nature of the ad hoc record-keeping system used by the company. Out of the 682 calls indicated in the table, 38.1% were intra-firm and 61.9% were to non-Collins destinations. These aggregate proportions applied to only a minority of the specified functions/departments however. The main reason for the dominance of the departments manufacturing commercial stationery and diaries was the month (December) selected for study. These departments are particularly active in the latter part of the year, especially diaries, for obvious reasons.

One way of evaluating the traffic volumes shown in Table H-1 is to express them in terms of calls per employee as has been done below on an exemplary basis:

Table H-1: STD and ISD Traffic Exceeding 29 Time Units Emanating from Collins Glasgow During December 1969 by Originating Function/Department and Type (Intra-Firm/Extra-Firm)

Function/Department	Volume of Traffic					
	Intra-Firm		Extra-Firm		Total	
	no.	%	no.	%	no.	%
Commercial Stationery & Diary Mfg.	68	26.2	144	34.1	212	31.1
Mfg. Dept. D	14	5.4	41	9.7	55	8.1
Home Order	23	8.8	26	6.2	49	7.2
Counting House	10	3.8	36	8.5	46	6.7
Directors	22	8.5	23	5.5	45	6.6
Mfg. Dept. B	40	15.4	3	0.7	43	6.3
Mfg. Dept. F	25	9.6	5	1.2	30	4.4
Export	10	3.8	16	3.8	26	3.8
Despatch	15	5.8	9	2.1	24	3.5
Litho	-	-	21	5.0	21	3.1
Paper-Buying	-	-	21	5.0	21	3.1
Accounting	4	1.5	13	3.1	17	2.5
Mfg. Dept. A	8	3.1	9	2.1	17	2.5
Mfg. Dept. C	1	0.4	16	3.8	17	2.5
Central Design	1	0.4	11	2.6	12	1.8
Publicity	9	3.5	1	0.2	10	1.5
Leather-Buying	1	0.4	7	1.7	8	1.2
Personnel	3	1.2	5	1.2	8	1.2
Printing Office	-	-	5	1.2	5	0.7
Mfg. Dept. E	-	-	4	0.9	4	0.6
Master of Works	-	-	3	0.7	3	0.4
Progress	3	1.2	-	-	3	0.4
General Office Mgr.	2	0.8	-	-	2	0.3
Secretary	-	-	2	0.5	2	0.3
Data Processing	-	-	1	0.2	1	0.1
Totals	260	100.0	422	100.0	682	100.0

Function/Department	Calls per Employee
Directors (based in Glasgow)	7.50
Leather-Buying	4.00
Manufacturing Dept. B	2.87
" " F	1.88
" " D	1.77
Paper-Buying	1.75
Central Design	1.33
Manufacturing Dept. A	0.85
" " E	0.80
" " C	0.77
Publicity	0.77
Printing Office	0.29
Despatch	0.20
Data Processing	0.07

In addition, one can compare and contrast the destinations of the long-distance calls originating in each function/department. Consider, for instance, the December 1969 experiences of the Paper-Buying and Central Design Departments:

Call Destinations	Number and Percentage Distribution of Calls Originating in			
	Paper Buying Dept.		Central Design Dept.	
	No.	%	No.	%
London	7	33.3	2	16.7
Leuchars	3	14.3		
Uxbridge	2	9.5		
Denny	1	4.8		
Liverpool	1	4.8		
Culter	1	4.8		
Hull	1	4.8		
Glenrothes	1	4.8		
Edinburgh	1	4.8	1	8.3
Bourne End	1	4.8		
Inverkeithing	1	4.8		
Aberdeen	1	4.8		
Prescot (Lancs)			3	25.0
Harlow			3	25.0
Netherlands			2	16.7
Scarborough			1	8.3
Totals	21	100.0	12	100.0

Finally, one can relate various call characteristics to the occupations (i.e., the levels of responsibility) of the call originators. For example, all 10 calls generated by the 13-employee Publicity Department during December 1969 as depicted above originated with the departmental manager. In contrast, the managers of the Counting House and the Litho Department generated very few calls relative to the numbers

generated by their respective staffs.

UK trunk call tariffs increase with distance in three stages: 1) under 35 miles, 2) 35-50 miles, 3) over 50 miles. The vast majority of the long-distance calls emanating from Collins incur the maximum charges.

In view of the great interest taken by Collins in communication costs, it is somewhat surprising to find that the firm's estimated CCGO ratio in 1969 was only 0.8%. The 1963 UK CCGO ratio for MLH 489 was 0.9% according to the Census of Production; the Scottish ratio was 1.2%. And both Census figures exclude telex charges, an item included in the Collins ratio.

Travel

Collins spent less on business travel in 1969 than it did on postage and telecommunications. Whereas the latter absorbed 0.8% of turnover as noted above, the former absorbed only 0.6% (home travel/home sales ratio = 0.6%; export travel/export sales ratio = 0.7%).

Testing our questions pertaining to travel on the executive director in charge of distribution and management services, we discovered that he goes to London approximately once a month, but not on a routine basis, for face-to-face contacts with Collins personnel concerning the sorts of difficulty that cannot be resolved satisfactorily by post or over the telephone. Once a year, usually during the spring, Collins's 'slack' season, his warehouse manager visits many of the firm's customers on a goodwill basis. The executive director usually travels by air unless early-morning meetings in London are involved; he then uses the Glasgow-London overnight rail sleeper service. In general, he had no complaints concerning the travel facilities available to Scottish businessmen.

Collins's managing directors travel back and forth between Glasgow and London a great deal, i.e., at least monthly.

Conclusions

Collins, while it is a public company, has retained its independence through being controlled by the Collins family, despite the growing number of mergers and take-overs in the publishing world. Its Glasgow location has not noticeably impaired its profitability although the bulk of the UK market for its products (together with most of its competitors) is concentrated considerably further south. It claims to be at a transport cost disadvantage in Scotland but this allegation is not supported by data available from the Census of Production. Furthermore, the alleged disadvantage is surely mitigated by the complete absence of any transport cost penalty on the input side of its business and by its sizable export sales. Indeed, exports represent book publishing's leading edge at the moment, i.e., Collins is well-ensconced in the growth end of the market. In addition, the firm itself minimizes the significance of its transport cost claim saying that its higher transport bill is offset by the lower wages, rates, etc. prevailing in Glasgow relative to London. Good communications are vitally important to Collins but as of mid-1970 it had no serious complaints. The congestion which used to delay telephone calls from Cathedral Street to London during the late 1960s has now largely disappeared due to the installation of additional STD facilities between Scotland and the South. In short, Collins is an excellent example of a successful Scottish manufacturing company geared to non-Scottish markets. Its longevity reflects its ability to adapt not only to changing conditions but to one key constant - the geographic facts of life. Its example should offer renewed hope to regional policymakers, many of whom have been forced onto the defensive recently by the juxtaposition of Britain's chronically poor economic performance and a cyclical recession.

APPENDIX I

GENERAL CASE STUDY QUESTIONNAIRE

Part I Corporate Characteristics and Cost Information

1. Name and address
2. Size
3. Ownership
4. Organisational structure
5. Products
6. Markets
7. Reasons for location in Scotland
8. Distribution methods and costs
9. Purchasing: i) items; ii) sources; iii) transport costs
10. Communication costs

Part II Decision Centres

11. Number, names and location(s) of centres
12. Each centre's function (where name is not self-explanatory)
13. Each centre: operating or administrative?
14. Degree of autonomy allowed each centre, e.g., is there a spending maximum?
15. Lines of authority in each case
16. Location of chief executive in the company (chief executive is responsible for profitability targets, product-mix, market-mix, financing strategy, etc.)
17. Communication linkages: does a given centre communicate with - a) other parts of the company; b) customers; c) suppliers?

Part III Extra-Company Communications (each decision centre)

A. Customers (assuming the centre is in contact with customers)

Communications

18. Rank/weight the main communication methods used:

    i) telephone
    ii) post
    iii) telegram
    iv) face-to-face contact
    v) other (specify)

19. To what extent are these methods interchangeable, i.e., to what extent are they used for different purposes?
20. Are the main methods used less than completely satisfactory in any way?
21. Are records kept of the frequency with which each method is used?
22. Who in the decision centre/company decides on communication matters?
23. Have face-to-face contacts increased in importance over time?
24. If yes, for what reasons?
25. If no, has the purpose of your face-to-face contacts altered over time?

Travel

26. How often do decision centre/company personnel travel to visit customers?
27. What are the positions of the personnel involved?
28. What are the predominant travel patterns/main places visited?
29. Which modes of transport are used?
30. Which is the preferred mode? Why?
31. Why do the personnel mentioned travel?
32. Are these essential reasons or could other forms of communication be substituted?
33. Who initiates the travel decisions? Approves them? Coordinates them?
34. Are the travel facilities/services used in any way unsatisfactory?
35. Are records kept on the time and cost of travel?
36. Has travel become more or less necessary over time?
37. If yes, for what reasons?
38. If no, have the reasons for travel altered over time?

B. Suppliers of Goods/Materials (to each decision centre)

39-59.

C. Suppliers of Services (financial, etc.) (to each decision centre)

60-80

Part IV Intra-Company Communications (each decision centre)

Communications

81. Rank/weight the main communication methods used:

i) telephone
ii) post
iii) telegram
iv) telex
v) face-to-face contact
vi) Datel or other data transmission
vii) other (specify)

82. For long-distance telephone calls, do you rent a private line?
83. To what extent are the various communication methods used interchangeable, i.e., to what extent are they used for different purposes?
84. Are the main methods used less than completely satisfactory in any way?
85. Are records kept of the frequency with which each method is used?
86. Are you aware of new communication techniques, e.g., Confraphone, Confravision?
87. Would such techniques be used by you if available?
88. If yes, for what purposes?
89. (optional) Would their use alter current travel patterns, i.e., permit increased decentralisation of decision-making?
90. Who in the decision centre/company decides on communication matters?
91. Are you conscious of communication costs generally, either internal or external?
92. Are separate communication cost accounts kept routinely?
93. Have face-to-face contacts changed in importance over time?
94. If yes, for what reasons?
95. If no, has the purpose of your face-to-face contacts altered over time?

Travel

96. How often do decision centre/company personnel travel on internal company business, i.e., visit other company offices/employees?
97. What are the positions of the personnel involved?
98. What are the predominant travel patterns/main places visited?
99. Which modes of transport are used?
100. Which is the preferred mode? Why?
101. Why do the personnel mentioned travel?
102. Are these essential reasons or could other forms of communication be substituted?
103. Who initiates the travel decisions? Approves them? Coordinates them?
104. (optional) Are the travel facilities/services used in any way unsatisfactory?
105. Are records kept on the time and cost of travel on internal company business?
106. Has the need for travel on internal matters changed over time?
107. If yes, for what reasons?
108. If no, have the reasons for travel altered over time?
109. How often are you visited by company personnel?

Part V General (each decision centre as relevant)

110. In what ways would you be affected by being physically closer to: a) customers; b) suppliers; c) other parts of the company?
111. Does your present location pose any disadvantages? If yes, what are they?
112. Has your purpose in locating in Scotland (as mentioned in the answer to question 7) in fact been fulfilled generally?
113. May I mention your company's name in writing up this interview?

APPENDIX J

Contact Questionnaire

Company

Your Position

Date

I Please circle the 'x' indicating the frequency with which you have personal contact with the following groups of people:

Group	Contact Frequency					
	Daily	Weekly	Monthly	Yearly	Infrequently	Never
Existing/potential customers	x	x	x	x	x	x
Suppliers of goods/ materials	x	x	x	x	x	x
Suppliers of services, e.g., printers, ad agencies	x	x	x	x	x	x
Suppliers of capital equipment	x	x	x	x	x	x
Company personnel located elsewhere	x	x	x	x	x	x

II Please circle the 'x' indicating the frequency with which you travel on company business for the following purposes:

Travel Purpose: To See	Travel Frequency					
	Daily	Weekly	Monthly	Yearly	Infrequently	Never
Existing/potential customers	x	x	x	x	x	x
Suppliers of goods/ materials	x	x	x	x	x	x
Suppliers of services	x	x	x	x	x	x
Suppliers of capital equipment	x	x	x	x	x	x
Other company personnel	x	x	x	x	x	x
Other (specify)	x	x	x	x	x	x

III Please circle the 'x' indicating the main method of communication used in contacting customers (A), suppliers of goods/materials (B), suppliers of services (C), suppliers of capital equipment (D), company personnel located elsewhere (E).

	Those Contacted				
Method of Communicating	'A'	'B'	'C'	'D'	'E'
Face-to-face contact, your office	x	x	x	x	x
Face-to-face contact, elsewhere	x	x	x	x	x
Telephone	x	x	x	x	x
Post	x	x	x	x	x
Telex	x	x	x	x	x
Datel (data transmission)	x	x	x	x	x
Other (specify)	x	x	x	x	x

APPENDIX K

SELECTING MIGRANTS FOR DETAILED STUDY - A PROPOSED TOOL

One can visualise a giant matrix being useful in the non-random selection of interregional industrial migrants for detailed study along the lines suggested by our hypotheses. Across the top would appear the three types of contact linkage between a firm and its surroundings, viz., 1) goods transport, 2) communications and 3) travel. Each type could be disaggregated into frequency, variability and cost. In addition, one could divide goods transport linkages into forward and backward, and all three types into local/regional and national/international. Down the side of the matrix would appear any or all of a large number of different ways of describing migrants. The following list encompasses most of the possibilities relevant to our interests:

1. ownership - UK, U.S. or other foreign
2. size (employment/capital investment) - large, average or small
3. SIC - Order and MLH
4. volume of output - high/low
5. main product(s): weight-gaining/losing, perishable/non-perishable, standardised/non-standardised, capital/intermediate/consumer (fashion or non-fashion) good, value/weight-bulk ratio
6. product range - narrow, wide or variable
7. product demand - steady/variable
8. production technology - mass assembly/fabricating/continuous process/batch/one-off, single/multi-stage
9. plant type - footloose, materials-oriented or market-oriented
10. organisational status - subsidiary, division or branch (satellite, market-oriented or self-contained (duplicate/separate product(s)))
11. main reason(s) for move - inducements/controls, labour availability, markets, other
12. industry location quotient - high, low or middling
13. industry coefficient of localisation - high, low or middling
14. urbanisation economies - important/unimportant
15. economies of scale potential - high, middling or low
16. degree of competition in industry - very competitive, oligopolistic or monopolistic

17. R & D - important (part of move/not part of move)/unimportant
18. industry growth prospects - good, mediocre or poor
19. pricing policy - f.o.b. works, carriage paid to wholesaler/manufacturer or carriage paid to retailer/consumer
20. distribution policy - stocks/depots away from works or no stocks/depots away from works
21. transport function - ownership (own account/purchased) and organisation (separate department/no separate department)
22. risk of damage to product(s) in transit - high/low
23. importance of after-sales service to customers - high/low
24. input prices - delivered/transport costs identified
25. supply sources - scattered/concentrated
26. functions - production, sales, purchasing, development, research, distribution, control, general administration
27. degree of autonomy - high, middling or low

Of course, conceptualising a matrix is one thing; filling in the empty boxes, migrant by migrant, is quite another. Without actually circularising the migrant population, it is difficult to see how one can avoid a situation where the gaps outnumber the entries. Nonetheless, we feel that the framework proposed above can be a useful starting point in any interviewee selection process directed toward the sorts of question that we have been examining. Perhaps its main drawback is the length of time it takes to assemble even a minimal amount of pertinent information. That is why we, for example, have not used the framework in a more explicit way.