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STUDIES IN THE SCOTTISH DAIRY INDUSTRY

in two parts

Part One: Milk Production in South West Scotland

Part Two: Milk Manufacture and Distribution in Scotland

A thesis presented for the degree
of Doctor of Philosophy at the
University of Glasgow and embodying
the results of research conducted
in the Geography Department there
over the period October 1958 to
June 1961.

JAMES D. W. McQUEEN

August 1961

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FOREWORD.

This thesis is in two distinct though closely related parts. In a sense it is really two theses bound together for convenience. Each part deals with a different aspect of the same industry but because the first part is restricted to the South West of Scotland and the second part ranges over the whole country it was decided to keep them strictly apart. For this reason there may be a little repetition but this has been reduced to the barest minimum and cross-referencing between the parts has been used. Similarly the pagination and illustration numbers continue from the first part to the second. Appendices relating to both parts are grouped together at the end.

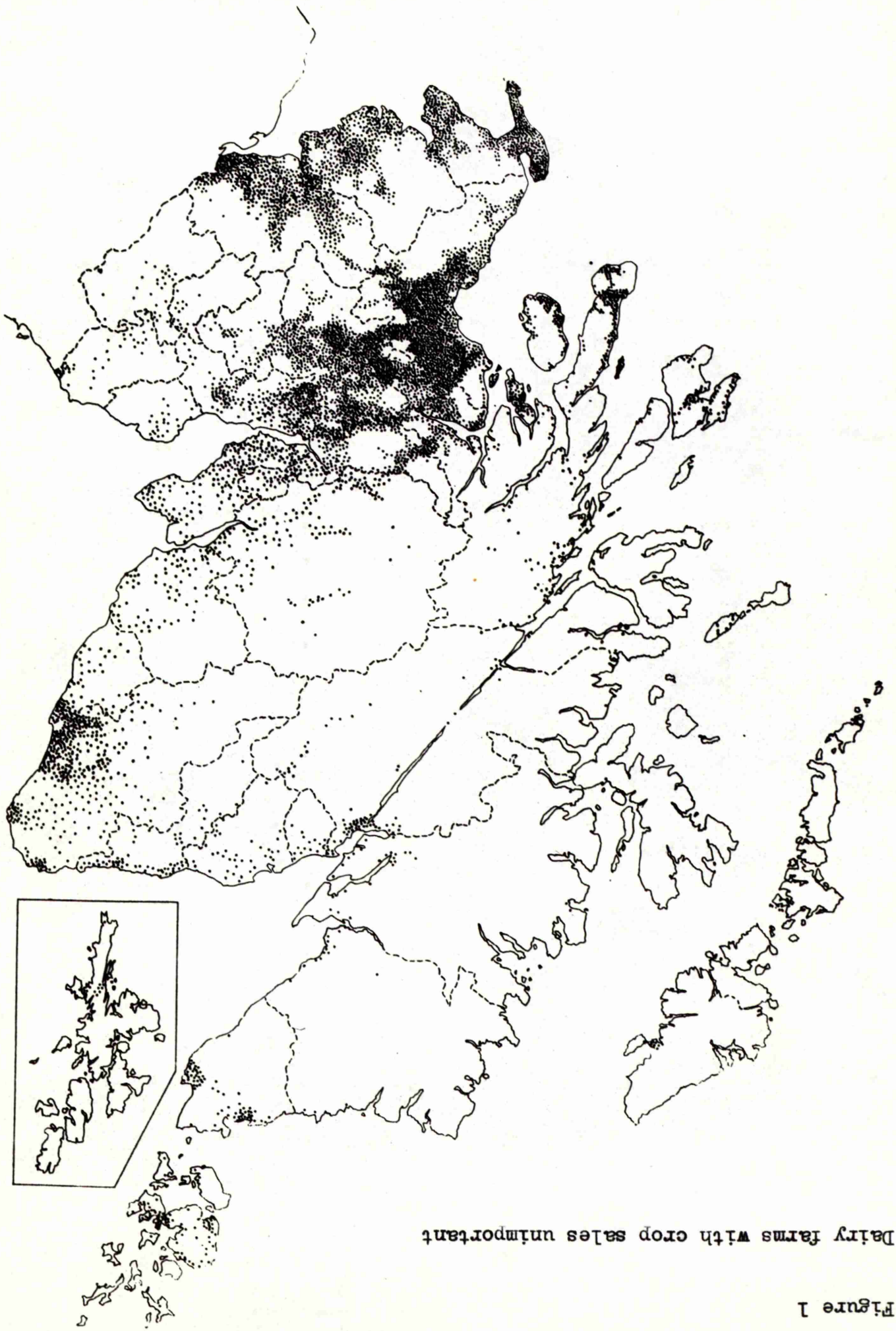
It is customary to treat the dairy industry as consisting of three divisions - milk production, milk manufacture and milk distribution - and these divisions have been adopted here. Milk production (or dairy farming) forms the subject of the first part and is discussed with reference to the four counties of Ayr, Dumfries, Kirkcudbright and Wigtown. The approach is largely historical and seeks to establish the forces which have moulded the present pattern of milk production in this, the most important dairying region in Scotland. The subject matter allows this to be done without constant reference to the position in other parts of the country, but where a glance at the overall pattern was considered helpful this has been freely taken as, for instance, in the chapters on T.B. eradication and seasonality of production.

In contrast, milk manufacture and distribution, which form the subject matter of Part Two, cannot be satisfactorily discussed with reference to a restricted area only. Because of the wider inter-regional relationships involved these subjects are best discussed on the national scale.

Except where necessary the precise methods of construction and sources of material used in the maps and diagrams are not discussed in the text. Instead these have been grouped in Appendix A.

PART ONE.

MILK PRODUCTION IN SOUTH WEST SCOTLAND.



Dairy farms with crop sales unimportant

Figure 1

AVERAGE COSTS PER GALLON IN THE THREE COLLEGE AREAS
1957 - 58

	WEST		EAST		NORTH	
	s.	d.	s.	d.	s.	d.
<u>Foods:</u>						
Purchased		7½		7.78		6½
Home-grown		8¼		7.89		6¾
Grazing		2½		2.19		2¾
TOTAL FOODS	1	6	1	5.86	1	4
<u>Labour:</u>						
Hired		2¾		5.41		5¾
Family		1		-		½
Farmer and wife		2		0.38		1¾
TOTAL LABOUR		5¾		5.79		6
Miscellaneous		4¾		5.78		5¾
Herd Replacement		1¾		1.26		1¾
GROSS COST	2	6¼	2	6.69	2	5½
<u>Credits:</u>						
Calves		1		?		1¼
Manurial Residues		½		?		¾
TOTAL CREDITS		1½		1.81		2½
NET COST	2	4¾	2	4.88	2	3
Net cost per cow	£91:10: -		£100:10: -		£90:14: 1	
Average yield	771		835		826	
Average herd size	50		63		51	
Number of farms	78		25		30	

INTRODUCTION.

In 1958 the four south west counties together produced 46.4% of the Scottish milk supply (Ayr 18.7%, Wigtown 10.2%, Dumfries 9.9% and Kirkcudbright 7.6%). Even so they form only a part (albeit the major part) of the dairy region of south west Scotland which must also include most of Lanarkshire, Renfrewshire and Bute whatever else. (Fig.1) The selection of these four counties was not, however, without some geographical justification and it is to be noted that the line separating them from the rest of Scotland lies along a major watershed for all but a few miles of its length and divides Solway and Firth of Clyde drainage on the one hand from Clyde Valley and North Sea drainage on the other. In addition, with the exception of the Ayrshire-Renfrewshire border it limits a self-contained dairy farming region. The Ayrshire-Renfrewshire border, in cutting through a major concentration of dairy farms represents the most arbitrary part of the boundary chosen, and this fact must be carefully borne in mind when examining the maps. This is particularly necessary in view of the important role of the Clyde Valley market in the evolution of dairying in this area.

The physical conditions of farming in this part of Scotland - the quality of the pastures in particular - have undoubtedly contributed much to the present importance of dairy farming in the region, but generalisations of this type should not be allowed to obscure some equally important facts. Most important of these is the fact that the range in cost of production within the south west is known to be very wide (over 100%) and there are many dairy farms which, even under good management, can barely cover their expenses. In addition, there is no evidence at all to suggest that the cost of milk production is appreciably lower in the south west than in other parts of lowland Scotland. The three Scottish agricultural colleges (at Glasgow, Edinburgh and Aberdeen) produce average milk costs for their respective areas and these are set out opposite. A comparison of these should illustrate, in hard cash terms, the effect of the different environmental/

environmental conditions under which milk production is practised. The lowest costs in general appear to be found in the north, a region not normally thought of as dairying country. It appears, however, that there is some dubiety about the extent to which this sample of farms is truly representative and it will be safer to confine the comparison to the west and east.

The average cost per gallon is practically identical in both these cases. Cost per gallon is the important thing but at the same time it should be noted that the average cost per cow is significantly lower in the west, an advantage which is dissipated in lower milk yields. The difference in yield is mainly attributable to the higher proportion of winter milk in the east. An autumn calving cow normally has its declining production boosted by the spring grass flush.

Food costs differ very slightly between the two areas which is perhaps surprising in view of the widely different cropping patterns in the two areas. It would seem that basic climatic differences between east and west have only a very minor effect on the cost of production. The most important difference between east and west is found in the structure (not in the total) of labour costs. In the east 7% of the total labour costs are attributed to the farmer and his family. In the west the figure is 52%. This is all the more important in view of the fact that this family labour does not represent actual cash expenditure and, whereas it must be properly allowed for in the costings, it does not assume nearly the same importance in the farmer's own estimation. The cash saving made possible by family work in the byre has long been a special feature of the west of Scotland. This is partly the result of the importance of small farms in the west, but also of the highly specialised form of dairying practised. In the east of Scotland the more typical association of dairying with cash cropping does not permit the careful personal attention to byre work normally given in the west.

By way of qualification it must be emphasised that these costs refer to actual dairy farms and reveal nothing about what costs would be in other parts, in the non-dairying parts of the east for example. For this reason/

reason it is important that too much geography is not read into them. But they do point to the complexity of the factors behind the present pattern of dairying in Scotland. On this point one authority, writing about milk production in the west of Scotland and in Ayrshire in particular, has already asserted, "it was family labour, the Ayrshire cow, and the Clyde Valley consumer rather than natural advantages which made these farms what they are to-day".⁽¹⁾ These and other considerations provide the basic subject matter of the chapters which follow.

Note: A parish map for reference purposes will be found in Appendix D.

CHAPTER 2.

THE ORIGINS OF COMMERCIAL DAIRY FARMING IN THE SOUTH WEST.

As early as 1578 Bishop Leslie wrote of 'Silurie', as Ayrshire was then known, "Of it are reckned thrie partes, Kerrick, Kyle, and Kunninghame..... The ground almost is alyke plentifulle in all this places; the pastorall is plesand, as afor I spak, of quhilke we have cheis nane fyner, and buttir in gret quantitie".⁽²⁾ Timothy Pont writing about twenty years later is more specific. Of Cunningham, Ayrshire's northern division, he says, "The 2nd. degree and parte of this countrey, (i.e. the middle part between the uplands and the coastlands) being a grate deall lower then the former, and for the most part 3 or 4 mylles breadth, is much more fertile in come and store, being of a deipe, fatt clayeish soyle, much enriched by the industrious inhabitants lymeing of their grounds,"³ quherly the pastures heir, since this experiment ves practised, is become more luxuriant then befor: quhence it is that this part of the countrey yelds a grate deall of excellent butter, as all the countrey besyde, bot especially the parishes of Stewartoun and Dunlopp. The butter of this countrey in effecte serves a grate part of the kingdome, one akre of ground heir yielding more butter than three akers of ground in any of the nixt adiacent countreyes".⁽³⁾ North Ayrshire, it appears, was famed for its dairy produce at an early date and at least two centuries before improved communications allowed regional specialisation fully to replace the traditional local self sufficiency. Shaw even suggests that "Cunningham derives its name from the home of milk pails or churns",⁽⁴⁾ but this is doubtful.

It is unlikely that at this early date there was much in the way of deliberate specialisation in the farming economy. Under the prevailing extreme parochialism any export of farm produce would represent only that surplus/

* Incidentally, a very early reference to lining.

surplus to local requirements and in north Ayrshire such surplus took its most profitable form in butter and cheese. The reason presumably lay either in the favourable physical conditions of the area (Font's 'deipe fatt clayeish soil' coupled with an ample rainfall) or in the existence of a specially high yielding type of cow, or in both. To the extent that this surplus is directly attributable to fortuitous physical circumstances, it must be held to predate the real development of commercial dairy farming involving deliberate specialisation and a reduction of local self sufficiency.

Commercial dairy farming in this strict sense was a much later development attaining little significance until the beginning of the 18th century.

The cheese alluded to by Bishop Leslie was undoubtedly the common skimmed milk cheese made, to some extent, throughout the country. Essentially this was a joint product with butter and represented a means of preserving the summer milk surplus either for sale or for later home consumption. It is unthinkable that cheese from the whole milk was not made at all at this time but it seems to have been rare and it was not until the closing years of the 17th century that "sweet milk cheese", as it was known, assumed any importance in north Ayrshire. The significance of this development cannot be over-rated. Since the whole milk was henceforth required for cheese making, butter churning was automatically precluded and local self-sufficiency to that extent reduced. The first major step towards commercialisation had been taken.

The story is often told ⁽⁵⁾ of one, Barbara Gilmour who, to avoid religious persecution, fled to Ireland where she learned a technique of **sweet milk cheese** making. This technique she is alleged to have introduced into Dunlop parish on her return to Hill Farm in the 1680's. Soon the new product acquired the name of Dunlop cheese, either directly after the parish of its origin or, as Aiton suggests, "from its first being brought to the Glasgow market by a carrier who lived in the parish of Dunlop and who carried to Glasgow much of the cheese of that and the neighbouring parishes". ⁽⁶⁾ Reference to an earlier importation of sweet milk cheese from Ireland ⁽⁷⁾ lends support to the story of Barbara Gilmour, a story which has won wide acceptance/

Figure 2

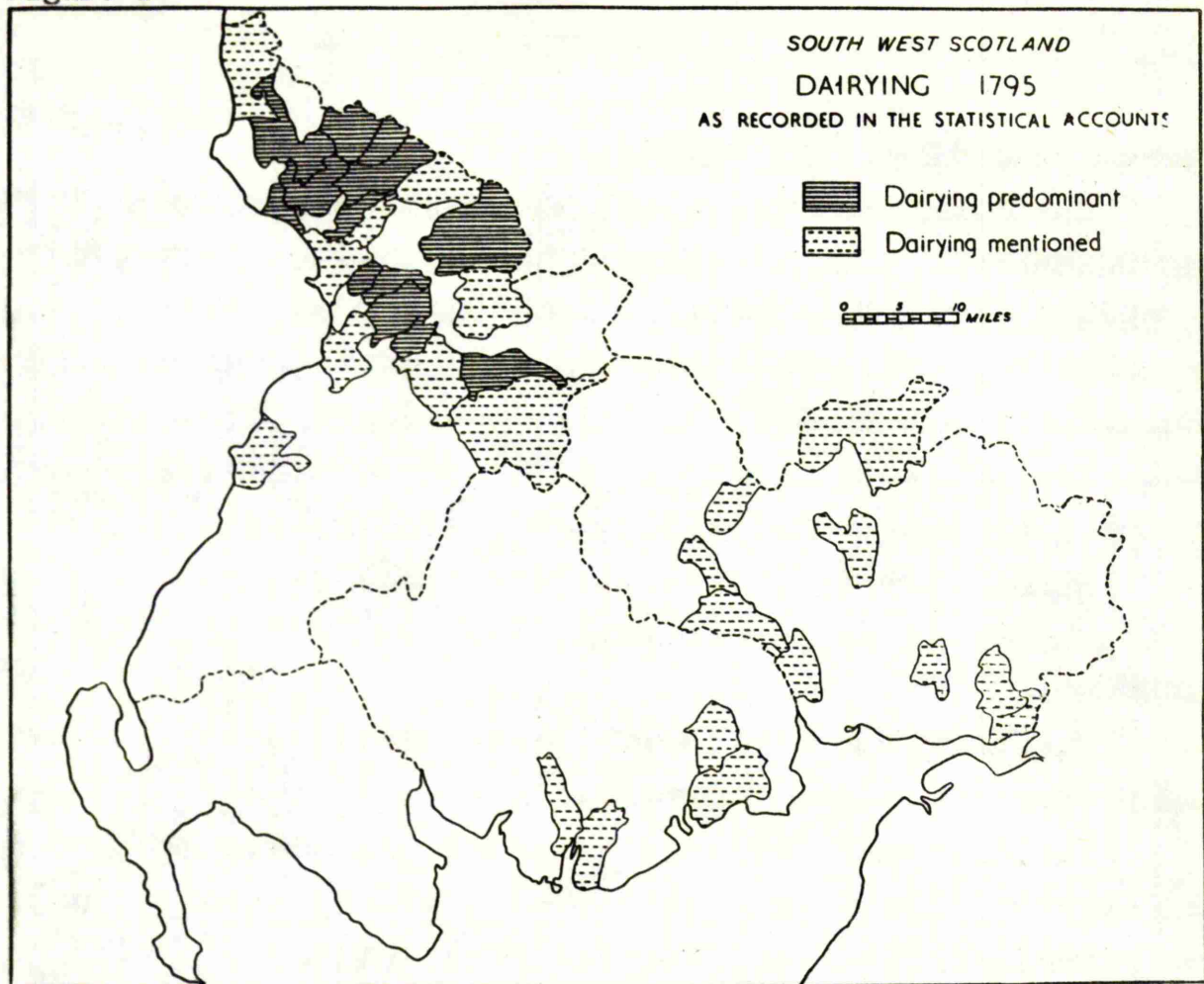
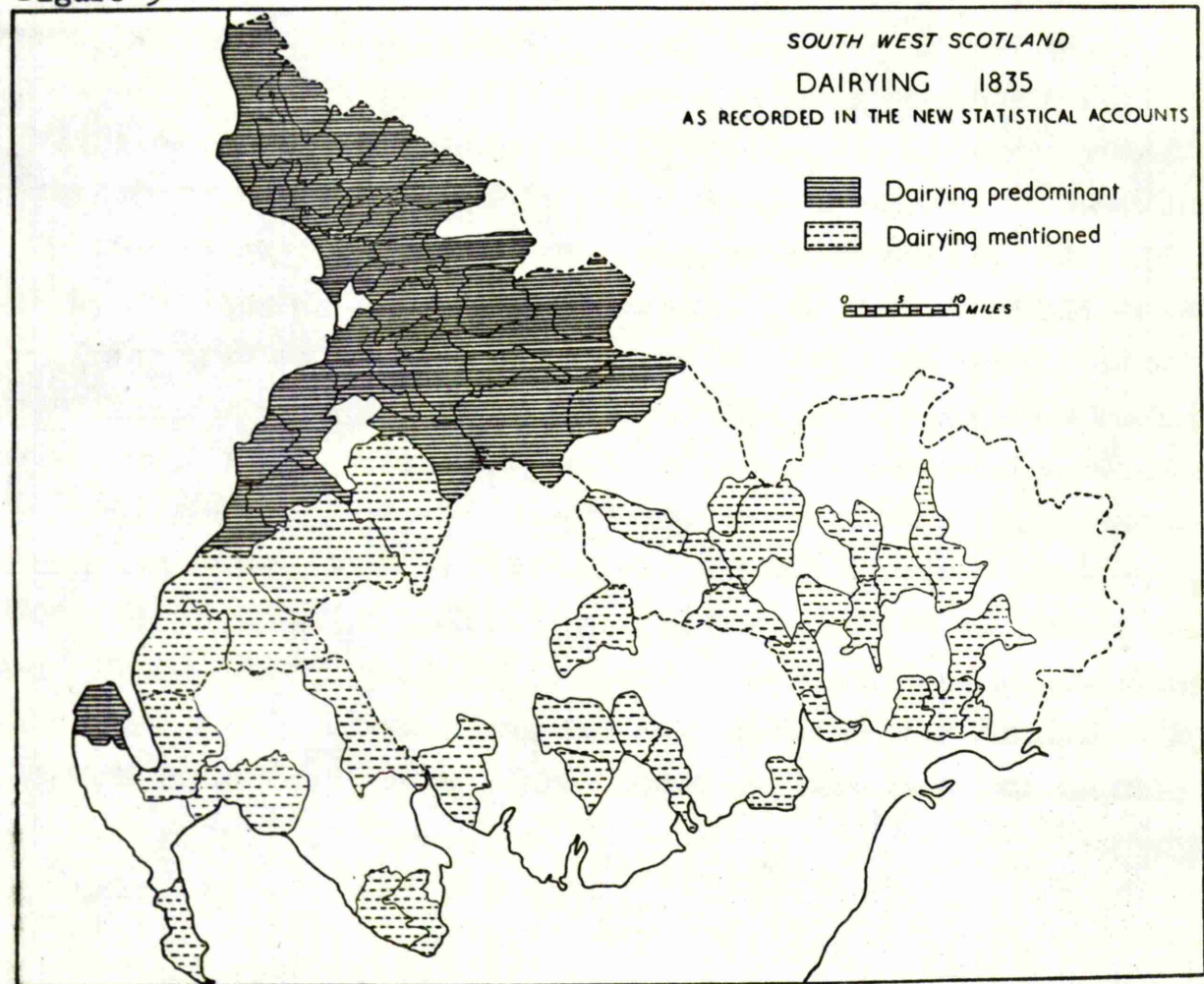


Figure 3



acceptance in Scottish dairy circles.

The Dunlop cheese, however, represented only the medium of commercialisation. The real stimulus to development came from the expanding urban markets of the Clyde Valley. This stimulus was particularly great in the second half of the 18th century when industrial and commercial developments gained momentum and the Old Statistical Accounts (c.1795) contain a record of continuing and optimistic prosperity for the new dairy farmers. Rising prices for dairy produce had then been the rule for some time.

O.S.A. Fenwick, "Butter and cheese have both risen very considerably in value of late and the sale is always good when trade is good in Glasgow and Paisley".

O.S.A. Beith. "It (Dunlop cheese) is a commodity which has been rising in value for a long time past".

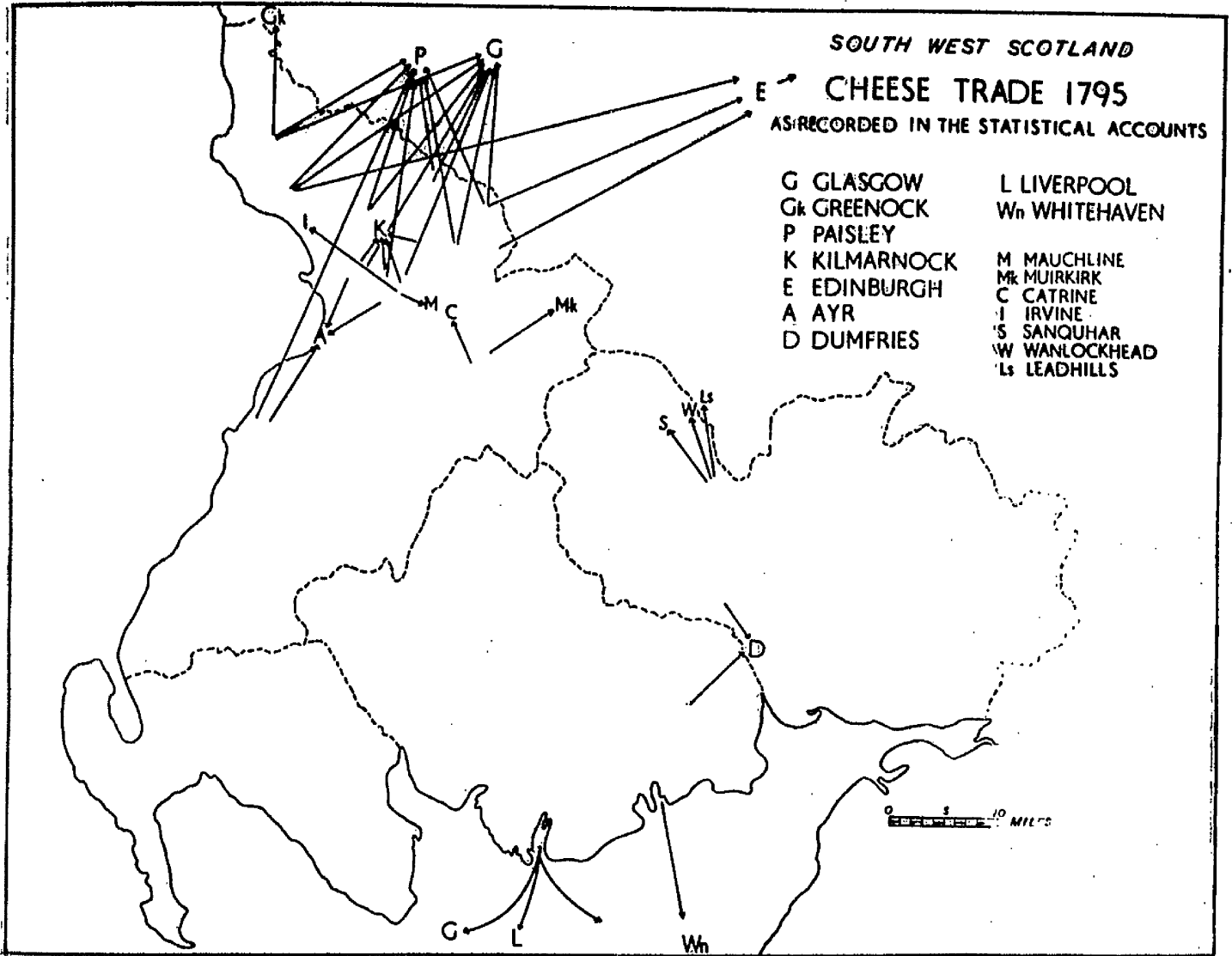
O.S.A. Dalry. "For some years past the profits of the dairy have been great and it may be said with certainty that the rents of the farms are in general paid from the butter and cheese made".

There are many more examples.

By that time a clear price differential had developed between sweet milk cheese and such skimmed milk cheese as was still made. Normally the former fetched twice as much as the latter, 6/- to 8/- as against 3/6 to 4/- a stone in Loudoun (1 stone = 16 pounds, 1 pound = 24 ounces).

The geographical extent of commercial dairying at that time is shown in Figure 2 where the extreme importance of Cunningham is clearly apparent. Dairying elsewhere was intermittent and in many cases is deduced only from a reference to a small export of dairy produce. Such dairying as was present in Dumfries and Galloway was apparently of a much less specialised type than in north Ayrshire. Butter and cheese remained common joint products and even ewe milk cheese was of some commercial importance.⁽⁸⁾ Gretna parish is recorded as exporting annually 200 firkins of butter and 50 hundredweights of cheese. Valued at £350 this has to be set beside the £2,500 worth of oats exported from the same parish. Sweet milk cheese was not unknown and commanded the usual higher price.⁽⁹⁾ There is no suggestion/

Figure 4



suggestion, however, that it was made after the Dunlop fashion.

Figure 4. indicates markets for dairy produce where these are recorded in the accounts. The importance of Paisley and Glasgow is immediately apparent, their influence extending as far south as Kirkoswald. More surprising perhaps is the established trade with Edinburgh, especially in view of the poor road conditions of the time. The extent of the trade, to be fully appreciated, must be set against the extreme parochialism of the time. The O.S.A. for Stair records that "This and the neighbouring districts are remarkable for producing good cheese and butter", while less than ten miles away in Kirkmichael parish "the dairy as an article of produce is not much attended to The manufacture of cheese is not understood".

Much of the intermittent development of dairying outside the main dairy region of the north can be explained in terms of local centres of demand. Thus it developed noticeably near Dumfries Burch, as a response to the inflated summer population of Moffat Spa, and to supply the mining population of Leadhills and Wanlockhead and the mill workers of Catrine and Muirkirk. There was a small trade in dairy products across the Solway "to the sea port towns in the north of England, where they find a ready market". (10) Butter, at that time in demand for sheep smearing, was imported into Kells parish, not only from Ayrshire but also from England. (11) The total absence of any reference to commercial dairy farming in Wigtownshire is noteworthy, especially in view of that county's later pre-eminence in dairy management.

Throughout the first half of the nineteenth century, at least, there is little (other than the obstacles arising from local prejudice) to suggest that the spread of dairy farming in the south west was other than rapid and continuous. The first forty years of the century, in terms of territorial expansion, were perhaps the most dynamic of all. A variety of influences appear to have been at work though the continuous growth of the Clyde Valley markets remained unquestionably the principal stimulus. Unlike cereal and beef production dairying remained peculiarly immune to the effects of the post-Napoleonic War depression. On the contrary, supported by/

by the growing urban demand, its spread was largely complementary to these other depressed branches of agriculture. This was especially true in the case of the traditional store cattle economy of the south west which at times faced serious financial crises.

Particularly since the Union of 1707 Galloway had been almost exclusively devoted to the breeding and rearing of young beef cattle destined for the English (chiefly London) market. When upwards of three years old these were taken in droves for fattening on the English Plain, usually in Norfolk and Suffolk. With such a tenuous link between the points of production and consumption the trade was ill-adapted to weather even minor economic disturbances, and in 1844 it was described as "proverbially insecure, its success or failure in each enterprise depending on a rise or fall of prices which very frequently can neither be foreseen nor controlled". (12) Elsewhere, and for the same date, it was noted that the introduction of the steam boat "will put an end to droving which has proved of late years so ruinous to all concerned". (13)

The steam boat probably had a greater impact on the traditional droving economy than was currently foreseen. Rightly it was welcomed as a means of dispensing with long and costly treks on the hoof and meant that fat cattle could be exported for the first time. Except where absolutely necessary cattle were never carried in sailing vessels, (14) and consequently, "except an odd beast for winter beef - which was not fattened without the guarantee of several families taking part of the carcase - and a few sheep for the Dumfries butchers, feeding for the market was unknown". (15) With the new facilities provided by the steam boat, which started operation in the 1820's, fatstock began to be exported in quantity from Galloway chiefly to Liverpool. At the same time, however, this new mode of transport transformed the basic "space relationships" of the beef cattle trade to the detriment of the Galloway breeders. So long as droving remained the only means of transportation, Galloway, relative to the other Scottish cattle breeding areas, enjoyed a valuable proximity to the London market, but when the steam boat made sea transport practicable, this advantage was immediately/

immediately lost to the breeders of the north east Aberdeenshire with the additional advantage of a superior beef breed soon rose to pre-eminence, (16) and to this competition the depression of cattle prices in Galloway at that time must be partly ascribed.

With depression in store cattle rearing and continued prosperity in dairying, the extension of the latter at the expense of the former was inevitable. The Galloway lowlands with their mild winters and very long grazing seasons were physically admirably suited to dairy farming, and Wigtownshire, with the easiest communications with Ayrshire and where the depression of store cattle rearing appears to have been worst felt was first extensively to adopt the new system. Dairying was first introduced there by an Ayrshire farmer, James Ralston, who started cheese making with milk from a herd of Ayrshire cows at Pineview, Kirkcubbin* in 1802. His success was conspicuous and by 1810 "upwards of forty other dairies, great or small, had been established in that single parish". (17) By 1837, however, the number had dwindled to thirteen (though the lapse was but temporary) and Ralston's dairy itself had disappeared. (18)

The New Statistical Account (c.1840) provides a record of dairying at what was perhaps its most dynamic phase (Figure 3). In Wigtownshire, in particular, the relative merits of cheese production and cattle rearing formed the great farming controversies of the day and the new system, though clearly at the time more profitable, met with widespread opposition and prejudice. Ayrshire cows were derided as "spotted beasts" and their owners reputed to subsist on a diet of whey. (19) In face of economic pressures there remained a reluctance to abandon the traditional source of income and a compromise was sought by using a Galloway bull with an Ayrshire herd. The progeny were always much more "Galloway" than Ayrshire and therefore marketable as store cattle, though of an inferior type. Concern, from more than one quarter was voiced on the consequent "contamination" of the Galloway breed. Some even believed "that the very sight/

* The site of Pineview is now occupied by the grounds of Corsewall House. McMaster (Trans. High. Agric. Soc. Scot 1895, p.214.) says Ralston's dairy was established in 1797, perhaps with the local Galloway cattle, the Ayrshires being introduced in 1802.

sight of Ayrshire cows in the neighbourhood corrupts the native breed, and that it often causes Galloways of the purest breed, and blackest colour, to produce red, speckled and spotted calves." (20)

Crossing with a beef type bull became regular practice throughout Galloway and it was not until relatively recently that Galloway became a breeding area of young dairy stock. Almost until the present century most dairy herd replacements were bought in from Ayrshire breeders. Apart from the crossing referred to above there is probably a good reason why this should have been so. The Galloway farmers were inexperienced in dairy management and adopted the system by degrees. Buying in heifers from Ayrshire, which in any case had a well earned reputation for dairy stock, allowed them to concentrate on the demanding job of running a dairy. The practice was not without its exceptions and at the time of the New Statistical Account young dairy stock were reared in Kirkbean parish in the Stewartry and in Tinwald parish in Dumfries, in the latter for the English market.

To a large extent the penetration of dairy farming into Dumfries and Galloway during the nineteenth century involved not merely a movement of ideas but an actual migration of dairy farmers from Ayrshire. Perhaps the most important sociological element in the pattern of dairy farming in the south west, the feature persisted until quite recently (1930's) in Dumfriesshire where a surprising number of dairy farmers to-day take the "Kilmarnock Standard" (See Chapter 5). In Galloway, family ties with Ayrshire are less obvious only because they are longer established. It is alleged, for example, that in the Stewartry there are only four indigenous dairy families, the Griersons, Grahams, Biggars and Spreats. The rest are of Ayrshire stock. (21) Records of such migrations are numerous. Dairy farming was first introduced into Carrick by Mr. Pulton of Beith in 1790. (22) Mr. Ralston of Pineview, referred to above, was an Ayrshire farmer. In Dumfries, too, the dairy system was first introduced on the farm of Kirkbank in Johnstone parish by Mr. John Aitken from Dalry in Ayrshire, and in 1832 a dairy was started at Hollybush in Cummertrees parish by Mr. William Stewart from Fenwick. (23) This last was not, however, as Gillespie alleges the first dairy in the Annan district for in the 1790's a dairy had been/

been successfully started on the farm of Relief in Hoddam parish. Interestingly it was in the hands of a Cheshire man "who acquired knowledge of dairy work in that country". (24)

Robert Burns' well known migration from Mossiel in Ayrshire to Ellisland in Dunscore parish in Dumfriesshire can perhaps be taken as an example of what later became a common phenomenon. Although Burns was never a specialised dairy farmer he has been accredited with introducing the Ayrshire breed into Dumfriesshire for the first time. On the 13th November, 1788, Burns wrote to Mrs. Dunlop of Dunlop, then in Haddington, informing her of his gratitude to Major Dunlop, who on the previous day had made him a present of "the finest quey in Ayrshire". (25) In view of the Dunlop family's pioneering role as breeders of Ayrshire cattle there can be little doubt that the animal referred to was of the Ayrshire breed. The writer of the Old Statistical Account for Dunscore further records, "The black cattle in general are of the Galloway breed; but Mr. Robert Burns, a gentleman well known by his poetical productions, who rents a farm in this parish is of the opinion that the West country cows give a larger quantity of milk".

In order that such migration could take place, it must be assumed that an appropriate number of farms were falling vacant. To some extent this was undoubtedly true. Bankruptcy among store cattle breeders, where it occurred, would preclude a fresh start with a new farming enterprise.* The relatively low rents in Galloway (a long standing feature due, presumably, to the remoteness from the major centres of demand) were an added incentive to the keen young Ayrshire farmers. (26) Biggar (1876) refers to "the influx of men from Ayrshire who found land cheaper in Galloway, and took farms at rents far above the ideas of the natives, and yet on the dairy system seemed to thrive". (27) Progress was clearly by immigration and example.

Dairying, however, is much more than a system of farming; especially when cheese is the end product it is also a domestic industry, and the Galloway/

* cf. The movement of Scottish dairy farmers to Essex in the 1930's when vacant arable farms were converted to dairies with marked success.

4th Dairyman to provide Sawdages and Colours purchased
 & to Redd Seven guiney Calves for Proprietors & to give about
 thirty Four acres of meadow than to the Satisfaction of Proprietors
 & to deliver to Proprietors all Dairy utensils, & implements
 and repairs at Parkingtons 1878

5th Dairy man to lay down £100 as part Security for this Rent
 for which he will be allowed four per cent interest
 6th The rent of each cow or grey to be nine pounds ten shillings
 Sterling two third of the Rent to be paid not later than
 the thirty first day of October eighteen hundred & Seventy
 eight and the remainder on the twenty second of November

following
 7th Dairyman to be allowed one rood of land in which
 to grow Potatoes
 8th Proprietors to supply Dairyman with a horse & cart
 to take Dairyman's for Mast & Calves & Buttes to Westhead
 Station & for bringing Dairyman's coal from said station

Facsimile of part of a Dumfriesshire bowing agreement dated 1877.

Original from Mr. W. B. Grant, Boreland, Lockerbie.

Galloway farmers had little or no experience of cheesemaking. This deficiency necessitated the widespread adoption of the "bowing" system, a peculiar arrangement of shared responsibility.

The Bowing System.

Now almost extinct, the bowing system operates where a farmer lets his herd to another person (the bower) who undertakes to manage the dairy work and to pay the farmer a fixed rent in return. Commonly the rent was paid in kind, so many stones of cheese, in which case the "bower" was referred to as a "kaner". The terms are of ancient origin though it is not clear why they should have gained currency in the south west at a time when they were clearly obsolete over most of the country. "Bower" is apparently related to "steelbow" an early form of tenancy in which the proprietor leased the farm stock as well as the land. (28) "Kane" was a common term in mediaeval Scotland meaning rent in kind. (29) Surprisingly the bowing system does not appear to have emerged out of a widespread occurrence of steelbow tenancy. The Old Statistical Account nowhere contains any reference to either system and there is no evidence to suggest that bowing was practised in the south west prior to the nineteenth century. The Oxford Dictionary lists the earliest use of the word "bower" (and only in its earlier form 'bouman') as 1752. One of the earliest references for the south west is found in Aiton's "Livestock" (1812) where the system is described in some detail, though the word 'bower' is not actually used. (30) Cobbett noted the practice in Ayrshire in 1832 commenting that "it is the habit here to 'let' or 'set' the cows". (31) Had the word 'bower' been in use then it would surely not have escaped Cobbett's pen. The New Statistical Account for Girvan (1837) contains one of the earliest uses of the term and explains that the system has recently been introduced.

The system was widely, almost universally, adopted in Galloway where the bowers were commonly those young immigrant farmers from Ayrshire who had not as yet found places of their own. The bower, like his successor the dairyman, had a distinct social status and bowing agreements were typically drawn up in meticulous detail, a procedure necessary under a system so open to abuse by both parties. Part of a bowing agreement is reproduced opposite.

The/

The rent agreed upon in this case was £9.10/- for each cow or quey (heifer). Another agreement, with rent in kind, is reproduced in full in Appendix B. The rent in that case was 20 stones of cheese (per cow). This represents about 500 gallons of milk and the cheese from any excess gallons would be the dairyman's (kaner's) share.

With minor variations (for example the farmer might or might not undertake to supply concentrates the rent being correspondingly greater or smaller) bowing agreements were all much alike in form and stipulation. The bower's rent, of course, varied with the yield of the herd and consequently with the quality of the land. Biggar records that the highest rents in Kirkcudbright and Wigtown were obtained "on the good strong land of the Rhinns of Galloway between Stranraer and the Mull of Galloway." (32)

The bowing system was naturally never adopted on small family farms where little additional labour was required anyway. In the days before milking machines, one man or dairy maid could attend to about ten cows. A herd of thirty cows would, therefore, represent the approximate upper limit for a family farm. In Ayrshire where farms of this size and smaller are much more common, the bowing system was consequently less general than in Galloway. It is clear, however, that the system was practised in Ayrshire long before dairying became firmly established in the Solway counties. The more general occurrence of bowing in Galloway was clearly due to (a) the prevailing large farm unit necessitating staff additional to the family, and (b) the Galloway farmer's inexperience in dairy work coupled with an availability of young Ayrshire men eager to take on the job of running a dairy. (33)

Historically the bowing system has been associated with cheese dairying. The skilled job of cheese-making clearly justified the existence of a separate management for the purpose. The collapse of the farm cheese economy, gradual since the beginning of the twentieth century and accelerated with the establishment of the Scottish Milk Marketing Board in 1933, brought with it the eclipse of the bowing system. As dairy work became less involved and farmers more able to keep it under strict surveillance the hired dairyman replaced the bower. Subsequently, a number of different systems of dairyman payment emerged/

emerged often incorporating a production incentive. One of the commonest systems is the payment of a fixed rate per cow (usually £11 - £13) with or without a bonus on the gallonage sold. On some farms the dairyman receives a fixed percentage of the monthly milk cheque, usually 1/6th or 1/7th, and this system is particularly common in Kirkcudbrightshire where it originated. An agreement based on this principle is reproduced in Appendix C. Under both these systems the dairyman is responsible for the hiring and payment of other dairy labour. Dumfriesshire dairymen are normally paid a straight weekly wage, perhaps because of the recent origin of dairy farming over most of the county.

Galloway, with its typically big dairy herds, is the region par excellence of the professional dairyman. His part in the business of milk production is a vital one and he has a social status which distinguishes him from other farm workers. The position is a particularly important one in the farming 'ladder' and many of the present dairy farmers in the south west were formerly dairymen.

Butter and Liquid Milk Production in the early Nineteenth Century:

Little mention has been made till now of butter and liquid milk production because of the overwhelming importance of the Dunlop cheese in the early history of the industry. Butter has never been a very important element in the dairy system of the south west generally speaking, though in places churning assumed special significance. Butter may be churned either from the whole milk or from the cream of the milk, the system adopted largely depending on the geographical circumstances of production. In the early nineteenth century three distinct forms of butter production could be identified within the south west.

1. Churning the whole milk was claimed to give superior butter to that produced from the cream only, but because of the need for a local demand for the butter milk this form of butter dairying was restricted to within carting distance of a town where it could be especially profitable. Maximum carting distance was generally reckoned at about ten miles. The butter, especially if salted, could be sold much more widely afield. The system was especially important near the seaside resorts of the Clyde coast and near the several colliery settlements of Central Ayrshire.

2. To the extent that Dunlop cheese was made churning was precluded. In fact, "In dairies where regard is paid to the character of the cheese, there is no butter made not even for the supply of the family, lest it should be alleged that the cheese might in this way be robbed of part of the cream of its own milk". (34) Small quantities of skimmed milk cheese continued to be made, however, even in Cunningham, and commercial butter production was associated with it, the butter being churned from the cream.

3. Cobbett in 1832 observed that "ham, bacon and butter" were the main products of Dumfriesshire, (35) and in 1827 the Highland and Agricultural Society sponsored a butter competition in Ecclefechan in order to encourage this trade which was "of late improving and susceptible to much further improvement". (36) It is unlikely, however, that the butter trade here referred to was associated with dairy farming in the more specialised sense. Butter churning from the cream of the milk is commonly associated with stock rearing, the skimmed milk being a valuable food for young animals, and the rearing of young store cattle has for long been a major element in Dumfriesshire farming. The real penetration of dairy farming into lower Nithsdale and Annandale was largely a twentieth century phenomenon.

Only in the first of these three forms of commercial butter production was the butter the principal source of farm income. With the development of the railways and improved transport generally this form of dairying could be conducted with success at greater distances from the centres of demand and by the twentieth century Cunningham had become largely a butter and butter milk region supplying the urban population of Glasgow and district.

Liquid milk production, prior to a speedy transport system, was even more severely restricted to the immediate vicinity of centres of demand. The growth of large urban centres like Glasgow coupled with a slow, unreliable transport system gave rise to a number of town dairies which were milk producing factories rather than farms. These are treated in more detail in Part Two.

CHAPTER 3.

DAIRY FARMING AND THE IMPROVING MOVEMENT

The establishment of the Scottish dairy industry in the south west during the second half of the eighteenth and first half of the nineteenth century can be considered as one aspect of the widespread Improving Movement which transformed Scottish agriculture in that period. Commercialisation and specialisation were the dominant themes. The pursuit of improvement in the south west took almost a century to run. There was no overnight 'revolution'. Much of the region was enclosed forty years before the end of the eighteenth century and yet by the time of the New Statistical Account (1830's) there was still a great deal to be done, especially with respect to drainage and farm buildings.

It is clear that specialised dairying occurred widely in an open field system. Even as late as 1837 most of Muirkirk parish was unenclosed though there were "numerous dairies of the best Cunningham breed".⁽³⁸⁾ On the other hand, the special advantages of enclosure for dairy farming were early (1795) recognised in Dunlop where the high milk yield of the cows was attributed in part to their "freedom from the restraints of herding".⁽³⁹⁾

So far as dairy farming is concerned, North Ayrshire is distinctive in that specialised dairying there predated the major technical innovations. Over an indeterminate area, roughly coterminous with Cunningham, the farms were clearly planned and laid out as dairy farms. In other parts of the south west, and notably in Dumfriesshire where the dairy herd is a relatively recent innovation on many farms, dairying was introduced on farms which were originally planned for other farming systems. In those areas the buildings in particular offered a serious problem of conversion.

Most farm steadings in the south west were built in the period 1810-1840. Generally those built specifically as dairy farms are quite distinctive and to-day these remain a conspicuous feature of the North Ayrshire landscape. Usually they are built in the form of an open square with the/

with the dwelling house facing the open side. Immediately adjoining the house and (before the days of dairy bye-laws) intercommunicating with it would be the dairy where cheese was formerly made and later the milk cooled and dispatched. At right angles to the dairy, and again formerly intercommunicating with it, would be the byre. It was previously possible, therefore, to rise, milk the cows, start the cheese-making, and go back for breakfast without going out of doors. Pacing the byre and forming the third wall of the square would be the stable (usually to-day converted for other purposes) and cart shed. Several variants of this basic pattern can be seen to-day in Ayrshire. Occasionally the fourth side of the square was built up leaving an arched entrance. More commonly the byre, dairy and dwelling house were built in line, with the stable forming the short leg of an I-shaped structure. Dairy buildings in the Solway counties are usually much more haphazard in their lay-out and it is common for the dwelling house to be some distance apart from the rest of the buildings. On one Dumfriesshire farm where the dairy was forty-five yards from the byre it was calculated that in the course of a year the dairy maid had to walk almost six hundred miles wheeling cans from one to the other. The diseconomies of labour resulting from unsuitably planned steadings remain to be fully investigated.

The inter-relations between dairying and the introduction of improved cropping systems varied from place to place. Improved rotations usually involving green cropping were widely enforced by 'enlightened' landlords, too often without due consideration to the nature of the land. The heavy clay soils of Cunningham are poorly suited to turnip husbandry yet for a period green cropping was enforced in the leases. It was not long, however, before the practice was seen to be detrimental, not only to the farmer's income, but also to the state of the land and the clauses were withdrawn. ⁽⁴⁰⁾ Further complaints were founded on the distinctive taste which turnip feeding imparts to the milk. ⁽⁴¹⁾ The closing years of the eighteenth century saw the introduction into North Ayrshire of the Fairlie Rotation which comprised simply three years of white crop followed by five to eight years ley. Three years cropping was later found to be too/

too exhaustive of the land and was reduced to two. (42) Pasture, of course, was of the greatest importance and the sowing of grass seeds was general from the 1760's onwards. (43) Rye grass, both annual and perennial, being specially suitable for the heavy clay soil soon dominated all other strains though its value as pasture was seriously vitiated by the "pernicious and unthrifty practice of seeding the rye grass hay crop", (44) a problem later surmounted by the use of fertilisers. The sale of rye grass seed was for long a remunerative enterprise in North Ayrshire.

In the Solway counties dairying was welcomed in places as an incentive to improved agricultural systems. Regular rotations were introduced into Wigtownshire with the dairy system so that the latter rapidly became associated not only with change but with all round improvement. Enclosures, good pasture, a plentiful supply of winter feed and well constructed buildings all had more obvious advantages under a dairy system than where store cattle rearing was practised. (45)

The period between the two Statistical Accounts (1795-1835) saw a marked consolidation of the dairy industry in North Ayrshire. Dairy management and the organisation of the dairy trade became major issues. Absolute cleanliness in the dairy, for example, was recognised as a sine qua non for the first time, (46) though conditions were still far from perfect. The domestic hygiene of Ayrshire farms in 1811 provoked the comment that "the respiration of a number of people sleeping in one compartment must create an unwholesome effluvia and render that room an improper place for cooking, eating victuals, making cheese, etc., through the day". (47) Growing commercialism in the early years of the nineteenth century saw the emergence in the cheese trade of the middleman, or cheese 'cadger', who toured the farms buying cheeses for sale in the major centres of demand. The parishes of Dunlop and Beith, straddling the main routes from the Ayrshire Plain to the Clyde Valley, soon became centres of the trade and developed an entrepot function. In 1837 in Dunlop parish alone there were fourteen people engaged in the business which was held to be extremely lucrative. (48)

The Ayrshire Cow:

closely/

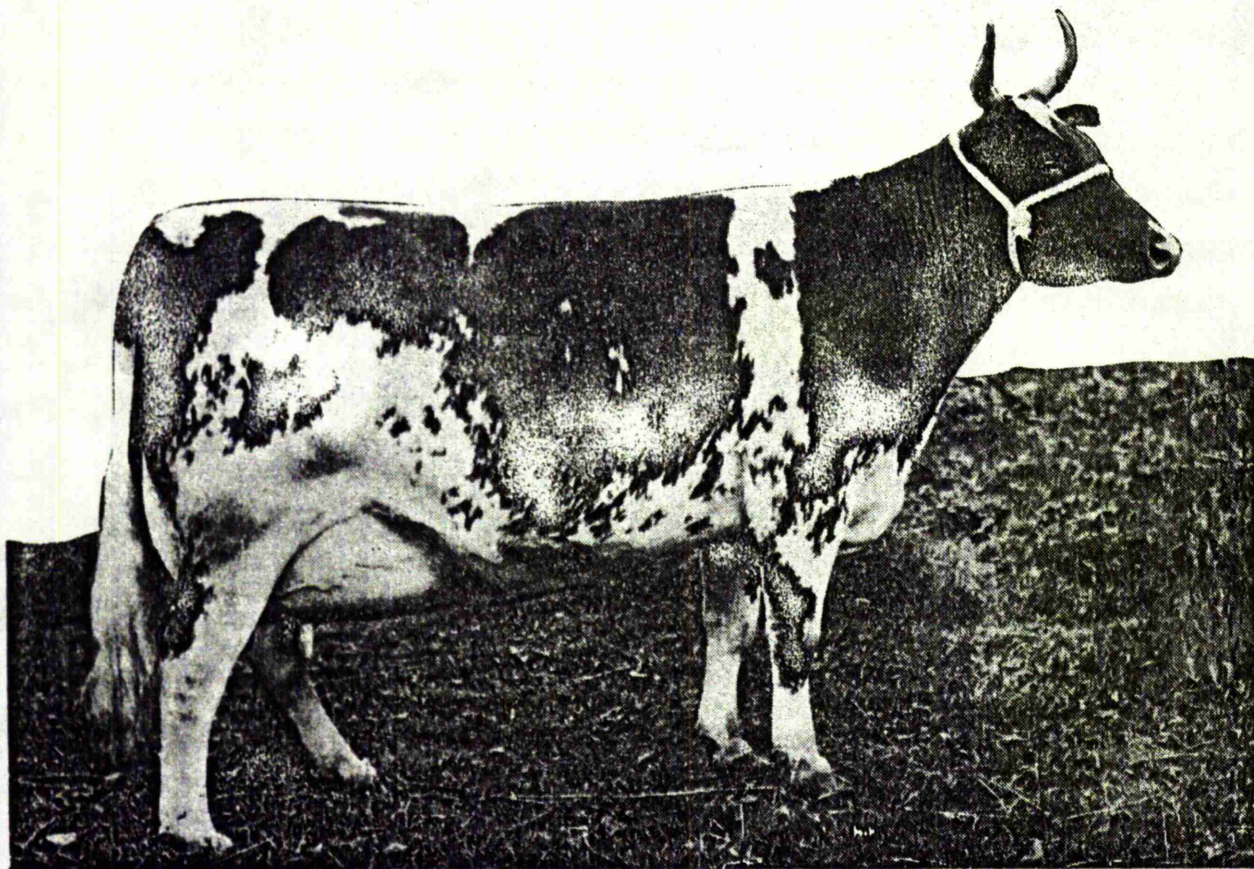
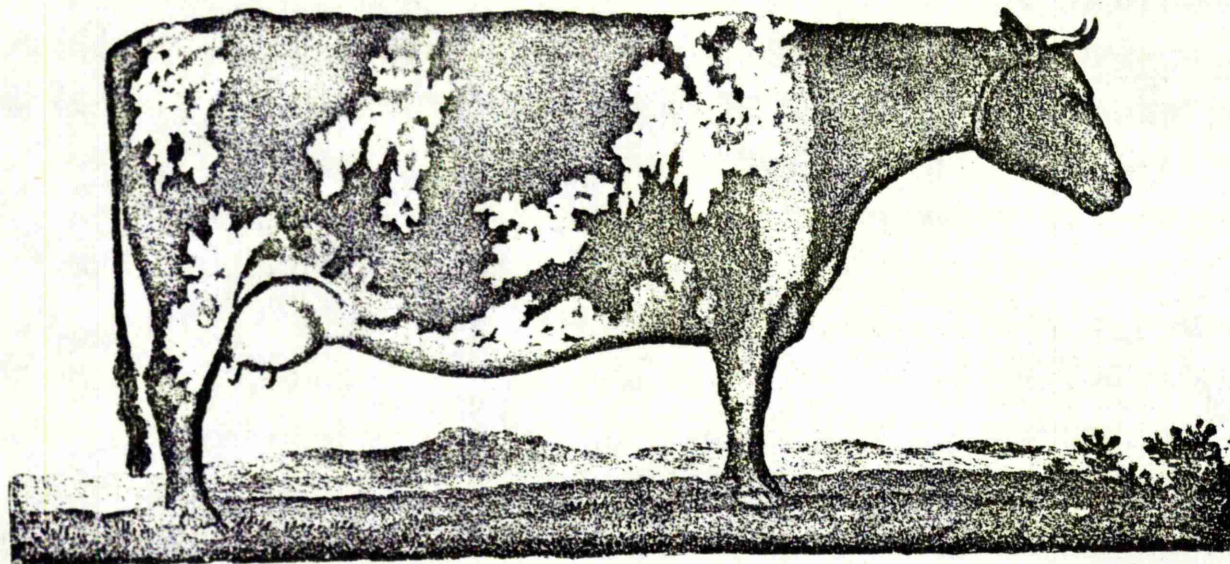
The Ayrshire Cow:

Closely parallel to the development of specialised dairy farming in the South west was the development of the Ayrshire cow. Originating, like the Dunlop cheese, in the traditional dairy area of north Ayrshire, the breed was in turn referred to as the 'Dunlop', the 'Cunningham' and finally the 'Ayrshire' cow, a sequence itself reflecting the breed's territorial spread. The term 'Ayrshire cow' did not become universal until the second half of the nineteenth century.

How far the early (17th Century) reputation of north Ayrshire for dairy produce was due to the presence there at that time of high yielding cows is far from clear. It has been suggested that north Ayrshire and the contiguous parts of Renfrewshire possessed at an early date a form of dairy cow which was the fortuitous result of interbreeding between the original local variety of black cattle and other varieties which were driven south from the Highlands. Large numbers of cattle from the West Highlands are known to have crossed the Clyde at Dumbuck ford near Dumbarton. (49) Although there is scant evidence on the point it seems unlikely that sheer physical conditions could have resulted in such a superabundance of dairy produce as that referred to by Font without there being at the same time an indigenous breed (or more properly, variety) of cow with a relatively high milk yield. In the absence of written evidence the existence of such a basic stock is suggested.

The real development of the Ayrshire cow can be dated from the second half of the eighteenth century in which period it was recorded as a distinctive breed for the first time. The Old Statistical Account, which for Cunningham is so full of references to the dairy system makes little reference to a distinctive dairy breed, though the account for Tarbolton records that the cows are "of a race famous for the abundance of their milk" and that they are "frequently brindled". By the time of the New Statistical Account, however, the breed was well established and apparently widely known. Aiton, writing in 1812, asserts that "for many years past" the breed has been introduced into every county in Scotland and/

Figure 6



Top. Ayrshire Dairy Cow as illustrated by Aiton in 1811.

Bottom. A modern Ayrshire Cow. (By courtesy of the Ayrshire Cattle Society).

and into many of those in England. (50) William Cobbett, after travelling in Ayrshire in 1832, wrote, "I was so delighted with these cows that I resolved that my country should not be wholly without them", and after having arranged with a friend in Newmilns for a bull and ten cows to be sent to his farm near London, he confidently asserted, "they will be worth a Kentish or a Sussex farmer's going fifty miles to see". (51)

From the late eighteenth century improvement of the native stock was both planned and rapid. Dutch blood is held to have been introduced about 1770 but accurate records are lacking. (52) Crossing of this kind would best explain the white in most Ayrshires. The distinctive horns may owe something to West Highland blood. (53) The nineteenth century saw increasing attention being paid to selection and there was much rivalry between breeders. The result was the gradual evolution of the Ayrshire breed as it is known to-day. Figure 6 summarises the changes that have been effected in the last century and a half. Most conspicuous of these was the development of the elongated udder which distinguishes the Ayrshire from all other dairy breeds. Another was the development of the characteristic upturned horns. In short, Aiton's "Ayrshire Dairy Cow" is as much Friesian as Ayrshire - perhaps more so - and is a pointer to an important stage in the breed's ancestry.

Well into the nineteenth century the Ayrshire cow was still, to some extent, a dual purpose animal. Though the breed was rejected by drovers, (55) it was considered a useful beef animal and at times even preferred for the purpose. (56) Similarly, the Galloway at that time was less specialised as a beef animal. Cobbett refers to numerous dairies with Galloway herds between Dumfries and Annan (57) and even as late as 1879, black cattle were still preferred as dairy animals on many Galloway farms, (58) where their rather higher quality milk was widely appreciated. Subsequent careful selection and breeding developed both breeds as single purpose animals.

The Ayrshire cow is clearly at once a product of, and partly responsible for, the spectacular development of dairying in south west Scotland during the nineteenth century. Its distinctive hardiness and ability to forage made it well suited to the pioneering role which it played, not only in the spread of the dairy system as such, but in the all round agricultural improvement with which it was so often associated.

CHAPTER 4.

THE PAIRI CHEESE ECONOMY - ADJUSTMENTS

By 1850 the dairy system, based almost universally on the Dunlop cheese, had spread from its original home in Cunningham throughout the whole of the Ayrshire Plain and had made substantial inroads into Wigtownshire (especially the Rhinns), the better parts of the Stewarty and into parts of Dumfriesshire, mainly upper Nithsdale which is in direct contact with Ayrshire and was nearest to the centres of demand. The lower parts of Dumfriesshire were late in adopting the system on any scale mainly because physical conditions, both of soil and climate, allowed a relatively prosperous mixed farming economy. In addition, before the advent of rail transport Dumfriesshire was peculiarly remote from the main centres of demand. The county was never well endowed with facilities for sea transport as, for example, was Wigtownshire where sea transport of cheese, both to the Clyde and to Liverpool, unquestionably played an important part in the early development of dairying.

Railway developments in the 1850's and 1860's had repercussions in the dairy industry that were as far reaching as they were sudden. Most obvious, the dairy system was allowed to extend into areas previously considered too remote from markets. Writing in 1873 Digger noted that in Kirkcudbrightshire "nearly all the dairies have begun in the last 25 years and a large proportion in the last 15". These dates would accord well with the introduction of the railway which linked Dumfries to Castle Douglas in 1858 and was extended to Portpatrick four years later.

More important, perhaps, than a simple extension of the dairy system, railway developments meant that English Cheddar cheese entered into serious competition with Dunlops for the first time.^{**} The Dunlop was never,
by/

^{**} It was not the case, however, that prior to the railways the Scottish cheese market was totally immune to foreign competition. Aiton (1812, p.207) refers to "an immense quantity of English and Dutch cheese" which served to keep prices down on the Scottish market.

by national standards, a high quality cheese and almost immediately it realised a lower price than its competitor. The following letter, submitted to the Dumfries Times in 1842 was a clear forewarning. (59)

"Dear Sir,

Having been in the habit for several years of receiving a number of dairies of Scotch cheese, and having noted their great deficiency in comparison with English cheese of the same richness, I have been induced to turn my attention to the different methods used in the two countries. In the course of last summer, being over in Wigtownshire purchasing cheese, I availed myself of that opportunity to make enquiries, and to witness the different processes in cheese-making adopted there, and on my return contrasted them with those adopted by our Lancashire farmers.

The faults found by English purchasers with Scotch cheese are - 1st. their soapy nature when cut.... 2nd. their want of firmness.... 3rd. their want of a ripe smart flavour....

Nearly all the Scotch cheese are of richer quality than English, and the deficiency is altogether in the management.

In Scotland, the making of cheese is entrusted principally to hired servants, or 'dairy maids'; here, in Lancashire, the farms are much smaller and the farmers' wives, almost without exception, act in that capacity, besides attending to their other numerous duties. From this it will be seen that the process takes up much less time with us than you devote to it; we not only save time but often make superior cheese of inferior milk.

(There follows an exhaustive examination of the different systems of cheese making).

I am, Sir,

Your obedient servant,

WILLIAM LIVERSEY,

8 St. Ignatus-Square, Preston,
Lancashire.

Unfortunately cheese prices at that time are hard to come by but these figures for a later period illustrate the slight yet persistent differential between Dunlops and Cheddars.

Wholesale/

Wholesale prices (per cwt.) at Glasgow in June of each year

(1st quality)	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
Cheddar	156/10	104	83	92/8	93	95/6	91/10	112	101/3	124	88	94/3	78/5	78
Dunlop	151	100	72/9	92/6	82	94/3	88/5	111/4	99/8	122	86	91/9	67/2	64

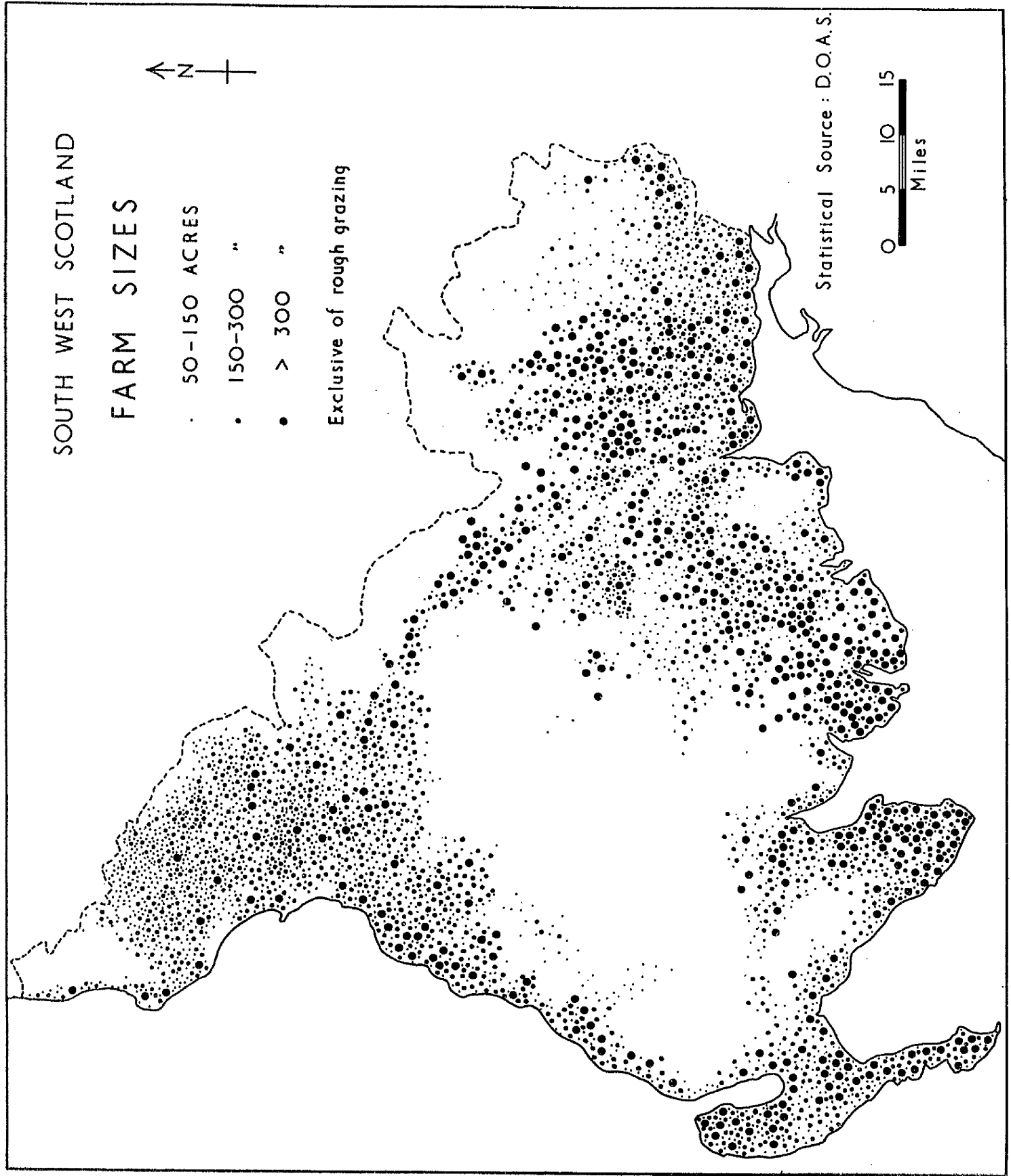
Source - Scottish Journal of Agriculture.

The Scottish farmers were quick to appreciate the significance of these developments and in 1854 under the aegis of the Ayrshire Agricultural Society a deputation was sent to Somerset to enquire into the Cheddar system. In consequence two Somerset men, Messrs. Harding and Norton, were engaged for the following season to give itinerant instruction in the Cheddar method of cheese making. Their teaching fell on receptive audiences and nowhere is there any record of that conservatism of which the farming community is so often accused. In the space of a decade or so the Cheddar system ousted the Dunlop over the greater part of the south west. Some of the more enthusiastic of the womenfolk even took the trouble to make the journey to Somerset in order to "learn the system at the fountainhead". (60) Later it was considered "no exaggeration to say that the new mode has added 10/- per cwt. to the value of cheese made in the south west." (61)

The Dunlop cheese, however, was not completely displaced. On the contrary, in Cunningham in particular it remained the principal type made. This being the original home of the Dunlop cheese and the area wherein it was made to its perfection - cheese merchants for a time had a "significant horror" of Galloway cheeses (62) - would perhaps be reasons by themselves. But there was a further, less controvertible control. The Cheddar is a big cheese, seventy to eighty pounds in weight, the Dunlop much smaller, weighing about half a hundredweight. As it requires about fifteen gallons of milk to make one stone (avoirdupois) of cheese, one Cheddar cheese represents about eighty gallons of milk or the daily output of twenty-five to thirty cows. Since milk cannot be stored for cheese-making, the scale of manufacture is limited by the daily output of the herd.*

* Not strictly, for it was not unusual for milk to be stored in shallow coolers until enough for a cheese was collected. The practice, however, had obvious dangers for if the milk is slightly sour before being coagulated, very inferior cheese results. It is extremely unlikely that milk was ever regularly collected like this for more than a day in order to make a Cheddar rather than a Dunlop cheese.

Figure 7



Consequently farms with a milking herd of less than about thirty cows were unable to adopt the Cheddar system, except perhaps for a few weeks during the spring milk flush. In other words most of the small family farms were obliged through their scale of operation to continue as Dunlop producers. The prevalence of such relatively small farming units in north Ayrshire can be seen in figure 7. The reasons for these regional differences in farm size are probably rooted in pre-history. Certainly the importance of family labour, scarcity of capital and small herd size have repeatedly, and in a variety of ways, set Cunningham apart from the rest of the south west, and size of producing unit was undoubtedly the main factor in the division of the farm cheese economy in ^{the} 1850's and 1860's into two distinguishable, if overlapping, regions - the Dunlop north and the Cheddar south. Confirmatory evidence lies in the fact that in Galloway small producers were reported as remaining in the Dunlop system. (63) (The original Cheddars from Somerset did not reflect a prevalence of big herds in that area for they were made co-operatively by the cowkeepers of Cheddar village. (64) More recently farms making cheese in Somerset were supplied with additional milk from other farms in the neighbourhood). One might have supposed that the smaller farms could with profit have manufactured a small 'Cheddar' cheese, but the cheese market remained peculiarly conservative and to be marketable as Cheddar a cheese had to accord to the recognised dimensions, irrespective of the recipe followed. In north Ayrshire tradition, of course, played its part too, and on some Cunningham farms which were big enough for Cheddar production, two Dunlops were made instead. Many farms had both Dunlop and Cheddar size moulds and change from one to the other in response to market demand was a simple and common procedure. (65) Inevitably the two cheeses became more and more alike in actual quality to the extent that to-day they are virtually indistinguishable to all but a connoisseur, and a rumour has for some time been current in dairy circles that one creamery in the south west was making both types from the same curd.

In Wigtownshire the arrival of the railway together with the new Cheddar system laid the foundation of that county's later pre-eminence in the field of cheese dairying. The prevailing large farm unit was well suited/

sited to cheddar cheese production. More important the new system brought with it new ideas in dairy appliances such as improved cheese presses and was generally associated with more exactness in the manufacturing process. Less hindered than Ayrshire by lack of capital, antiquated equipment and traditional ideas, technical progress in the county was rapid. Wigtownshire soon took the lead from Ayrshire in the business of dairy management and before long Galloway cheeses ousted those of Somerset from first place in the market. To some the final triumph came in 1869 when the Galloway producers challenged the Somerset producers to a £200 wager on who could produce the best cheese. The challenge was not accepted. (66)

In the thirty years or so following the introduction of the Cheddar system and the consequent rise to pre-eminence of Galloway generally and Wigtownship in particular, the Scottish farm cheese industry probably reached its highest development. A new liberalism in British foreign trade policy, however, epitomised by the controversial abolition of the Corn laws in 1846, heralded a new era in British agriculture. The much feared depression of farming resulting from competition with low priced foreign produce came later than was generally expected but was nevertheless inevitable. As early as 1842 American cheeses had been coming into the country and were competing very favourably with the home produced varieties. (67) The importation increased yearly. In 1885 the United Kingdom's cheese imports were as follows:- (68)

U.S.A.	...	81,863,958
Canada	...	1,229,570
Holland	...	883,490
France	...	96,221
Others	...	41,959

The American and Canadian cheeses which were of a Cheddar type repeatedly proved themselves distinctly superior to the Scottish variety and the resultant position bore an obvious resemblance to the unequal competition between Dunlops and English Cheddars in the 1850's. Perhaps with the success of Harding and Norton in mind the Scottish Dairy Association in 1884, and largely at the instigation of Mr. Clement, a prominent Glasgow Cheese Merchant, induced two Canadians, Messrs. Harris and/

and Drummond, to come to Scotland and give instruction in the American methods. Again the instruction was well received and the new techniques were quickly and widely adopted, though with less far-reaching results. (69)

The importation of American cheeses and the adjustments which it led to in this country were but the beginnings of a fundamental dichotomy in the British dairy industry. Increasingly from that time the industry has had to contend with two alternative, separate and very different markets - the liquid market and the manufacturing market. The former, by the nature of the product is immune to foreign competition, while the latter is open to severe competition from abroad. New Zealand dairying, for example, operating under conditions involving a twelve month growing season, no necessity for artificial feeding stuffs or elaborate housing, and farms planned for modern techniques is in a position actively to compete in the European markets despite a 12,000 mile shipping charge. Progressively as the difference in price between liquid and manufactured milk increased, farmers were given more and more inducement to abandon cheese in favour of production for the liquid market. Trow-Smith asserts that from the mid-century mark liquid production was about twice as profitable as cheese or butter production, not counting the value of the whey and skimmed milk. (70)

The railways, of course, allowed the spread of liquid milk production to areas previously too remote from the centres of demand. Whereas previously liquid milk production was severely restricted to within carting distance of the centre of demand the market was now accessible from, if not open to, all farms within carting distance of a railway station. The qualification is important. There was no immediate widespread shift out of cheese production. Unfortunately accurate figures are not available since milk was not distinguished from other traffic in the railway returns but available records suggest a delay of twenty years at least before there was any significant abandonment of cheese production in favour of production for the liquid market. The reason lay in the demand position. Even to-day the liquid milk supply of the Clyde conurbation can be obtained, in summer/

summer, from within an approximate twenty mile radius. In view of the much smaller population in the mid-nineteenth century and the distinctly lower consumption per head (much of which would be of butter-milk rather than whole milk) the ten mile "carting distance" zone must have been well able to satisfy the existing demand. In winter when production on the liquid farms dropped by about a third, the demand was satisfied from the nearest cheese farms which were only too willing to take advantage of the liquid milk market. As the winter progressed cheese farms further and further afield would contribute such milk (if any) as they had available at that season. There emerged, therefore, an intermediate group of farms on which cheese was made for a variable period in summer and liquid milk sold during the rest of the year, the length of the cheese-making period varying inversely with proximity to the centre of demand.

It was clearly in the winter period, when the city had to seek further afield for its milk supply, that the advantages of the railway system were most apparent. The dispatch of winter milk by rail represented the first major modification of the farm cheese economy of the south west. As population and demand expanded cheese farms progressively further afield were able to take advantage of the position, but progress was slow. By 1873, eleven years after the introduction of the railway, not one farmer in Kirkcudbright or Wigtown had ever sent milk to the city. In the towns 'railway milk' was held to be inferior, perhaps with some justification, and customarily commanded a lower price.⁽⁷²⁾ It was not uncommon for city dairymen to warm the milk slightly in order to create the illusion of its being fresh from the cow.

Dumfriesshire, having the quickest main line links with Glasgow⁽⁷³⁾ sent "large quantities" of winter milk as early as the 1860's but it was not really until the 1880's that the winter milk trade became a valuable source of revenue to the Galloway farmers. Writing in 1886 Speir notes that the liquid milk trade between the main urban centres and outlying farms near railway stations "has sprung up within the last fifteen or twenty years but more particularly within the last ten years".⁽⁷⁴⁾

Wigtownshire/

Wigtownshire, which was so well suited to cheese dairying, soon found that remoteness from the consuming centre weighed very much more heavily against liquid milk production and entry into the market was not easy. This remoteness was not one of sheer distance for rail transport was cheap and presented no difficulties. The real obstacle lay in the intervention of Ayrshire which was well able to cater for most of the demand. It is significant that even in the nineteenth century Wigtownshire milk which could not find a market in Glasgow or Edinburgh was railed to the south of England. (75)

Progressively with the growth of demand, more and more farms in Ayrshire found it possible to sell milk in the towns throughout the year and became liquid milk producers in the full sense. In this way farm cheese production became increasingly associated with the remoter parts, though it remained widespread in Ayrshire, and was present even in Cunningham, well into the twentieth century.

CHAPTER 5

THE DEVELOPMENT OF DAIRY FARMING IN DUMFRIESSHIRE.

Though from a purely geographical point of view a county unit seldom has much real meaning, the development of dairying in Dumfriesshire has been sufficiently distinctive to merit special attention. This distinctiveness lies mainly in the relatively recent widespread adoption of the system, especially in the lower part of the county. It was mentioned earlier that two major obstacles stood in the way of the early introduction of dairying (cheese-making) into Dumfriesshire. One was the suitability of the land for a relatively prosperous mixed (grain and store cattle) farming system, the other an early remoteness from the major consuming centres. The inter-war period saw the progressive weakening of those obstacles in the face of a number of independent developments. Fundamental, of course, was the increasing depression of agriculture and the attendant relative (perhaps only apparent) profitability of liquid milk production. For a full analysis of the growth of liquid milk production, however, it is necessary to look back to the years prior to the First World War.

About the turn of the century, Sir Robert Buchanan Jardine of Castlemilk, near Lockerbie, who realised the advantages in the form of higher rents accruing from sound investment in dairying, played a prominent part in the establishment of the Dumfriesshire Dairy Co. Ltd., later to become the Edinburgh and Dumfriesshire Dairy Co. Ltd.. This was incorporated specifically to market the liquid milk production of Dumfriesshire farmers and of those on the Castlemilk estate in particular. A creamery built at Lockerbie manufactured supplies surplus to liquid requirements after the fashion of the early co-operative creameries in north Ayrshire.* Outlets for milk were found mainly in Edinburgh and on the east coast generally, but it was not until about 1920 that a real break-through into the market was effected. About that time the Company opened a number of retail dairies in Edinburgh, Dundee and Perth and with them a firm link was established between producer and consumer. By overcoming the remoteness of/

*

See below Chapter 14.

Figure 8

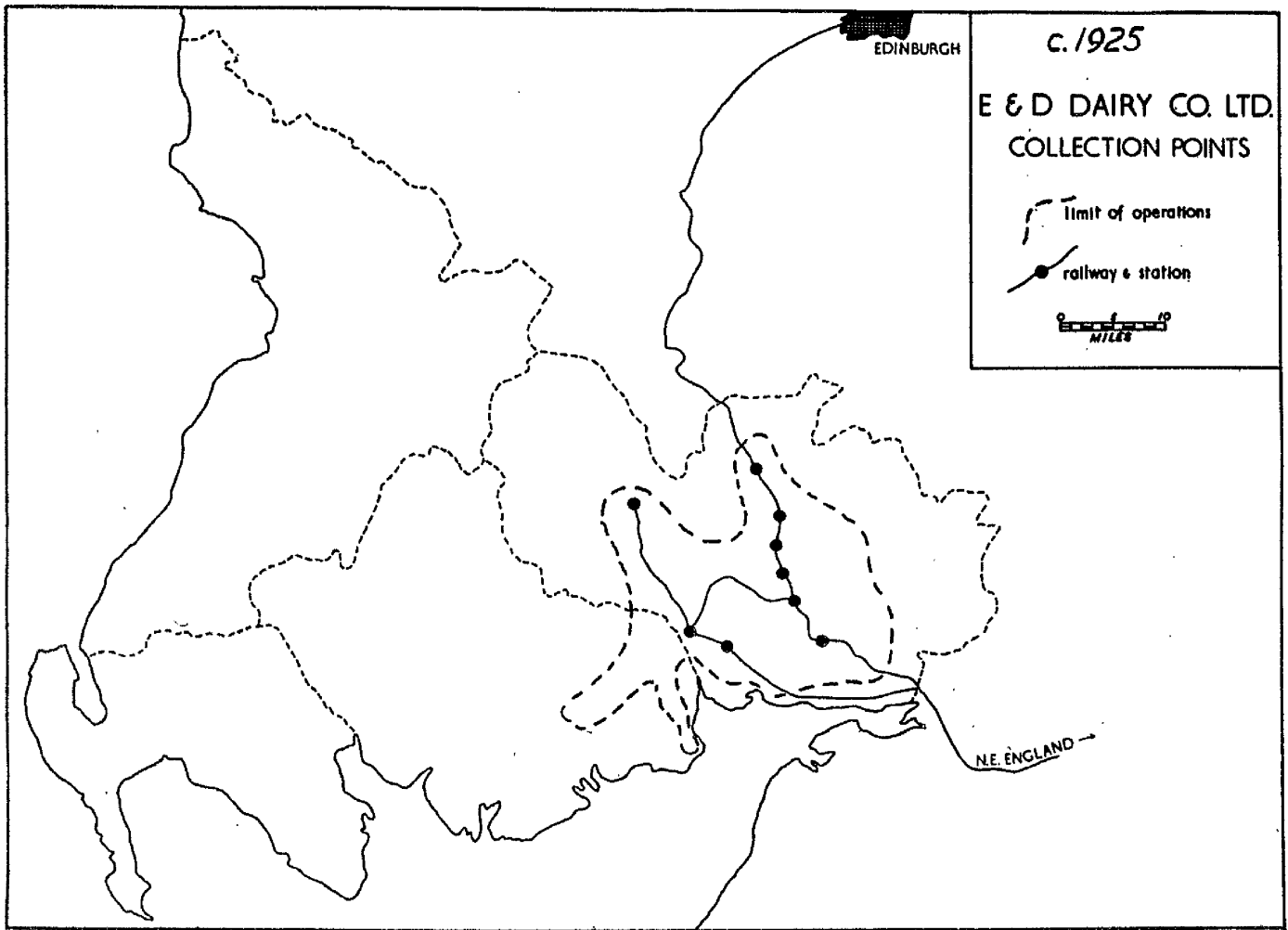
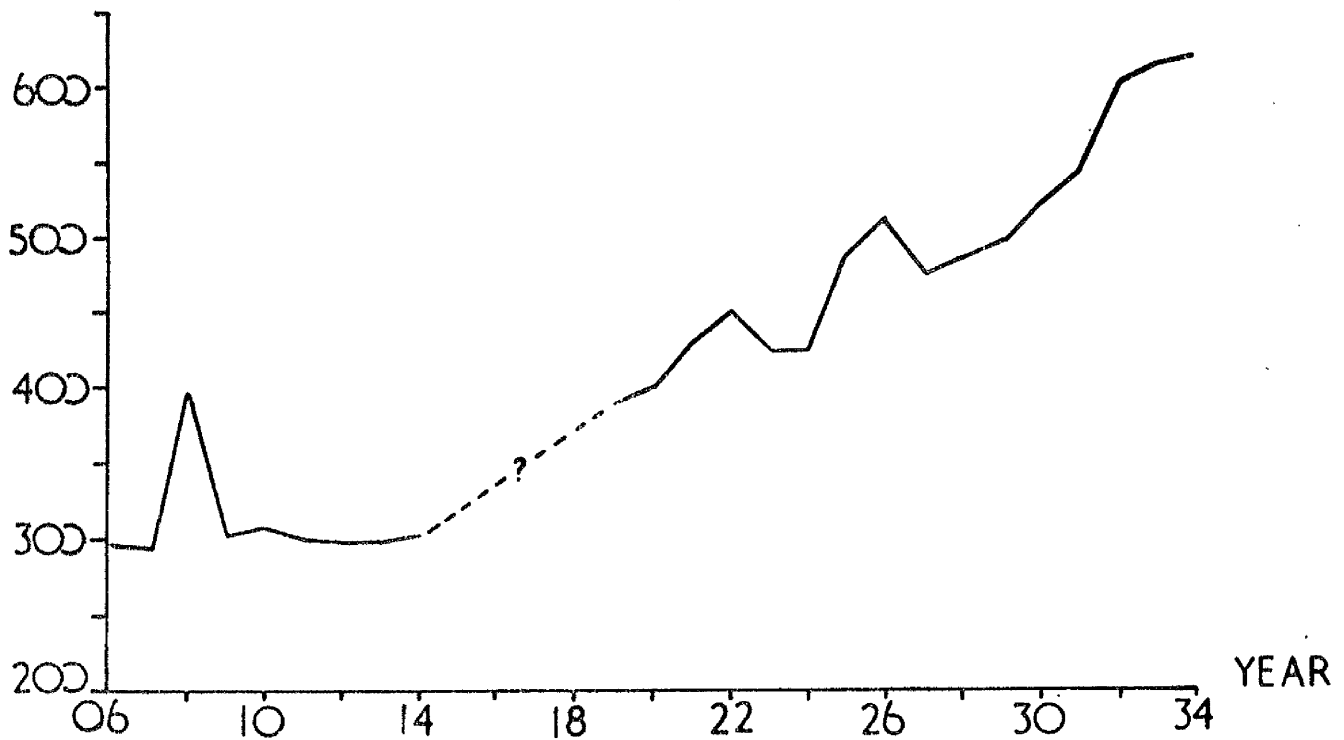


Figure 9

DUMFRIESSHIRE DAIRY FARMS 1906 — 1934



of the Dumfriesshire producer from the centres of demand the Edinburgh and Dumfriesshire Dairy Co. played a vital role in the foundation of dairy farming in the county and especially in the lower part where cheese was never of any great importance. Consequently the 1920's saw a marked increase in the number of dairy farms (Figure 9) and it can be assumed (there are no accurate records)** in the milking herds on existing dairy farms.

Naturally the company's operations were concentrated in the east of the county, in Annandale in particular, and the previous marked association of dairying with Upper Withedale no longer applied. Railway links were crucial. Figure 8 shows those stations from which milk was despatched to the consuming centres. The company's milk purchasing activities were largely confined to within the county where in the inter-war period it was by far the most important buyer. A few reliable, high quality producers sent milk from as far west as Kirkbean and Castle Douglas in Kirkcudbright.

Later in the 1920's the Company acquired a second (wholesale only) outlet in Newcastle and Sunderland providing an alternative market and thereby a more stable day to day demand. No meaningful figure can be put on the relative quantities of milk sent to each of these two main outlets since day to day diversions were normal and farmers sent to Edinburgh or north east England as the demand arose. Telephone messages received at railway signal boxes were used to advise local farmers on where to send their milk and a widespread custom of family baking on Sunday afternoons in north east England resulted in a major diversion of Dumfriesshire milk towards the end of the week.

Notable among the other outlets for liquid milk in Dumfriesshire in the inter-war period were the Dundee Pasteurised Milk Co. and the Carse of Gowrie Dairy. Both of these, however, were mainly winter buyers. The Edinburgh and Dumfriesshire Co. was distinctive in that it offered all year contracts to the farmers. These contracts stipulated that the winter supply be at least two-thirds of that in summer, a clause which may be reflected/

** Dairy cattle were not distinguished from other cattle in the Agricultural Returns prior to 1933.

reflected in the seasonal pattern of production in Dumfriesshire to this day (Chapter 12). Some farmers preferred to manufacture in summer and to negotiate high 'scarcity' prices in winter. These prices were distinctly higher than those obtainable under contract. (76)

Those farmers who entered liquid milk production at this time in response to the amenities provided by the Edinburgh and Dumfriesshire Dairy Company, extended well beyond the Castlemilk estate where the venture first started. Elsewhere estate policies varied widely and though seldom obstructionist they were equally seldom positively encouraging. In such a period of unrelieved depression investment of any kind required courage and single-mindedness to a rare degree.

Though less so than formerly, Dumfries is still a county of big estates. The prejudices, financial circumstances, business acumen and prescience of the lairds all have had an important, if obscured, influence on the farming scene. It is seldom, if ever, the policy of an estate now to lay down the system of farming to be followed. Much more so was this the case in the nineteenth century when tenants were sometimes threatened with imprisonment if they did not follow crop rotations specified by the landlords. On the whole this system of control from above was largely responsible for the relatively advanced state of farm management in lowland Scotland at that time, though serious mistakes were made (see above p.19). In Ayrshire and Wigtownshire, and to a lesser extent in Kirkcudbrightshire, dairying has been established long enough for the results of any past restrictionist estate policies to be overcome or obscured. In any case, the nineteenth century generally was a period when most estates fostered agriculture in every possible way.

The important fact in the inter-war period was that if a farm was actually let as a dairy farm the landlord was by law obliged to undertake the structural alterations necessary to bring the premises up to dairy bye-laws standards. Even where the initial buildings were in good order alterations were normally extensive - cement plastering of byres, ventilation brought up to standard, grips widened, and milk and boiler houses/

houses built on. Frequently, in addition, the existing water supply system was inadequate for the heavy demands of cooling and washing twice a day. Against this had to be set the higher rents payable on dairy farms.

On several of the bigger estates the expense of conversion to dairy premises was considered excessive and farms were let specifically as stock and cropping farms and not as dairies. No instance has been found of an estate adopting a policy of prohibiting dairying (some individual requests for dairies were refused on the grounds that the land was not suitable), but where a farm was not let as a dairy the onus of building improvement was put upon the tenant. This policy has been followed in particular by the Annandale and Sprinkell estates. Even without estate assistance, however, many farmers were prepared to incur the expense involved in adopting the dairy system, on average to-day about £100 - £120 per cow. This in itself is a measure of the relative attractiveness of milk production in the depression years. On the Annandale estates in the 1930's 31 farms, totalling approximately 7000 acres, turned to dairying with no financial assistance from the estate. It should be remembered that the period saw the introduction of the Scottish Milk Marketing Board.

It was not always the case, however, that the estates had a free choice in these matters. Small farms in particular were very difficult to let at that time and virtually unsaleable. One source of demand remained in the Ayrshire (and Lanarkshire) farmers, referred to earlier who were looking for farms and who formed the vanguard of the more conspicuous migration to south east England.* Several landlords found it necessary to equip farms as dairies in order to accommodate these people. This was notably the case on the Annandale estates.

A good deal of indefiniteness surrounds estate policy on this matter since each case is normally considered on its merits and the estates are naturally unwilling to commit themselves. It is clear, however, that/

* The movement into Dumfriesshire was conspicuous enough to be consciously noted. "Another b--- through the Thornhill tunnel!" was a common expression among Dumfriesshire farmers.

that the importance of the estates in Dumfriesshire, coupled with the fact that dairying developed there especially rapidly in the uncertain years of the depression, have made the outlook of the landed classes a force to be reckoned with in the subsequent geography of dairy farming in the county. Many of the empty spaces in the distribution map of dairy farms in lowland Dumfriesshire must be at least partly attributable to recent estate policy.

The development of dairying in Dumfriesshire in the inter-war period was marked by the same cautiousness that characterised the nineteenth century adoption of the dairy system in Galloway. Unwilling to sever all connections with the store cattle system, farmers, especially on the Solway Plain and parts contiguous with England, used a White Cumberland Shorthorn bull with their dairy cows. The bull calves were readily acceptable for rearing on the many store cattle farms of the area while the heifers found a ready sale to English buyers. Pure bred dairy herds were not common in lowland Dumfriesshire until after the Second World War when the expanded dairy industry created a high demand for pure-bred stock. (77)

Figure 10

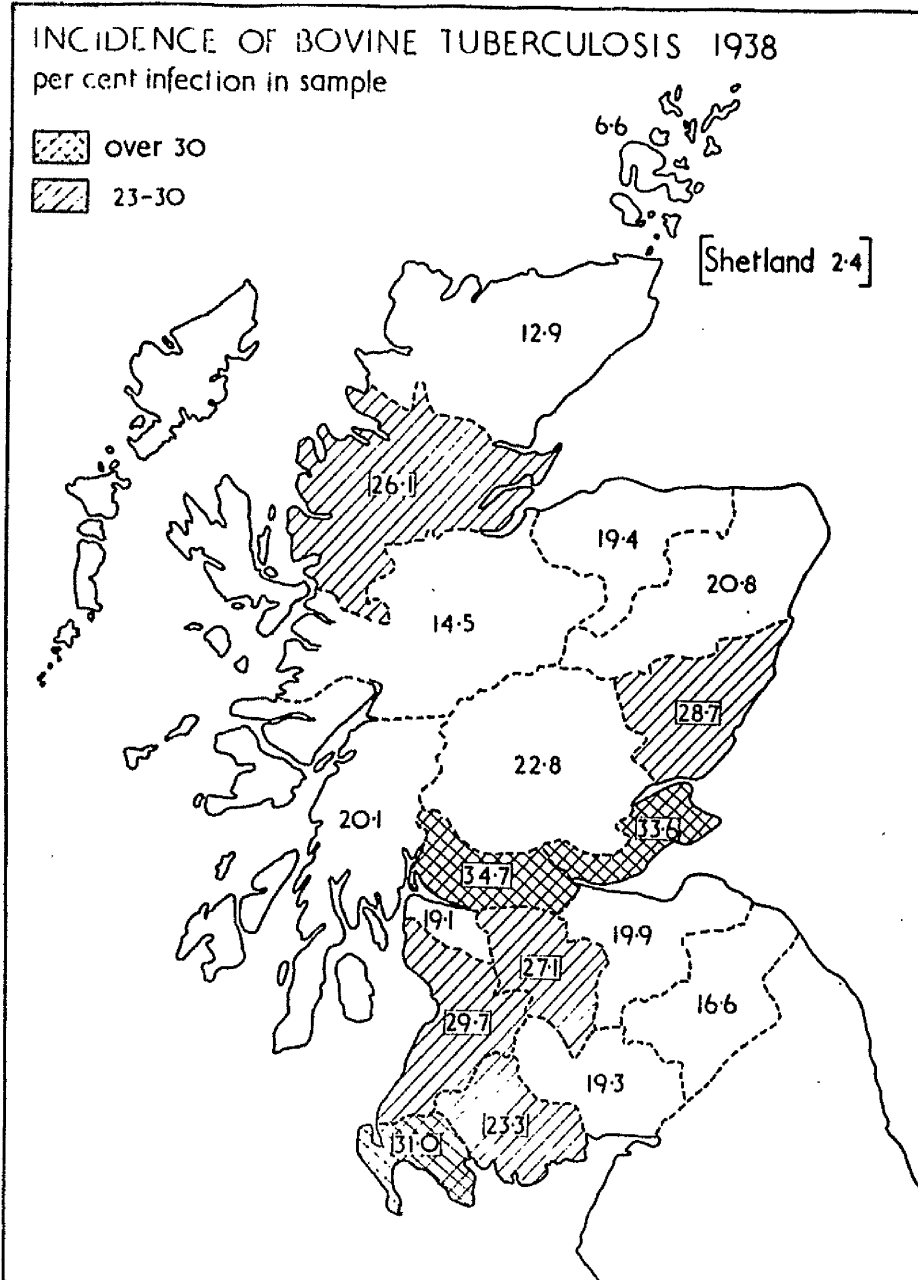
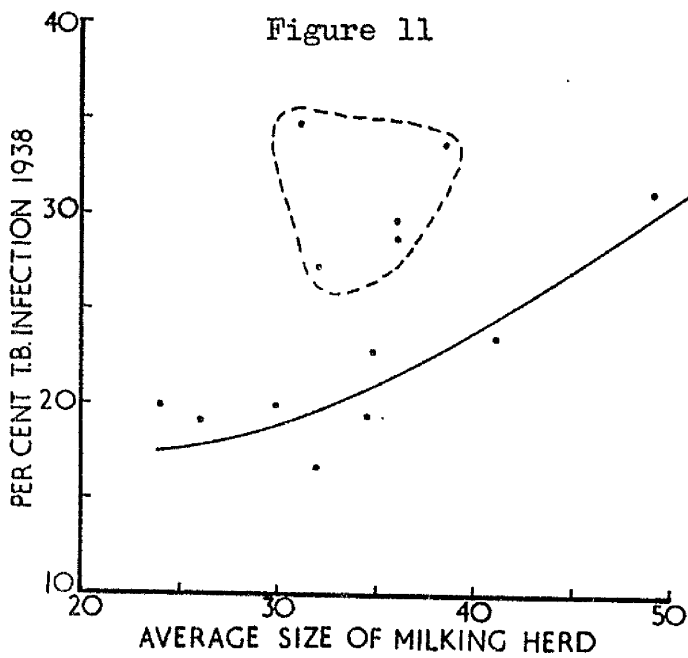


Figure 11



CHAPTER 6

THE ERADICATION OF BOVINE TUBERCULOSIS

This chapter is very properly included in the historical section for since 1st October, 1959, the whole of Scotland has been free from bovine T.B.. It is one of the great success stories of Scottish Agriculture and deserves attention for that reason alone. More important here, however, the incidence of T.B. among dairy cattle is known to have varied widely between areas and, therefore, the issue possesses a geographical significance which has been given little attention.

The eradication of bovine tuberculosis in Britain can be dated from the Milk (Special Designations) Order of 1923 which made provision for farmers to sell milk from tuberculin tested cows though it made no provision for the systematic establishment of T.B. free herds. This came with the Attested Herds Scheme of 1935 involving control over the movement of cattle and special bonuses paid through the Milk Marketing Boards or the Department of Agriculture. On 1st October, 1952, south west Scotland was declared an Eradication Area and provision made for the final clean-up of all herds. This was completed within five months and on 1st March, 1953, the four south west counties together with Renfrewshire, were declared an Attested Area free from bovine tuberculosis. Apart from the Shetland and Scilly Isles, where the disease was never common, this was the first part of Britain to reach this status. In 1938 a sample survey was made of the incidence of T.B. in self contained dairy herds (73) and the results were taken cautiously, as an indication of the general incidence of T.B. in each area (Figure 10). The most important and most obvious shortcoming of the survey was the fact that it was restricted to self-contained dairy herds and did not include flying herds. The latter, because of the frequent introduction of outside stock, are known to have been particularly heavily infected. It is almost certain, therefore, that the incidence of T.B. in such areas as Renfrewshire, Lanarkshire and Aberdeenshire was distinctly higher than the figures given here/

here suggest. On the other hand, even so called 'self-contained' dairy herds typically buy in stock from time to time and cannot, therefore, be considered as existing in isolation from the rest of the national herd.

Dairy cows are more susceptible to infection than other cattle partly because the business of almost continuous milk production is a very exacting one but also because of the extent to which they are herded and confined in byres thereby facilitating the transmission of the disease. The spread of the disease must have been largely determined by such contact between animals and, therefore, by the movement of infected cattle through the country. The role of the south west as a major exporter of dairy stock was a prime consideration in the 1952 decision to declare it an Eradication Area; clearly the quickest way to rid the country of the disease was to attack it first in the stock-producing areas. The very small, almost non-existent, importation of dairy cattle into south west Scotland facilitated the campaign. Before the inauguration of the Attested Herds Scheme in 1935 many reactors were sold on the open market by farmers who were voluntarily cleaning up their herds. The moral issue at stake was salvaged for many by the conviction that the infected animals were sent to be "among their own kind", and by the dubious corollary that to sell healthy stock on the open market where they were exposed to infection was almost a criminal act! Such was the magnitude of the T.B. problem in the 1930's. Justice, of a kind, was frequently served when the infected animals arrived back on nearby or even neighbouring farms and so frustrated the original objective. More important, perhaps, large numbers found their way to England so that to some extent the Scottish farmer must be held responsible for the relatively uphill task of eradication in that country.

Since areas importing large numbers of cattle are susceptible thereby to increased infection, an exact statement of the movements of cattle would provide a means of estimating the actual endemic nature of the disease. Much of the early infection of the east must be attributed to these movements rather than to any indigenous factors. Were it possible, therefore, to set aside the consequences of these movements of cattle the relative position/

Figure 12

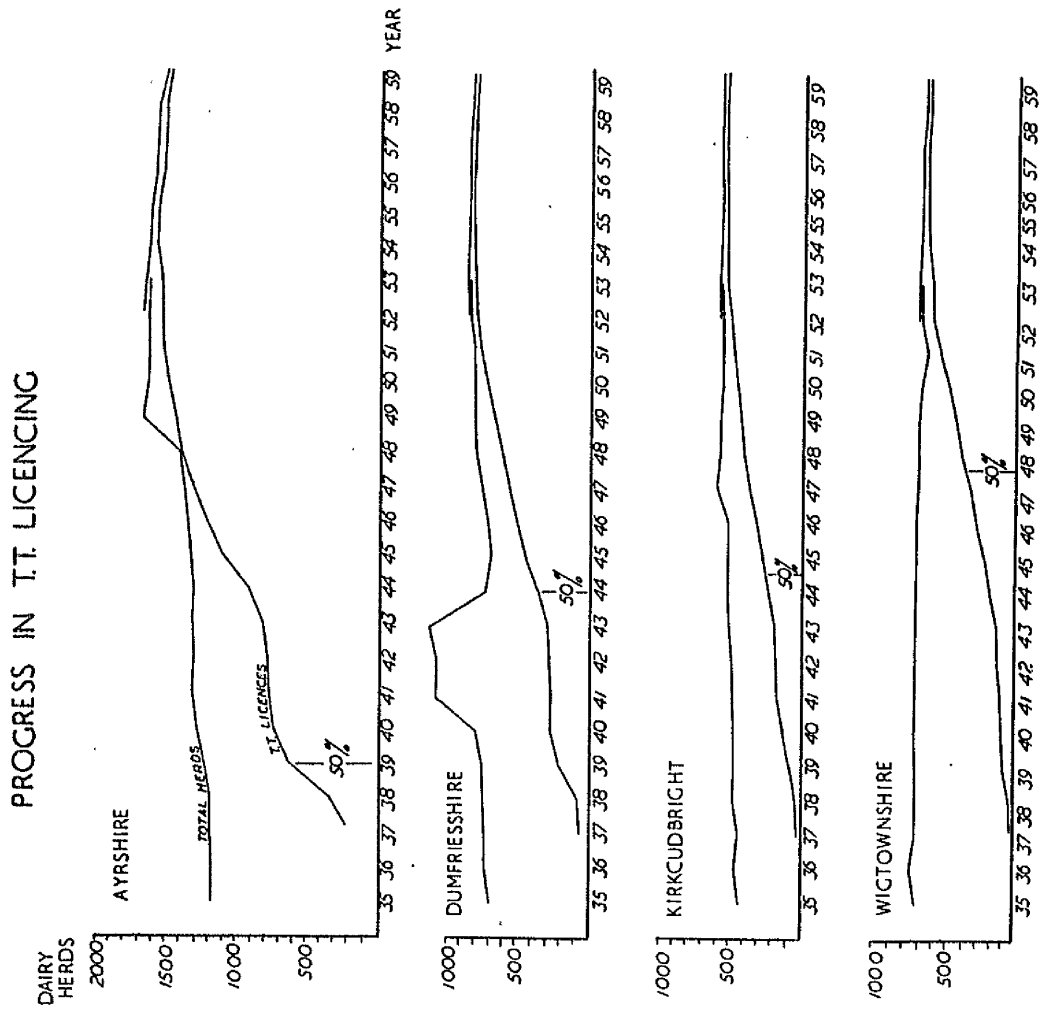
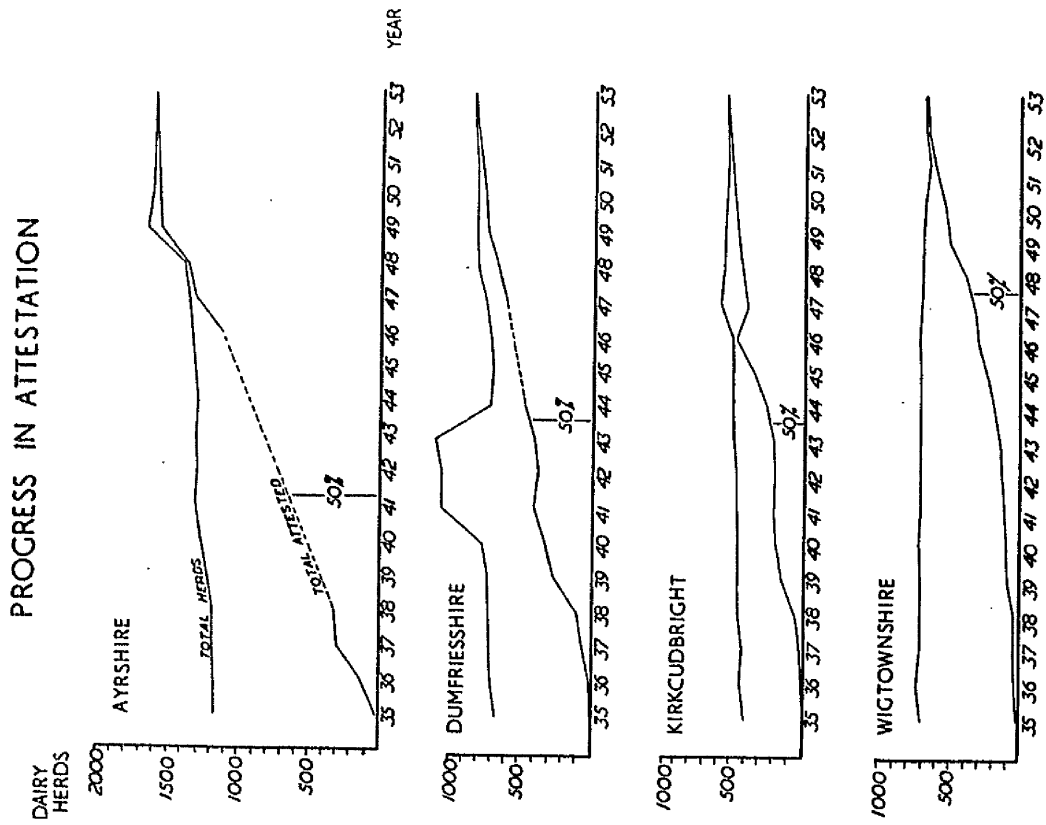


Figure 13



BROKEN LINE - NO RECORDS

position of the south west would be seen to have been much worse than it was in actual fact.

In the case of the south of Scotland (Figure 10) there does appear to have been a definite west to east decline in the degree of infection. This is almost certainly a function of the importance of dairying in each county since the thicker the cows are on the ground the more easily will the disease spread, but the possibility of a more basic environmental factor, such as climate, should not be overlooked. This is clearly a matter for physiological research. The Hannah Dairy Research Institute, where a great amount of work has been done on the effect of different climatic conditions on the metabolism of the dairy cow, has no evidence on the subject.

A contributory factor must undoubtedly lie in the prevailing herd size, for the bigger the herds in any one area, the greater is the contact between the animals. The relationship between average herd size and the degree of infection is expressed graphically in Figure 11 which refers to the counties in the Scottish Milk Marketing Board's area. The figures used in the compilation of the graph are set out in the appropriate section of Appendix A. The evidence is on the whole confirmatory, though not without exception, and the five most obvious anomalies have been ringed on the graph. These are, Angus and Kincardine; Ayr; Fife and Clackmannan; Lennox; Stirling and Dumbarton. It is not unreasonable to assume the overriding influence of some other factor in these cases, probably a relatively short grazing season meaning long periods in the byre. The correlation between herd size and degree of infection is particularly close in the southern counties from Wigtownshire to Berwickshire.

Figures 12 and 13 show the progress in T.B. eradication since the start of the scheme in 1935. 'Attestation' refers purely to the pathological state of the herd. In order to qualify for a T.T. licence certain minimum standards of premises and dairy management must be maintained. The number of T.T. licences follows very closely the graph of attested herds suggesting that farmers made the necessary improvements required for T.T. status as they built up attested herds. In 1959, however, there was still a hard core of 78 herds in the south west, the premises for which were not of/

of a sufficiently high standard for T.T. status. A final drive to attain hundred per cent T.T. licencing began on 1st April, 1960, since which date only milk from T.T. herds has been sold on the liquid market.

All the graphs show broadly the same trend as might be expected. A levelling off during the war years was due to a necessary relaxation of the scheme at that time. There are nevertheless interesting variations between the four counties. Wigtownshire in particular got off to a very slow start and did not reach 50 per cent attestation till 1948, a position which was attained in Ayrshire about eight years earlier, and in Dumfries and Kirkcudbright by 1944. When 50 per cent of the Ayrshire herds were attested only about 15 per cent of those in Wigtownshire had been cleared. To some extent this might be attributable to a greater initial infection in Wigtownshire but the lag is too great (the initial infection in Ayrshire was very nearly as high) to be fully accountable in that way. Here resort must be had to speculation.

Some explanation might reasonably be sought in the relative importance of cheese dairying in Wigtownshire. Indeed the progress in attestation in the early stages seems to have been greatest when cheese dairying was least important. Ayrshire took the lead followed by Dumfriesshire, then the Stewartry, and finally Wigtownshire. On the other hand, there is no evidence at all to suggest a causal link between cheese dairying and a relatively slow rate of progress. Cheese producers were given precisely the same financial incentives as those producing for the liquid market, and in any case their numbers declined rapidly in the 1930's.

A disincentive to attaining attestation may have been present in the proportionately greater expense involved in clearing the bigger herds of Wigtownshire though logically this should be set against a correspondingly greater income from such herds. In the last resort the explanation may be sociological. There is an undercurrent of opinion, difficult to justify by example and certainly not canvassed here, that the Wigtownshire farmer is peculiarly conservative in outlook. Certainly most of the major developments in dairy management (with the great exception of the Cheddar cheese in the nineteenth century) have come from Ayrshire. Cut off by moorland from both Ayrshire and Kirkcudbrightshire, Wigtownshire suffers from a very real isolation, which is only partially relieved by modern transport facilities.

CHAPTER 7

THE SCOTTISH MILK MARKETING BOARD AND ITS GEOGRAPHICAL CONSEQUENCES.

The antecedents and basic organisation of the Milk Marketing Boards are discussed in Part Two where they are more appropriate. Attention is restricted here to the effect of establishment of the Scottish Milk Marketing Board on the pattern of milk production in the south west.

The important point is that with the creation of the Board all producers, no matter where they were situated, had an assured market for their milk which they could have collected from their farms (not just from the farm road end as in England) by haulage contractors working under the Board's direction. Similarly all producers received the same basic price irrespective of where their own particular milk was sold. In this way basic 'space relations', for so long a vital consideration of the dairy farmer, lost their former significance. Their only manifestation to the individual producer to-day is a nominal haulage charge which varies with distance from the nearest of a number of prescribed "haulage centres". * These are fixed for accounting purposes and are not wholly realistic. For example, farmers in Wigtownshire pay the maximum haulage rate yet during most of the year their milk is transported only short distances to local creameries. The following are the haulage rates currently charged:-

Miles from "haulage centre"	d. per gall
0 - 5	$\frac{5}{8}$
5 - 10	$\frac{7}{8}$
10 - 30	$1\frac{1}{8}$
30 - 40	$1\frac{3}{8}$
Over 40	$1\frac{5}{8}$

It will be noticed that the difference between the rate payable

by/

* These are - Glasgow, Edinburgh, Dundee, Alloa, Brechin, Crieff, Cupar, Dunfermline, Duns, Galashiels, Haddington, Kinross, Kirkcaldy, Perth and Stirling.

Figure 14

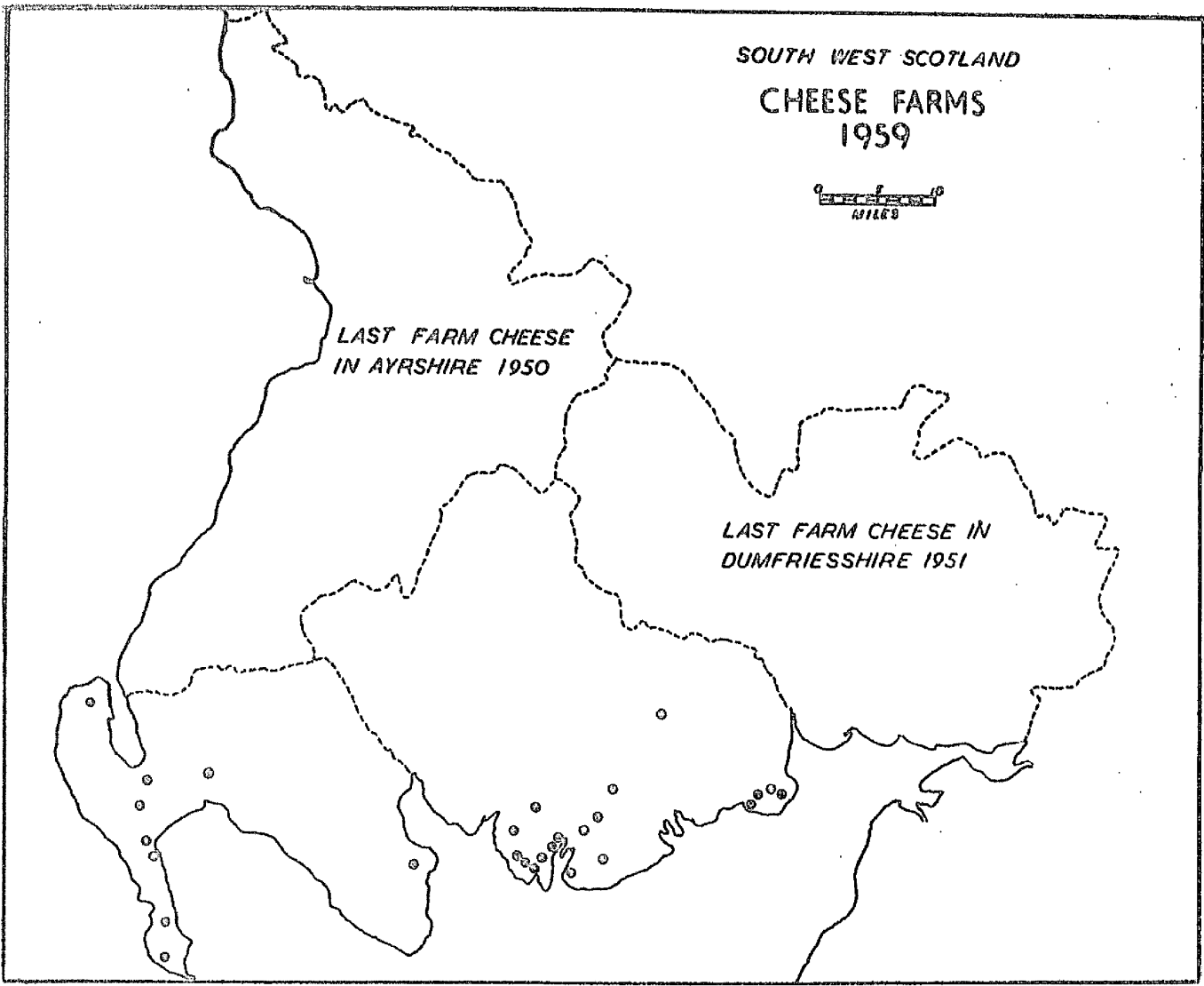
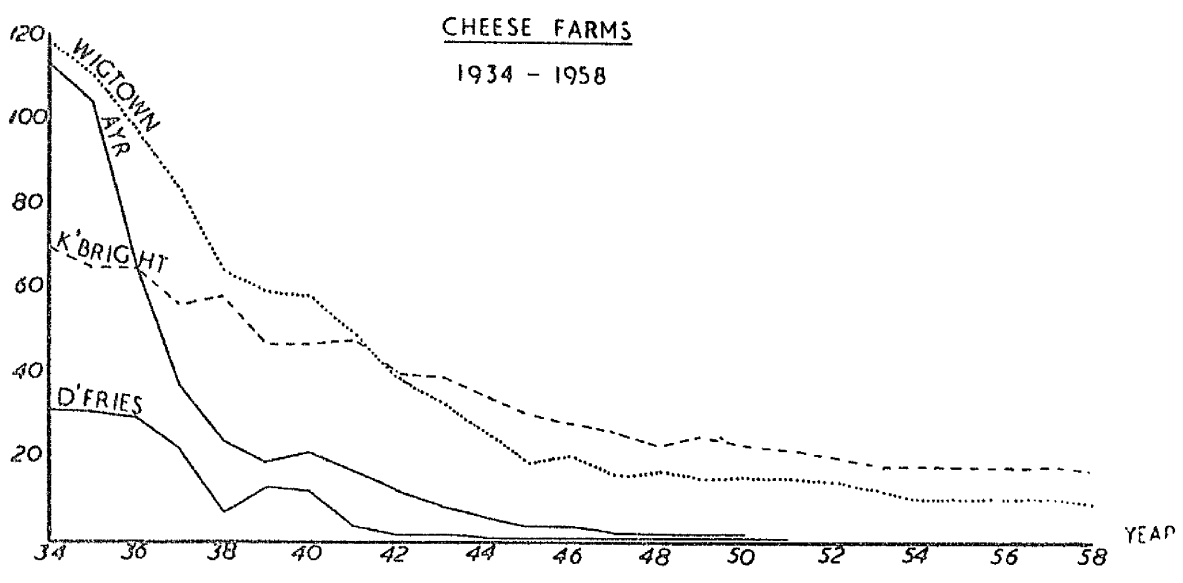


Figure 15



by a farmer in north Ayrshire and by a farmer in Wigtownshire is only $\frac{1}{2}$ d. per gallon (Glasgow being the relevant haulage centre). Effectively, therefore, the two are now on very much the same footing so far as the market is concerned. The inevitable consequence has been a continued, if uncertain, modification of the geography of dairying in the south west.

The most striking effect of these changes was a rapid acceleration of the already marked decline in farm manufacturing. Commercial butter making is now a completely uneconomic business and has disappeared entirely.* Farm cheese-making has similarly declined almost to the point of extinction but has persisted because the farm cheesemakers are specially subsidised to enable them to continue production. They are, in fact, encouraged by the Board for they are keeping milk off the market at a time when it would be surplus to liquid requirements in any case. It is to labour problems and the sheer bother of cheesemaking rather than to poor returns that the decline in the numbers of farm cheesemakers since 1954 must be attributed. In 1959 there were only 27 cheese farms left in Scotland, all in Galloway (figures 14 and 15). The system of payment is complicated, but may be outlined as follows:-

To the ordinary pool price (less the standard haulage deduction[†] and including any milk quality premiums) is added an allowance (generally 6d. - 6 $\frac{1}{2}$ d. per gallon) to compensate the cost of manufacture. From this total is deducted the average price of Scottish grade 1 factory cheese (95 lbs. cheese = 100 gallons milk). The difference is paid to the producer as a direct subsidy putting him on a par with ordinary producers yet leaving him free to compete with quality on the cheese market. The cheese farmers, together with the cheese creameries, have their own organisation in the Company of Scottish Cheesemakers which, as a non-profit making body undertakes to market the cheese for the farmers.

Since/

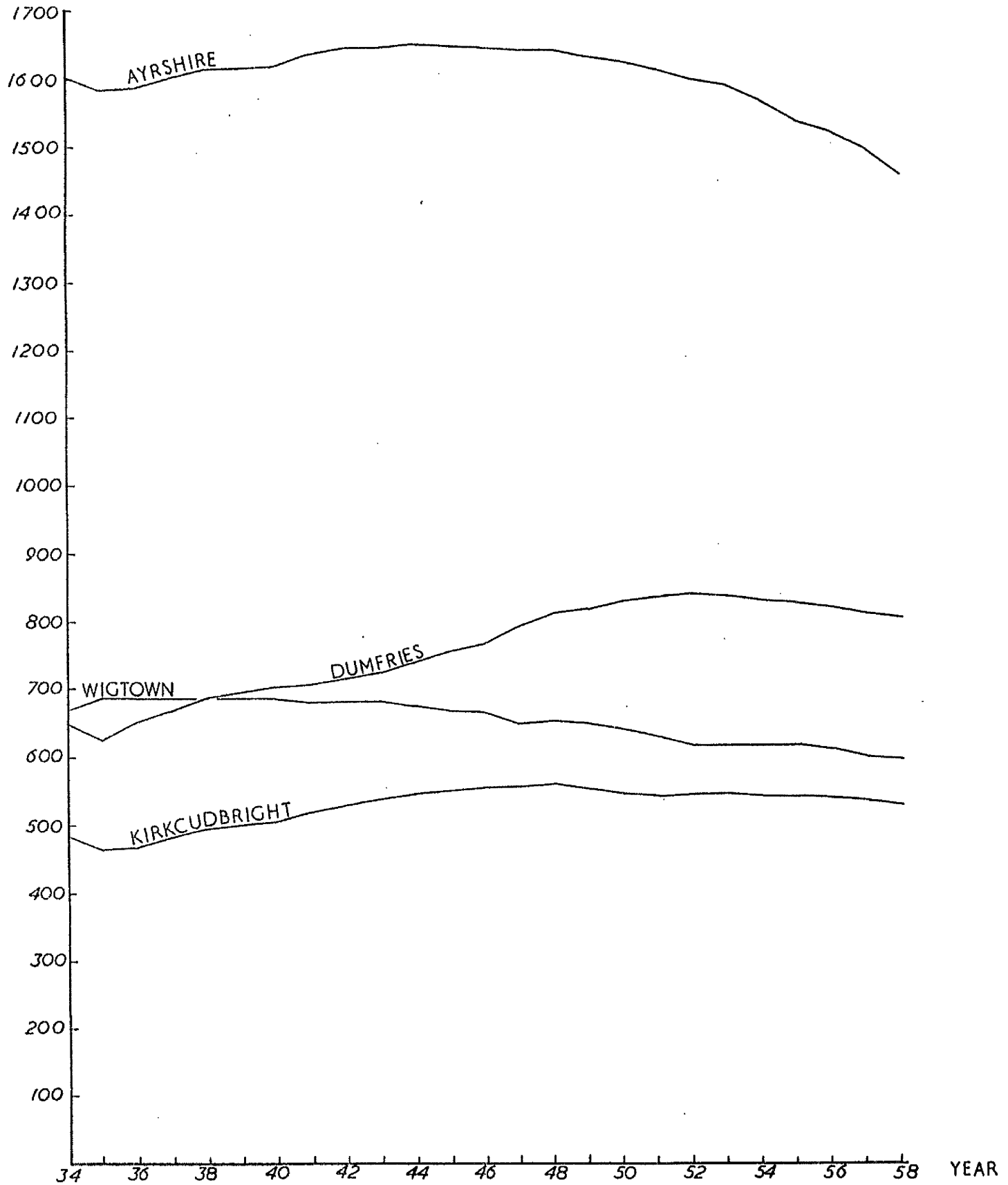
* One pound of butter is equivalent to about two and a half gallons of milk. Assuming the cost of a gallon to be 2/4 (Chapter 1) the cost of one pound of farm butter would be about 6/=-, not counting labour costs, overheads or the value of the butter milk. This is about twice the current retail price.

† An interesting fiction since the milk never leaves the farm.

Figure 16

REGISTERED PRODUCERS

PRODUCERS



Since accessibility to markets ceased in 1933 to be of any importance to the individual producer, dairying was enabled to spread to all parts of the south west where physical conditions were suitable. In theory, therefore, the distribution of dairying should to-day reflect the physical environment more closely than ever before. Numerous rigidities, obstacles and inertias have in fact thwarted such a development. One of the most obvious lay in the fact that the security of the monthly milk cheque at a time of general depression was a strong inducement to farmers to adopt the dairy system and in consequence many farmers, especially in Galloway, started dairies on land ill-suited to milk production. Milk production takes more out of the land than any other form of animal husbandry, and proper crop rotations, fertilisers and cultivation are necessary if the soil is to be kept in good heart. In the south west this means taking the plough round the farm and periodically renewing the pasture. Many of the small marginal farms which started dairies at that time were ill-adapted to such treatment and have since struggled to prevent a spiral of soil deterioration.

The extension of dairying following the establishment of the Board was most marked in Dumfriesshire where room for expansion was greatest. (Figure 16) Kirkcudbright similarly experienced a significant increase in the number of dairies mainly on the smaller marginal farms which were previously in store cattle rearing. In Ayrshire and Wigtownshire, on the other hand, most of the land suitable for milk production had been put to that use prior to the Board and change in the extent of dairying has been relatively small. In these two counties the numbers of producers have actually declined, by 8% and 14% respectively, since the Board started operations. The figures, however, are deceptive since the decline results largely, if not entirely, from amalgamation of holdings, a feature common to the whole area throughout the period. Total production has risen in all four counties over the period only showing a decrease in recent years. Much of the increase has been due to a marked improvement in yield per cow, as can be deduced from the following table.

Per cent/

Per cent change 1934-1958.

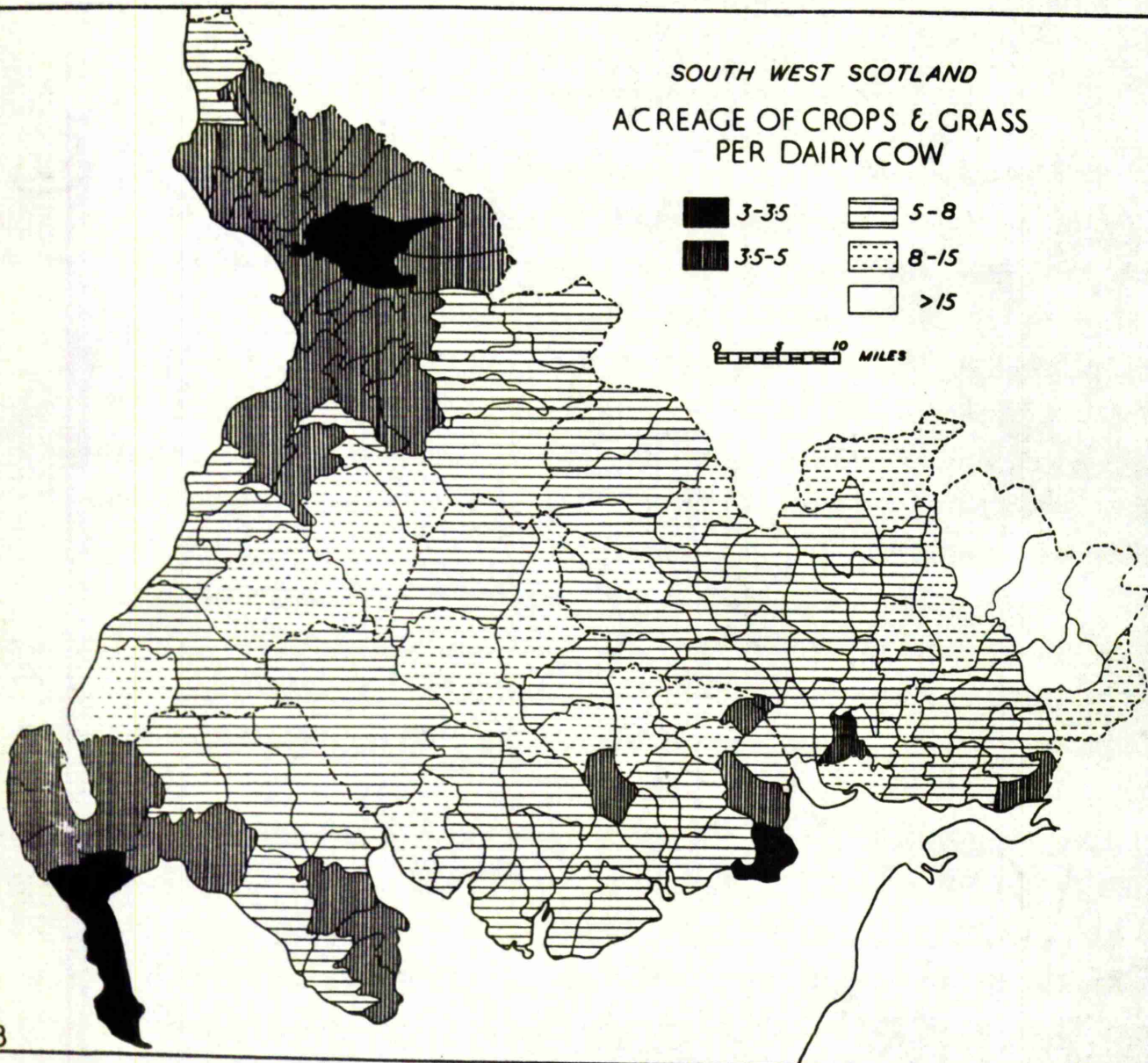
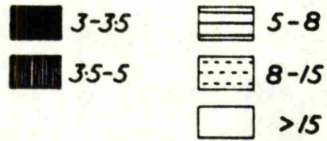
	<u>Total</u> <u>Producers</u>	<u>Total</u> <u>Production</u>	<u>Total</u> <u>Milking Herd</u>
Ayr ...	- 8.2%	+ 47.7%	+ 21.6%
Dumfries ...	+ 23.5%	+ 122.4%	+ 63.4%
Kirkcudbright	+ 9.1%	+ 135.3%	+ 43.8%
Wigtown ...	- 14.2%	+ 77.6%	+ 23.6%

(Sources: S.M.M.B., D.O.A.S.)

Since the establishment of the Board in 1933 the pattern of dairying has undergone progressive, if irregular, modification in response to a new combination of geographical factors. Some aspects of the industry, such as farm cheesemaking and butter churning, have reacted quickly to the new circumstances, others less quickly. To a large degree the present geography of dairy farming in south west Scotland is the product of factors which are no longer operative. The industry is incompletely adjusted to the geographical facts.

Figure 17

SOUTH WEST SCOTLAND
ACREAGE OF CROPS & GRASS
PER DAIRY COW



1958

CHAPTER 8

THE STOCK STRUCTURE

The importance of dairying in an area can be measured in a variety of ways, different methods occasionally giving disturbingly different results. The most accurate method would involve the use of income figures but these are not available. Using Department of Agriculture figures the best measure is probably obtained by relating the total milking herd to the acreage of improved land. This has been done in figure 17. An alternative would be to show total dairy stock (perhaps reduced to cow units) related to the area of improved land. Such a map would show the same basic pattern as figure 17 with a smaller range of figures. The map here really shows the extent to which improved land is used for milk production (as distinct from dairy farming which could be taken to include the rearing of young dairy stock). It is to be emphasised that it tells nothing about stocking densities on dairy farms as such.

Two major areas stand out on figure 17, the Kilmarnock area and the southern Rhinns of Galloway. On good individual dairy farms a stocking density of about one cow to two and a half acres is normally aimed at, though the figure is usually nearer three. It will be appreciated then that less than three and a half acres per cow over a wide area represents a very high development of dairy farming. A minor centre is identifiable in the little Kirkbean peninsula in Kirkcudbrightshire. Developed largely on Carboniferous limestone with a veneer of glacial sands and gravels and raised beach deposits, the peninsula is particularly fertile and with the added advantage of a specially long grazing season, it is admirably suited to milk production. It was here that William Craik of Arbigland, one of the foremost of the eighteenth century improvers, conducted most of his experiments, though the dairy system was of no importance in the area until the second half of the nineteenth century.

More important, perhaps, is the fact that the two main centres of milk/

milk production - the Kilmarnock area and the Rhinns of Galloway - probably represent (within the limits of improved land) the two extremes in physical conditions in the south west. The former is an area of medium to heavy or very heavy soil developed on glacial till derived mainly from a Carboniferous bed rock. It is characterised by a short grazing season (150-180 days) and relatively heavy rainfall (45-55 inches). It is a region of small family farms. The Rhinns on the other hand, are covered for the most part with glacial drift derived from the Silurian and Permian rocks of the neighbourhood and providing the basis for a medium to light soil. The peninsula has the longest grazing season (200-230 days) and lowest rainfall (30-40 inches) in the south west and is an area of typically very big farms. Physically the Rhinns have much more in common with lower Nithsdale and Annandale than with north Ayrshire, a fact which may serve further to illustrate the importance of historical circumstances and space relations as factors in the present geography of dairy farming in the south west.

The precise pattern of regional variations in stocking densities on individual dairy farms must remain unknown in the absence of a comprehensive farm by farm survey. It is well known, however, that many farms are over-stocked to the degree that young stock are summered away. The practice is closely allied to transhumance and relevant statistical information would be valuable. General observation suggests that the practice is most widespread in the small farm region of north Ayrshire, but it is also common in the better parts of the Dumfriesshire Solway Plain where the profitability of cash cropping tends to displace some dairy stock during the summer months. The summer pastures for these young stock vary in nature. Commonly they are sent to a farm with a bit of improved hill not otherwise utilised. Many are summered in the grounds of big country houses or institutions. Most frequently, perhaps, they are sent to farms where on account of age or disability, the farmer has dispensed with his stock and laid his land entirely in grass parks. A very little attention will keep these in good order indefinitely. Such is the demand for these parks that good pasture will realise as much as £12 per acre for a six month period. £10 an acre is a common figure. (Ordinary farm rents/

rents of good land in the south west are in the range of £2-2½ per annum). Most of these grass farms will be able to draw a further income from wintering sheep. Whereas the practice will not compare in terms of profitability with running a dairy, it is sufficiently remunerative under present conditions to enable owners who would otherwise have to sell out to remain on the farm until circumstances enable the dairy to be started again.

Closely, though by no means inevitably, associated with milk production is the business of rearing young dairy stock. These may be reared either for direct herd replacements or for sale. With few exceptions (dealt with below) the whole south west of Scotland is an area of self-replacing dairy herds. Why this should be so is by no means clear and may be rooted in a stock rearing tradition. The basic economics of the matter are revealing. Dinsdale and Winter, (79) working in north east England, calculated that the produce of about five acres of land (in total) is required to rear a heifer from birth to calving at 2½ years. Assuming the value of the heifer to be £70, this represents a gross output per acre per year of about £14. This, they conclude, "is a low figure compared with alternative ways of using land". A rough comparison may be made as follows: assume one dairy cow to require annually the produce of three acres (a generous allowance) and assume 700 gallons of milk at the low summer price, that is $£(700 \times 2/6 \div 3) = £29$ approximately per acre, or more than twice the output from rearing at a very conservative estimate. The disparity in gross output is clearly sufficiently great for a distinct difference to remain even after the undoubtedly higher labour and capital costs of the cow have been taken into account. The comparison is only valid, of course, to the extent that the cows and followers are competing for the same land resources. This is not in fact the case on most higher farms but attention is for the present directed to the better class dairy farms with no unimproved land of which there are a great many in south west Scotland, in central Ayrshire, the Rhinns and lowland Dumfriesshire especially. Even in these areas most dairy farms rear enough young stock for/

for replacement and many of them more than enough. On the face of it the practice seems economically untenable since land which could be carrying milking cows is being used for the far less remunerative business of rearing. It is quite clear that many dairy farmers take a special pride in the stock they rear. "They fancy themselves as cattle breeders", was one informed comment and it could be that the general prevalence of self-replacing herds in the south west is due to just such sentiments. Strict economics of the balance-sheet kind seldom fully explain farming practices. Whether or not it is a profitable business the young dairy stock of the south west have a reputation for quality that is known in every part of Britain. In addition to this incentive there are a number of other immeasurables which make home rearing attractive. Chief among these is the advantage of knowing precisely the background of all herd replacements and breeding policy can be directed towards the achievement of a specific type of animal. Farmers boast that their herds have seen no outside female blood for several decades and many automatically distrust bought in replacements. Disease is clearly a danger though much less so now than before strict control such as is embodied in the T.B. eradication scheme.

There are, however, a number of more tangible factors operating in the south west which tend to encourage home rearing. The most direct of these lies in limited byre accommodation. Old buildings planned for the circumstances of the early nineteenth century remain a major stumbling block to improved stocking. Available byre accommodation more than any other factor sets a limit to the size of the milking herd whereas the young dairy stock in south west Scotland are for the most part out wintered and when necessary can be housed relatively cheaply in simple buildings. What this means is that any improvement in the stock carrying capacity of the land tends to be reflected in a progressively lower cow/follower ratio. Such improvement has, in fact, been a major achievement of the last hundred years or so. George Robertson in his 'Description of Cunningham' published in 1820 appended a very complete set of agricultural statistics for the sixteen parishes concerned. The figures may be accepted as accurate since considerable/

considerable pains appear to have been put into their collection and verification. The date is interesting for it was about that time that most of the present farm buildings in south west Scotland were erected. A comparison with the 1958 figures may be made as follows:-

Cunningham (16 parishes) stocking.

Year	1819	1958
Milk Cows	12,563	23,388
Other Cattle	8,991	33,695
Horses	2,809	589
Sheep	16,482	62,924
Pigs	3,975	14,942

These figures are converted to stock units by the following commonly accepted equivalence.

1 horse = 1 cow = 1 bull = 1 bullock	=	1 unit
1 heifer	... .. =	0.5 "
1 sheep	... .. =	0.14 "
1 pig	... .. =	0.1 "

(*Other cattle* assumed equivalent to heifers).

Thus:-

Cunningham stock units.

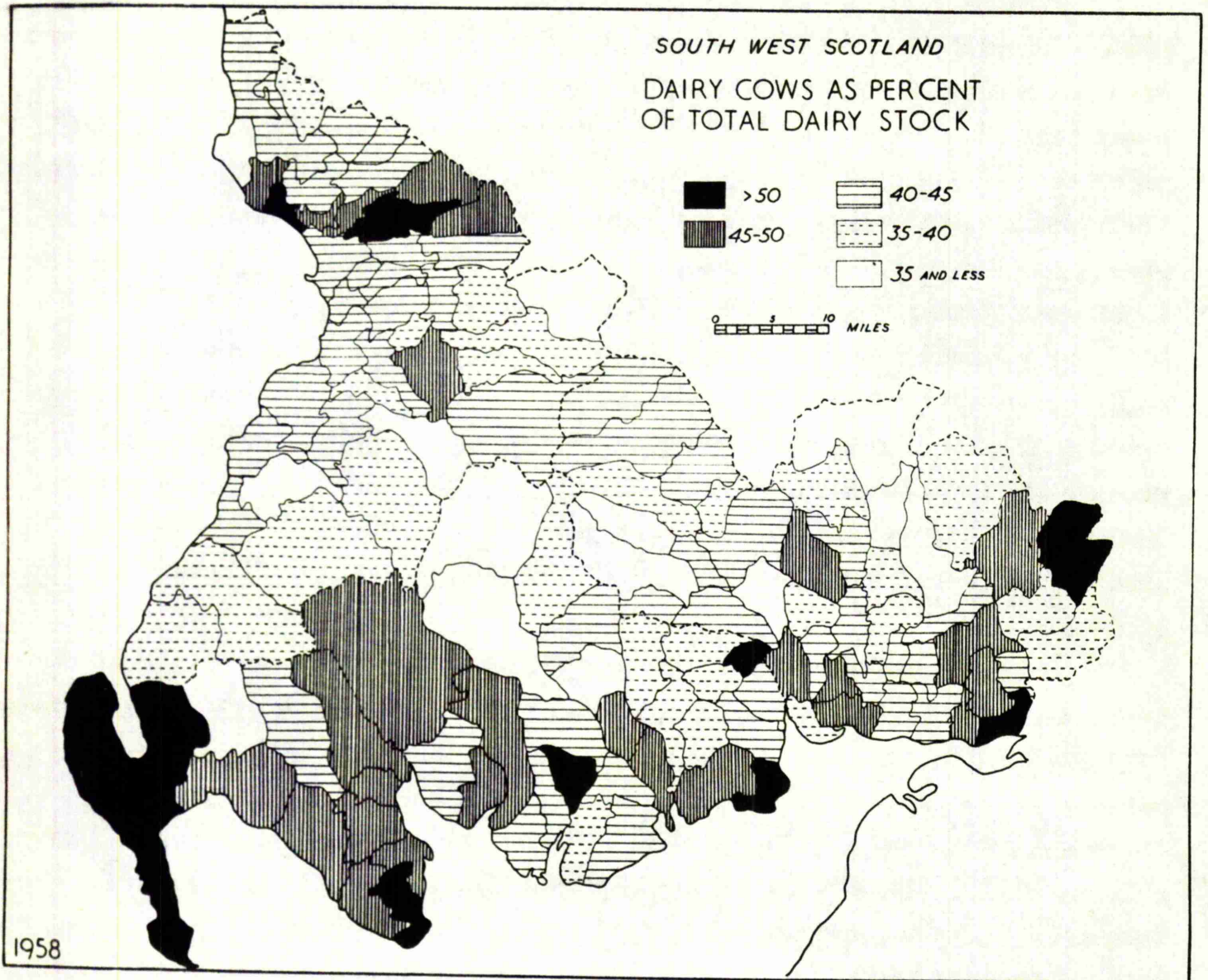
	1819	1958	% change
Milk Cows	12,563	23,388	+ 85
Other Cattle	4,496	16,843	+ 275
Horses	2,809	589	- 79
Sheep	2,307	8,809	+ 282
Pigs	398	1,494	+ 275
Total	22,573	51,123	+ 127

By this calculation the stock carrying capacity of the land has more than doubled over the period. This is probably mainly attributable to improved cultivation techniques, better strains of grasses and more complete drainage. Much land remained improperly drained until the government advanced money for the purpose in the 1840's. To an indeterminate extent the increased stock carry is supported by bought-in feed. Discounting the horses, whose decline is easily accountable in terms of mechanisation, it is striking that other than the milk cows all kinds of stock have increased to about the same degree, roughly $\times 3.8$ ($= + 280\%$). The milk cows, on the other hand, have less than doubled themselves. The discrepancy clearly supports the argument that limited byre accommodation is partly responsible for the present cow/follower ratio in the region. Assuming all Robertson's 'other cattle' to be dairy followers (which is certainly not true but is probably not far from the truth) the percentage of cows to total dairy stock in 1819 was 57. This is a higher figure than for any parish in the south west in 1958, the nearest being Kirnmaiden in the Rhinns with 55.5. Common observation confirms that the byres of south west Scotland are filled to overflowing and it is clear that many farmers would increase their milking herds at the expense of their followers had they more accommodation. Modern developments in self-feed silage, cattle courts and milking parlours may ease the position. One inevitably wonders, however, to what extent the export trade in dairy herd replacements from south west Scotland is due to byres designed for the stocking densities of over a century ago.

The general prevalence of self replacing herds in the south west is further encouraged by the fact that by national standards the farms of the region are well above the average in size. The average size of dairy herds in England, for example, is only half that in Scotland (16 as compared with 37). It is on the smaller farms that these "immeasurable" advantages discussed above must be foregone in favour of an immediate high return per acre; on bigger farms the higher income allows more consideration to be given to these additional quasi-economic considerations.

Closely/

Figure 18



Closely related to the influence of farm size is that of rent per acre. Clearly the higher the rent the more keenly felt is the need to cut down the number of followers to allow for more cows. High rents have, in fact, been put forward as a major reason behind the prevalence of flying herds in parts of England and are presumably partly responsible for the traditional importance of flying herds in the immediate vicinity of the Clyde conurbation. In the south west in general farm rents have been, at least until recently, distinctly lower than the national average.

A great many dairy farms in the region have some second class land which is not suitable for the milking herd but which is excellent for the rearing of young dairy stock. This perhaps the source of most of the young herd replacements reared in the south west. It is to be emphasised, however, that since many farms do not have this additional land this in itself does not explain why home-bred replacements are so universal in the region.

Within the south west the cow/follower ratio varies widely and these variations are shown on figure 18. The complete range is represented from flying herds at one end to farms buying in young dairy stock for rearing at the other, though the great majority fall between these two extremes. The flying herd is rare in the south west and is normally found only on smallholdings or small high-rented farms near towns. This relationship between small farm units and high cow/follower ratios can be seen on the map in the cases of Gretna parish and Terregles parish, near Dumfries, both areas of smallholdings. The break-down of the agricultural holdings by sizes in these two cases is as follows:

	1-50 acres	50-150 acres	Over 150 acres
Gretna	74	25	9
Terregles	55	11	2

Other than on smallholdings flying herds are found only under special/

special circumstances. Perhaps the commonest of these is the case of the farmer who has been in financial difficulties and is now 'thirled' to a cattle dealer. The tight control commonly exerted by the dealer over the sale of the farm stock makes any proper breeding policy impracticable.

Since on average about 50 per cent of all calves born are heifer calves (potential replacements), and since three seasons are required before replacement age is reached, a farm rearing all potential replacements can be expected to have a cow/follower ratio of 40/60 (assuming all cows calve each year), the arithmetic as follows:-

40 cows		
20 bull calves sold at birth	20 heifer calves (1st year) 20 bulling heifers (2nd year) 20 calving heifers (3rd year)	} 60 followers

By this estimation, then, 40 per cent cows to total dairy stock is a crucial figure. Areas with a higher percentage of cows apparently sell off (on balance) some young dairy stock before they reach replacement age and those with less than 40 per cent cows buy in (on balance) such young animals for rearing purposes.

It is clear that no single environmental factor is responsible for the pattern shown on Figure 18. Most obvious, perhaps, is the general association of a low cow/follower ratio with the upland areas. Basically the reason lies in the individual farm's 'bit of hill', not rough grazing but marginal land under permanent or near-permanent pasture. Such land is ideally suited for rearing young stock and gives them a hardiness which considerably augments their ultimate sale value. More important, this land is of little use for the milking herd and, therefore, the two types of stock are not competing for the same land resources.

Of the areas with a high cow/follower ratio that in the lower parts of Cunningham can be satisfactorily explained in terms of relatively small, relatively high rented holdings where milk production is by far the most important farm enterprise. Both to the south and to the north the land rises in altitude and deteriorates in quality. The very high ratio of cows to followers in the Rhinns of Galloway, on the other hand, is less easy to explain. This is an area of very big farms with (until the recent easing/

easing of rent restrictions) the lowest rents in the south west. Unexpectedly perhaps many are very heavily stocked. The high percentage of cows in this area may be due in part to the high percentage of ploughland (see below Figure 20) since full use must be made of the limited pasture available. As shown above the rearing of young dairy stock does not represent full use of the grazing where milk cows are an alternative. A further explanation, however, probably lies in the herd replacement rate.

This is discussed fully in the next chapter and it is enough to note here that the percentage of the milking herd replaced annually appears to be relatively low in Wigtownshire and in the Rhinns in particular. This means that proportionately less followers will be required to maintain the herd and more inducement given to the farmer to sell them off early, particularly in view of the fact that pasture is relatively scarce. Similar conditions are found in parts of the Stewartry of Kirkcudbright but these are clearly more than offset by the characteristic broken nature of the terrain, a feature which gives most farms a bit of hill and permits young dairy stock to be reared with profit. Only where such tracts of relatively low quality grazing are not readily available (in Kirkbean, for example) does the cow percentage rise above 50. The position in Dumfriesshire is less easy to explain but is probably related to the relative importance in the county of cattle breeding in general. The high cow/follower ratio in Ewes parish can be discounted since only 33 dairy animals are represented and these will be largely casual milk cows kept on hill sheep farms. Dumfriesshire has a long tradition of cattle rearing and in response to the very substantial post-war increase in the prices of dairy heifers, young dairy stock may have ousted beef animals from many of the stock and cropping farms, though this trend is likely to be reversed now.

Generalising then, Figure 18 can only be explained in terms of a number of different and often conflicting environmental factors. Of these the principal ones are:-

1. The nature and extent of the grazing and, in particular, the availability of some second class land where young stock can graze without competing with the milking herd.

2./

2. The size of the holdings.
3. The rent per acre.
4. The relationship between the capacity of the byre and the actual stock carrying capacity of the land.
5. The herd replacement rate.

per cent cows in each lactation by Recording Society.

Lactation	N. Ayr	S. Ayr	Dumfries	Stewartry	Machars	Phins
1	27.6	26.9	25.3	21.6	23.5	22.9
2	23.1	21.4	22.6	20.0	19.8	19.6
3	16.4	17.1	18.6	15.2	15.4	15.0
4	11.4	11.5	11.8	11.2	11.2	11.9
5	7.6	8.3	7.3	10.0	8.3	9.1
6	4.9	5.9	5.2	7.3	7.2	7.4
7	3.5	3.7	3.8	5.7	6.4	5.3
8	2.1	2.2	2.4	3.9	3.7	3.6
9	1.4	1.4	1.6	2.5	2.5	2.3
10	0.9	0.8	0.7	1.4	1.4	1.5
11	0.5	0.4	0.3	0.7	0.3	0.8
12	0.3	0.2	0.2	0.4	0.1	0.4
13	0.2	0.1	0.1	0.1	0.1	0.1
14	0.04	0.05	0.05	0.05	0.05	0.05
15	0.01	0.03	0.02	0.01	-	0.03
16	-	-	-	-	-	0.03
17	-	-	-	-	-	0.01
Total.	100	100	100	100	100	100

CHAPTER 9

REGIONAL VARIATIONS IN HERD REPLACEMENT RATES.

The annual replacement rate in a dairy herd is directly related to the average herd life of the cows. For example, a replacement rate of 25 per cent means an average herd life of four years. It tells nothing, on the other hand, about the actual milking life of the cows for a cow may continue its milking life elsewhere when it is taken out of the herd and some cows in the herd may have been introduced after one or two lactations elsewhere. These complications are very difficult to allow for. However, in the south west of Scotland transference of cows from one herd to another is not usual and the herd life will approximate very closely to the milking life.

Casual observation alone clearly reveals wide variations in the percentage of cows replaced annually. The Wigtownshire dairy farmer, for example, will express disbelief at the replacement rates found necessary in north Ayrshire. Fortunately statistical information is available in the files of the milk recording societies of which there are six operating in the south west. The figures extracted represent approximately 35 per cent of the total milking herd of the region and consequently provide a good sample. It is important to remember, however, that they do not provide a true cross section of the cow population since the recorded cows belong ipso facto to the more progressive farmers. The figures are for 1955, the last year for which totals are available. The cows in each society are classified by lactation and in percentage form in the table opposite.

The following assumptions are made:-

- (1). There is no change in the total herd size from year to year.
- (2) There are no bought-in cows (as distinct from heifers).
- (3) One lactation represents one year.

None of these assumptions is wholly accurate but they are close approximations to the truth and are necessary simplifications. Given these assumptions the following facts emerge from the figures:-

Firstly/

Firstly, the percentage against lactation 1 is in every case the replacement rate since all young replacements coming into the herd in any one year are necessarily represented by this group. The range, from 21.6% to 27.6%, is a wide one and if only the exact number of animals required for replacement are reared the number of followers required for a hundred cow herd would be 64 and 82 respectively, a very appreciable difference. Conversely, if both cases rear all the potential replacements (assuming 50% heifer calves every year) the first case would have an annual surplus of 28 heifers and the second case 22. The difference is clearly of some importance.

Translated into average herd life the figures are as follows:-

Average Herd life in Years.

N. Ayr	...	3.62
S. Ayr	...	3.72
Dumfries	...	3.88
Stewartry	...	4.63
Machars	...	4.25
Rhins	...	4.37

Even allowing for the known weaknesses of the figures there can be little doubt that on the average cows have a longer milking life and, conversely, replacement rates are lower, in the remoter parts of the south west.

It remains to explain these regional variations in milking life. The milder climate of Kirkcudbright and Wigton resulting in a distinctly longer grazing season and, therefore, less confinement in byres, may be partly responsible.

It is likely, however, that the chief cause will be found in the prevailing seasonality of calving and milk production. This is treated in full in Chapter 12 and it is enough to note here that the areas with the greatest winter production are those of lowest cow life and highest replacement rate, and vice versa.

The precise relationship between milking life and seasonality of production/

production may be either direct and physiological or indirect and inherent in farm policy, or (more probably) both.

1. Direct physiological relationship. Autumn calving and winter milk production mean subjecting the animals to the strains of an artificially induced breeding regime, and almost continuous milk production is an arduous enough business at any time without this added complication. Winter milk is obtained principally from the young cows and autumn calving heifers. If only a little winter milk is aimed at, as in most of Wigtownshire, the autumn calving heifers will calve for the second time a year the following spring. On the other hand, where a high winter supply is the aim these autumn calving heifers will calve for the second time the following autumn, and in Ayrshire where such a policy is general it is often necessary prematurely to dry off the heifers in order to ensure a resting period before the second calving. The characteristic long time lapse (15-18 months) between first and second calvings in the seasonal areas, by more gently introducing the young animal to milk production, may well be largely responsible for the associated longer milking life. This is suggested as a specific part cause, in addition to the more obvious advantages of spring calving.

2. Indirect farm policy relationship. Since winter milk production depends chiefly on the younger cows, the older cows being spring calvers and summer producers, there will be a tendency in the level producing areas to cull the cows earlier in order to make way for young winter producers. This will clearly result in a shorter average milking life and a higher replacement rate.

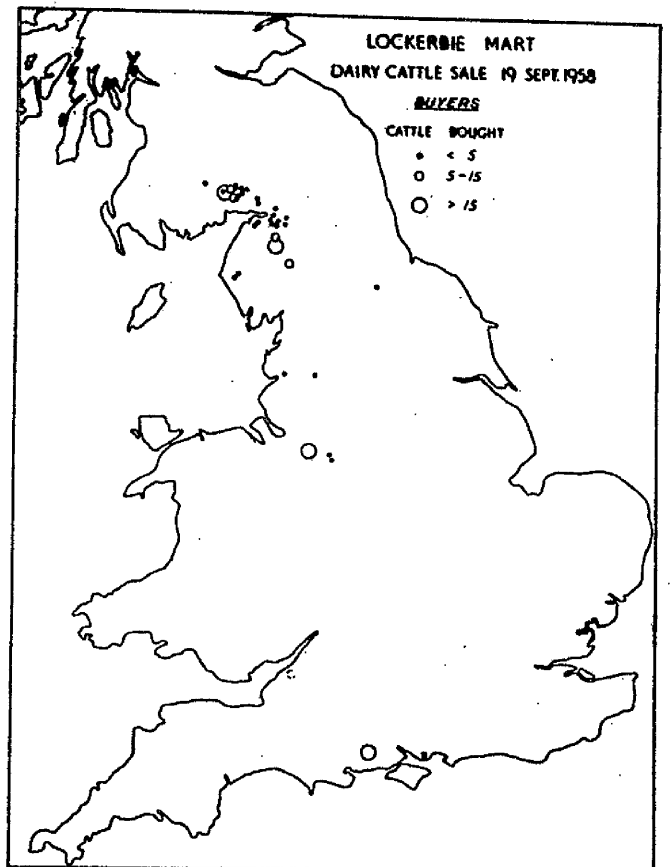
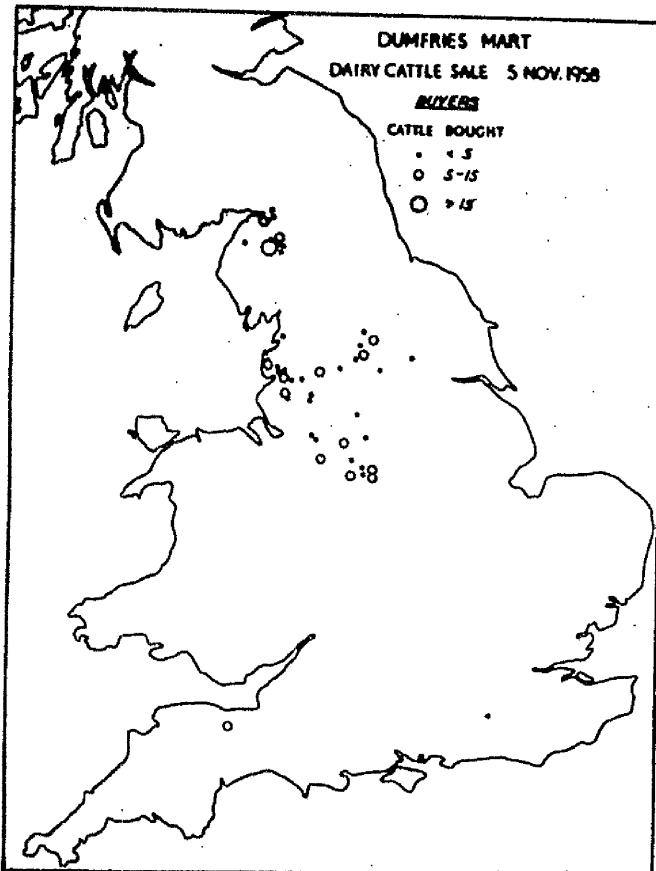
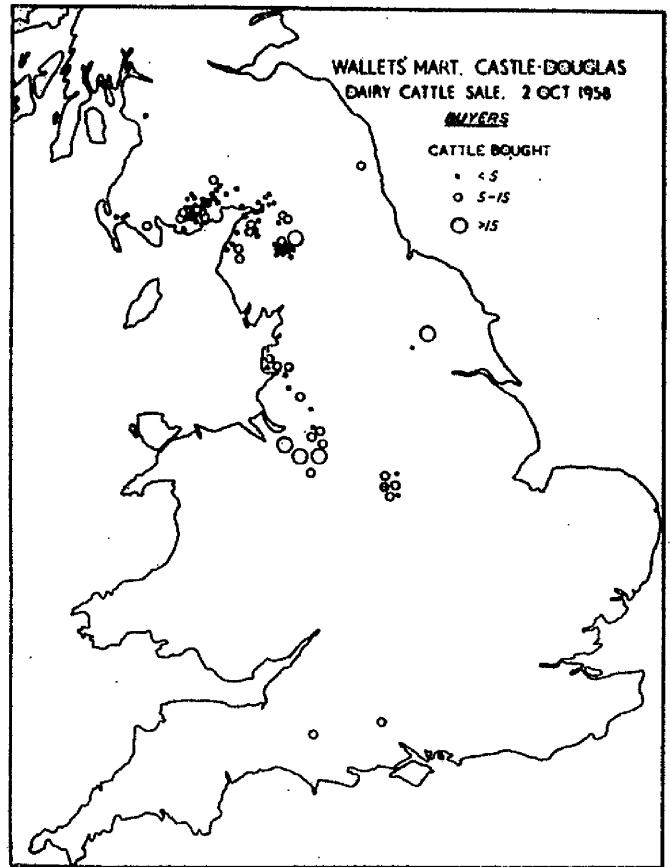
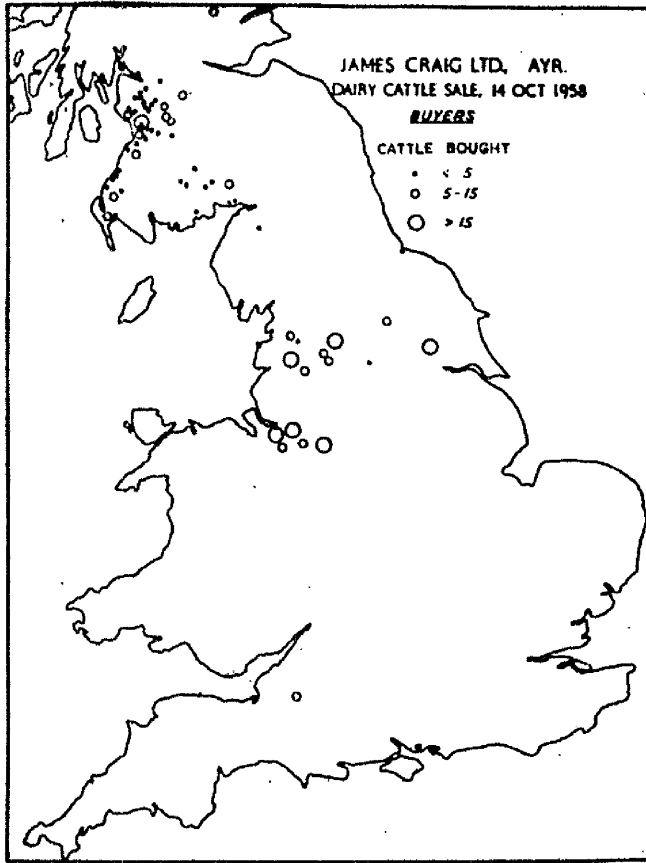
A final answer to this matter requires a comprehensive survey of the precise reason for each cow's removal from the herd.

Though close, the relationship between cow life and seasonality of calving is clearly not absolute and a number of other circumstances may be held to influence the average milking life, even on a regional scale. Farm size, for instance, may have a bearing on the issue since the smaller the farm the less can it afford to carry any "passengers". This may be a contributory/

contributory factor in the high replacement rate prevailing in the small farm region of north Ayrshire. Further, there appears to be a tendency in Ayrshire to sell cows when they are still in good condition and will realise a fair price. This may be pure tradition from the days when Ayrshire alone supplied the rest of Scotland with dairy stock. On the other hand, it may be a simple consequence of the policy referred to above, of selling off cows to make way for young autumn calvers.

Since a cow does not reach its highest yield until about the sixth lactation there is clearly a long way to go yet before the optimum average life span is reached. A close examination of the reason behind the regional variations in average herd life is one way of approaching this problem.

Figure 19



CHAPTER 10.

THE DAIRY CATTLE TRADE.

South west Scotland is one of the best known sources of young dairy stock in Britain. Ayrshire has had a regular export trade in dairy cattle for fully a century and a half though it was only towards the end of the nineteenth century that the Solway counties took part in the trade on any scale. Previously it had been more usual for them to import young stock from Ayrshire.

The exact movement of cattle both within and from the area cannot be precisely stated since a large and unknown percentage of the total transactions are conducted either directly between buyers and sellers, or through dealers who need not be registered anywhere and on whose operation there is no available information. The remainder of the animals are sold through the auction marts of which there are eight in the region, at Ayr, Kilmarnock, Dumfries, Lockerbie, Annan, Castle-Douglas, Newton Stewart and Stranraer. All but the last two have regular (fortnightly or more frequent) dairy cattle sales.

By far the most important type of dairy animal sold is the calving heifer. These are animals in their third year (usually $2\frac{1}{2}$ - $2\frac{3}{4}$ years) and are bought as herd replacements. The demands for a winter milk supply result in the great majority of heifers being calved in the autumn it is in that season that the big heifer sales take place.

Relevant information on the movements of these dairy herd replacements was extracted from the sales books of four of the major dairy cattle marts and mapped as shown on Figure 19. Each map shows the home addresses of the buyers present at one of the big autumn dairy cattle sales and the number of animals bought by each. The maps can be taken to refer to calving heifers or heifers with calves though an occasional animal of another class (cow, bulling heifer, or calf) is included.

The great importance of English buyers in every case is striking.

In/

In the four cases illustrated, the sales of animals to English buyers were:-

<u>Mart</u>		<u>Total Sold</u>	<u>To England</u>	<u>%</u>
Ayr	...	432	228	52.8
Castle-Douglas	...	497	385	77.5
Dumfries	...	198	198	100.
Lockerbie	...	190	137	72.1

The extraordinary position of Dumfries where every single animal went to England can be explained by the fact that the sale was of Friesian and Friesian Crosses only. These are in particular demand in England and in correspondingly limited demand in Scotland. At the other three sales the great majority of the animals sold were Ayrshires, and for these there is a steady home demand. The prevalence of relatively big batches sold to English buyers in all four cases reflects the importance of dealers in this class. These are usually substantial farmers who buy regularly at the Scottish markets for resale to farmers in their home areas. Bulk purchase, by ensuring full waggon loads, also serves to minimise transport costs.

With few exceptions the sellers in each case came from fairly close proximity to the market (within a 30 mile radius) and there is little point in including a map of these here.

In order to establish the precise basis for this very important trade, eight of the leading English dealers were contacted to give their reasons for buying Scottish stock. Several of these import upwards of 2,000 dairy cattle a year and buy every week at the markets in south west Scotland. Fundamentally the reason lies in the quality of the animals. The Scottish heifers have a well founded reputation for being hardy and good 'doers', qualities which are largely attributable to their early lives in a relatively harsh environment and which become very apparent when they are moved to more clement areas. It is interesting that the English demand is not specifically for Ayrshire heifers. Though in general these are/

are held in high regard, especially on account of their firm reputation for standing up well to the annual T.T. test, the demand is often for "black and white" animals[¶] of a variety of kinds, Friesians and Friesian Crosses especially. Three of the dealers stated categorically that they preferred these to pure Ayrshires partly on the grounds that they were worth more for beef when their milking lives were over. It appears that many of the heifers are ultimately sold in mixed farming areas where a less specialised animal than the pure Ayrshire is appreciated. It remains true, however, that most of the heifers sold to England are in fact pure, and often pedigree, Ayrshires.

The whole issue of T.B. eradication has a bearing on the matter since as one of the earliest attested areas the south west was in a position to supply disease-free stock to English farmers who were cleaning up their herds. It is clear, on the other hand, that this is not to-day the main reason behind the English demand. Although not yet fully attested England is rapidly approaching complete eradication[¶] and from being at first an extra advantage to the cattle breeder attestation is quickly becoming a necessary licence for sale. All eight dealers replied in the negative when asked if their main object in coming to south west Scotland was to acquire attested stock. There can be no doubt, however, that the early attestation of the region brought a great many new buyers from England, many of whom have persisted even though their own areas are now cleared. This seems to be particularly true of the dealers from the south of England. By leading the way in the regional eradication of bovine tuberculosis the south west has probably gained a lasting increase in demand from the more distant parts.

The maps show that the English demand originates in a number of well defined areas. These are:-

1. The Lancashire-Cheshire Plain. By far the most important, this is readily explained in terms of the great importance of dairy farming in the area and by the fact that full attestation is still/

[¶] The description "black and white" in this sense does not include black and white Ayrshires. The latter are especially common in Wigtownshire, where one breeder has specialised in this type.

^{*} Since this chapter was written England has attained 100% attestation.

still to be reached there. In October, 1958, the percentage of dairy cattle attested was - Lancashire 78%, Cheshire 70%

2. Cumberland. Here the relative importance of small batches and their virtual absence from the Ayr market suggest the relative importance of individual farmers buying in markets within a reasonable day's motoring.
3. The Midlands, especially the Derby area.
4. The Vale of York.
5. The English West Country. The demand from this region is largely channelled through one or two dealers operating on a big scale. It is notable on account of its distance from Scotland and the fact that it is itself an attested area.

In addition to the English trade there is a limited export to other parts of Scotland, notably to Aberdeenshire. Most of this trade is conducted through the Lanark market which is attended by farmers from parts of north Ayrshire.

Perhaps the most important single fact about the export trade is that most of the animals sold are surplus to home requirements and are not bred specifically for sale. The farmer will naturally bear both issues (replacement and sale) in mind but the first consideration on the lowland farms, where many of the calving heifers originate, will be the rearing of a type of animal suitable for immediate herd replacements. It follows that wide disparities can develop between the type of animal supplied and the type of animal in demand. Something of this can be seen in the present English demand for "black and white" heifers. Only on the upland farms with low cow/follower ratios where the breeding and rearing of young dairy stock for sale becomes the main farm enterprise is there any real flexibility in supply to take account of the demand position. Numerically these farms are less important than the lowland dairy farms where the calving heifers sold can be regarded as a by-product of milk production.

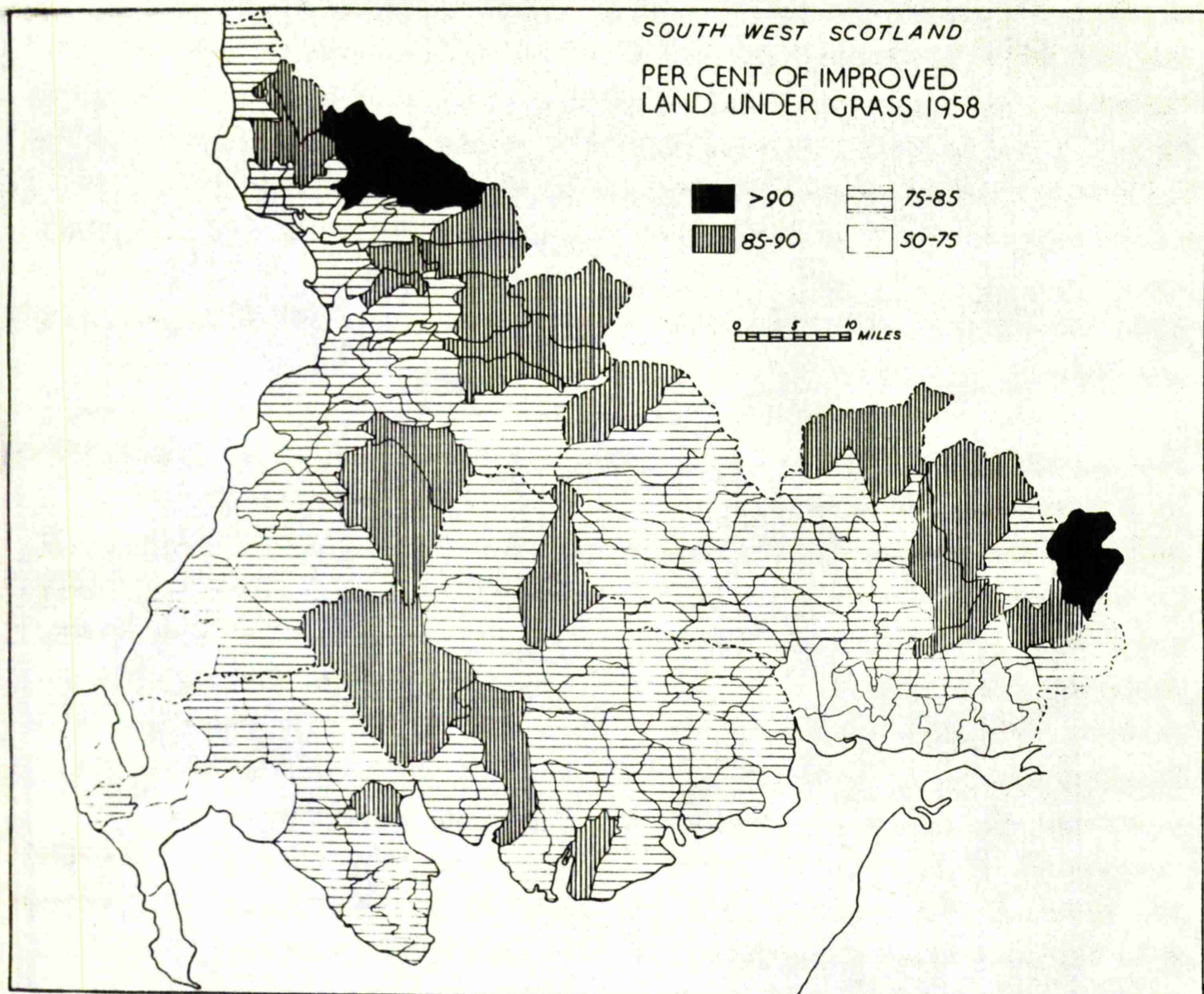
CHAPTER 11.

THE CROPPING PATTERN

The business of milk production ultimately devolves on the cropping pattern associated with it. It is generally recognised that dairying takes more out of the land than any other form of stock farming and consequently a careful rotation and fertiliser policy must be followed if a running-down of the land is to be avoided. In the early days of dairying in Galloway lack of appreciation of this fact led to the near ruination of many farms and landlords became very cautious when taking new dairy tenants.⁽⁸⁰⁾ However, beyond the continual need to maintain the productivity of the land, widely varying cropping policies can be, and are, followed within the south west. These variations reflect primarily the actual physical condition of the farms though there is some reason to suspect that they may be in part related to the pattern of milk supply in turn dictated by historical circumstances. This will be elaborated in Chapter 12.

Inevitably the cropping pattern falls into two distinct, though largely inter-dependent parts - summer pasture and winter feed. The two are closely linked under the ley system of farming which is universal in the south west and involves taking the plough round the farm and so periodically renewing the pasture. The term "permanent grass" though it appears in the agricultural returns, is perhaps best avoided when dealing with this region. It is no exaggeration to say that the Department of Agriculture returns for "permanent grass" and "rotation grass" are in many instances totally misleading and great caution must be exercised in dealing with them. There is a good reason for this. Where a system of very long (10 - 15 years) ley is practised, as in parts of north Ayrshire, the distinction between the two is obviously blurred. More especially is this the case when the farmer is completing his official returns form where the two terms are undefined, and it is a well known fact that many farmers include all grass over about six years old as "permanent grass" though they continue to follow what is strictly a system of very long ley farming. Significantly/

Figure 20



Significantly, a planned revision of the Agricultural Returns form dispenses with the terms "permanent" and "rotation" grass, substituting instead "grass in its 1st., 2nd., 3rd., ... year". Such genuinely permanent grass as does exist is mainly meadow, especially Timothy meadow, and improved land of a very marginal or rocky nature making ploughing impracticable. The common Galloway sight of cultivation in fields studded with bare rock out-crops (usually roches moutonnees) testifies to the value of ley farming under the dairy system. Where store cattle rearing is practised such fields are commonly left under permanent grass.

Statistically the two divisions of land use - pasture and winter feed - overlap where grass is grown for conservation either as hay, or silage, or for drying. Under these circumstances the aftermath is normally available for grazing for a period up to a half of the grazing season. It is important to remember then that land classified in the returns as "grass for mowing" also represents pasture for the same season. For that reason no accurate map of land under pasture is possible for the whole season. Instead, a map has been constructed (Figure 20) showing the percentage of improved land under grass (for grazing and for mowing, both rotation and permanent) at 4th June. Though designed to show variations in the importance of pasture, the map might be more properly described as showing the extent of improved land under the plough in any one year. As a general rule the percentage of improved land under grass can be taken to vary directly with the length of the ley. General observation verifies that the figures can be taken with little reservation to apply to dairy farms, though, of course, they are aggregate figures of all types of farming.

It will be noted that in no parish is as much as 50 per cent of the improved land under the plough. The most highly cultivated* area of all is the Solway Plain in southern Dumfriesshire where in Caerlaverock parish 43.4 per cent of the improved land is under tillage. The other main tillage areas are the Rhinns of Galloway generally and patches of better coastal/

* The term "arable" is avoided for it is perhaps the most abused of all agricultural terms. It is used in three distinct senses:-

1. Land actually ploughed in any one season.
2. Land which is regularly ploughed under rotation.
3. Land which may or may not be ploughed but which could be ploughed.

Figure 21

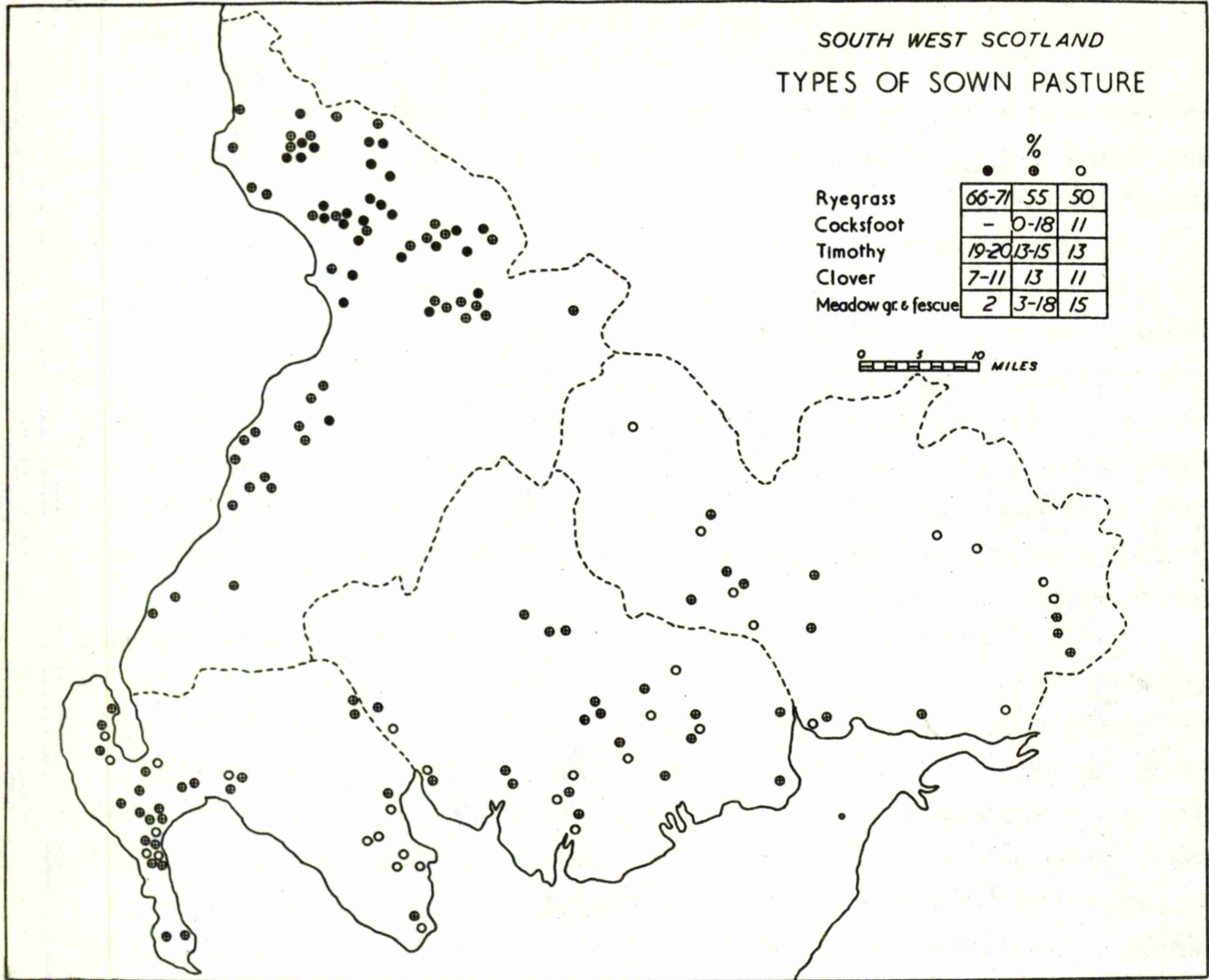
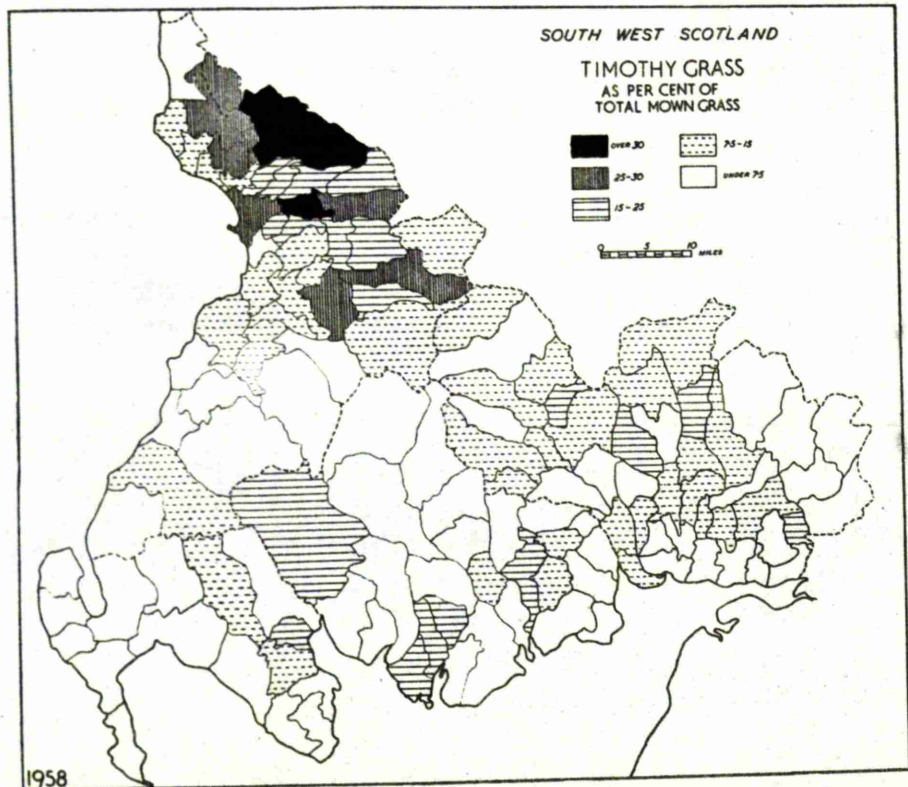


Figure 22



coastal land mainly in Ayrshire but including the Kirkbean peninsula in the Stewartry. Much of the ploughland in this last group is represented by the raised beaches.

The basic cropping pattern shown on Figure 20 can be easily explained in terms of climate and soils. Soil texture in particular is important and although no soil map for the whole area exists, the areas with a high proportion of tillage can be broadly related to the areas of medium or light loams. Heavy cold soils militate against short ley farming and the heavy drift soils of north Ayrshire, coupled with a relatively heavy rainfall are responsible for the development in that area of a grassland dairy system with, in Dunlop parish, as little as 5.3 per cent of the improved land under the plough in any one year.

In addition to these wide variations in the importance of improved grassland the actual composition of the pasture varies significantly within the south west. Figure 21 is an attempt to illustrate these variations using the sales records of one of the leading Scottish seed merchants. Because of the nature of the source material and the method of construction used, it is particularly important that the note of explanation in Appendix A be consulted. The regional variations in pasture types shown here are a direct reflection of the major regional variations in soil types. The soil preferences of the main pasture grasses can be stated briefly as:-

Ryegrass. This is a shallow rooting grass which produces a rich nutritious sward on medium to heavy soils and under moist conditions. It is probably the most valuable of all pasture grasses but does not do well in dry soils where its shallow root system makes it particularly vulnerable to drought.

Cocksfoot. This grass gives good yields in a wide variety of soils but is particularly valuable in dry soils where its deep roots enable it to withstand long dry spells. In this respect it is largely complementary to Ryegrass, the value of the two varying inversely with change in soil texture.

Timothy. A very hardy plant; this gives best yields in heavy moist soils. It is shallow rooted and will not thrive in light dry soils.

Fescue. Tolerant of extreme conditions of moisture and drought this deep rooted plant is valuable in poor land and marginal upland areas. (1)

The/

The heavy soil region of north Ayrshire stands out clearly on Figure 21 through the prevalence of a mixture with a high Ryegrass and Timothy content. These two grasses form the backbone of Ayrshire ley farming often together accounting for over 90 per cent of the seed mixture. In the lighter soil areas of Dumfries and Galloway both are liable to be so weakened by dry spells that the clovers assume dominance with a consequent danger of cow bloat. In these areas a more varied seed mixture is more common with the frequent importance of drought resisting Cocksfoot. A great variety of special mixtures not illustrated here are also used throughout the south west. Deep rooting chickory, for example, is commonly used in areas of very freely drained soils.

The distinctiveness of Ayrshire is even more clearly apparent in the hay crop. Most north Ayrshire dairy farms have a sizeable acreage set aside for Timothy hay and on this the winter milk supply largely depends. Figure 22 shows the great importance of Timothy meadows in this area. These Timothy meadows are permanent and are heavily manured, usually with dung. The term "meadow" must be liberally interpreted here for the Timothy is by no means restricted to the flat haugh-land beside rivers, but is found on a wide variety of sites. It is normally, of course, laid down on heavy, relatively poorly drained soils. The suitability of the heavy soils of north Ayrshire for Timothy hay is seen in the estimated yield per acre. (82):-

Timothy Hay - Average yield (cwt/acre) 1948-57.

Ayr	...	45.7
Dumfries	...	22.2
Kirkcudbright	...	29.2
Wigtown	...	29.4

Timothy hay surplus to farm requirements provides an added source of revenue for many Ayrshire farmers, and much of it is sold to the southern counties, to Wigtownshire in particular.

The cropping pattern of most dairy farms in the south west is geared specifically to the provision of winter feed for the dairy herd. Only occasionally in the better coastal parts of Ayrshire, the Rhinns of Galloway and the Dumfriesshire Solway Plain does the sale of cereal crops provide an important part of the farm income. Early potatoes are grown on many/

STRAIGHT FERTILISERS SUPPLIED 1957-58 - Per cent by weight.

	Ayr	Dumfries	Kirkcubright	Wigtown
Sulphate of Ammonia	4.01	0.88	0.26	0.92
Other Nitrogenous	29.08	14.00	9.19	12.21
Superphosphate	5.07	2.51	0.45	2.42
Ground Rock Phosphate	5.06	3.70	3.54	3.67
Basic Slag	56.7	78.96	86.54	80.74
	100	100	100	100

Compound fertilisers are much more important than straight fertilisers. The percentage of compounds to total fertilisers was, Ayr 63.87, Dumfries 61.43, Kirkcubright 64.11, Wigtown 61.55. Regional variations in the type of compounds supplied appear to be relatively slight.

many Ayrshire and Wigtownshire dairy farms with a stretch of raised beach but as a completely distinct enterprise these can be dismissed here.

Home grown winter feed varies widely throughout the south west both in terms of quantity per head of stock and in terms of composition. Little statistical material is available on the first point though it is generally known that on many smaller farms, especially in north Ayrshire, home grown feed is insufficient even for the maintenance ration and in many cases the entire winter milk production is provided for out of the feed bag. This is a simple measure of the very high stocking density associated with the smaller farm units. As a general rule the big Galloway dairy farms are much more self-sufficient in winter feed though on account of the crops grown certain diet-balancing concentrates may have to be purchased. In Dumfries and Galloway generally cereal crops and roots form a very important part of the winter ration and hay is much less important than in Ayrshire, but in order to avoid repetition a fuller analysis of the winter feed pattern is deferred to Chapter 12.

These broad regional differences in the cropping pattern are reflected in the fertilisers supplied to each county. The Ministry of Agriculture figures, derived from subsidy claims, are reproduced opposite. The relative importance of nitrogenous fertilisers in Ayrshire is a direct reflection of the importance of grass in the cropping system. Basic slag, which assumes great importance in Galloway, is largely associated with the turnip crop in the improvement of which it has played a vital role.

CHAPTER 12.

SEASONALITY OF MILK PRODUCTION

The natural seasonal pattern of milk supply, resulting from spring calving and the early summer flush of pasture, has repercussions which ramify through the entire economic structure of the dairy industry. The demands of the liquid market for a level supply have resulted in a profound modification of this natural pattern, but the seasonal nature of overall milk production remains distinct. Since liquid demand varies only slightly throughout the year the satisfaction of this demand inevitably results in a summer surplus which is sold for manufacture at the low manufacturing price. Any attempt to reduce the summer surplus must make provision to avoid any corresponding development of a winter surplus. Clearly the sale of expensive winter milk at the low manufacturing price must be avoided to the greatest possible extent. A small surplus is desirable, even in winter, in order to avoid periodic scarcities, and for the provision of a basic supply to the creameries in that season.

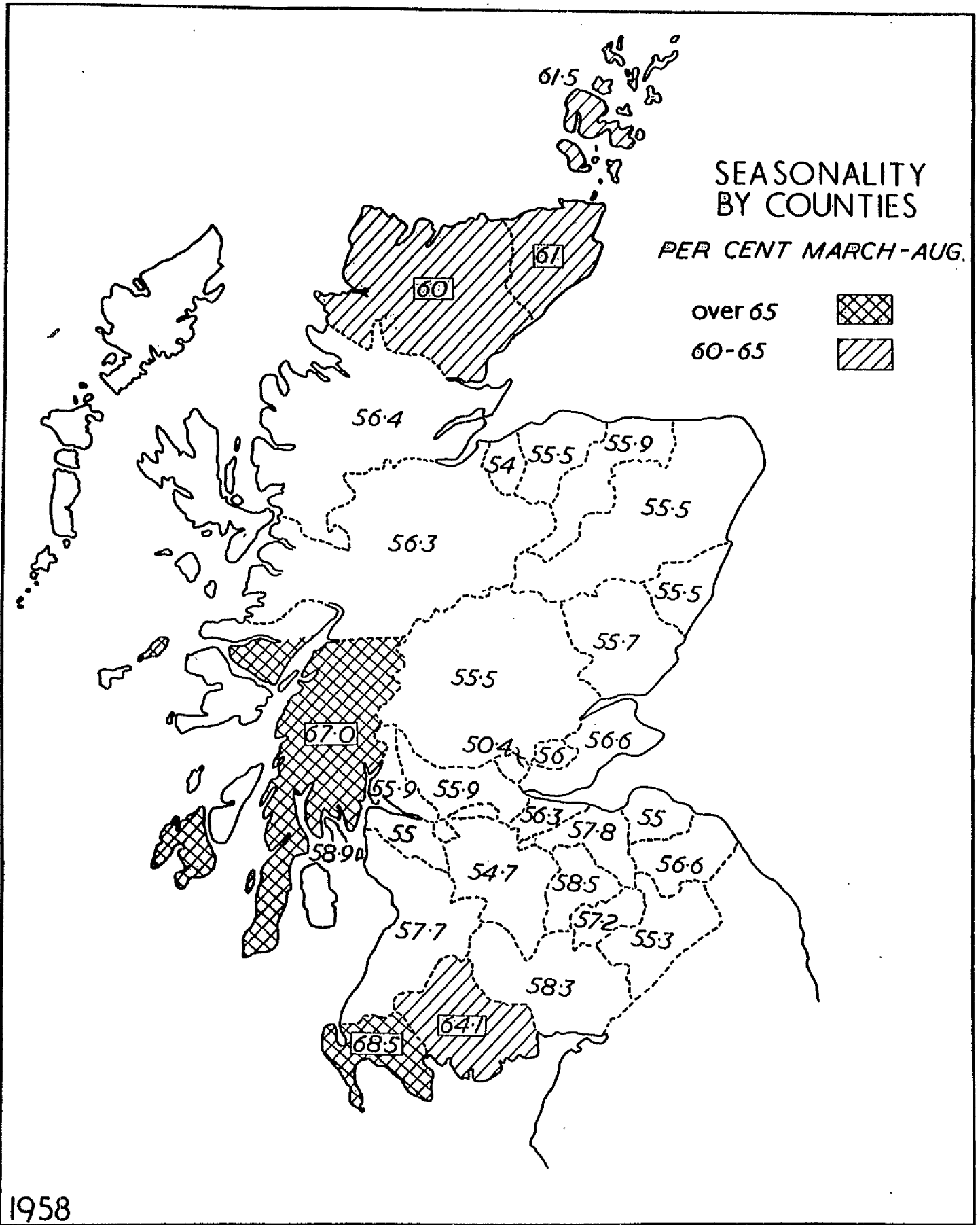
The seasonal fluctuation in cost of milk production is reflected in the monthly prices payable through the Board and by appropriate adjustment of these prices some control can be exerted over the summer/winter supply position. The following were the monthly pool prices per gallon in 1957:-

J	F	M	A	M	J	J	A	S	O	N	D
3/11½	3/10½	3/3¼	2/7½	2/-	2/-¼	2/2	2/5 ⁸	2/11½	3/6	3/8	3/8

The whole business of winter milk production has already been denounced as an "economic absurdity" and the alternative suggestion put forward that surplus summer milk be kept in refrigeration for use in the winter. (83)

In Scotland this would require refrigerated storage capacity for tens of millions of gallons, probably at an astronomical capital cost. The suggestion, on the other hand, does not appear to have been given serious consideration and with refrigerated bulk storage tanks rapidly becoming standard/

Figure 23



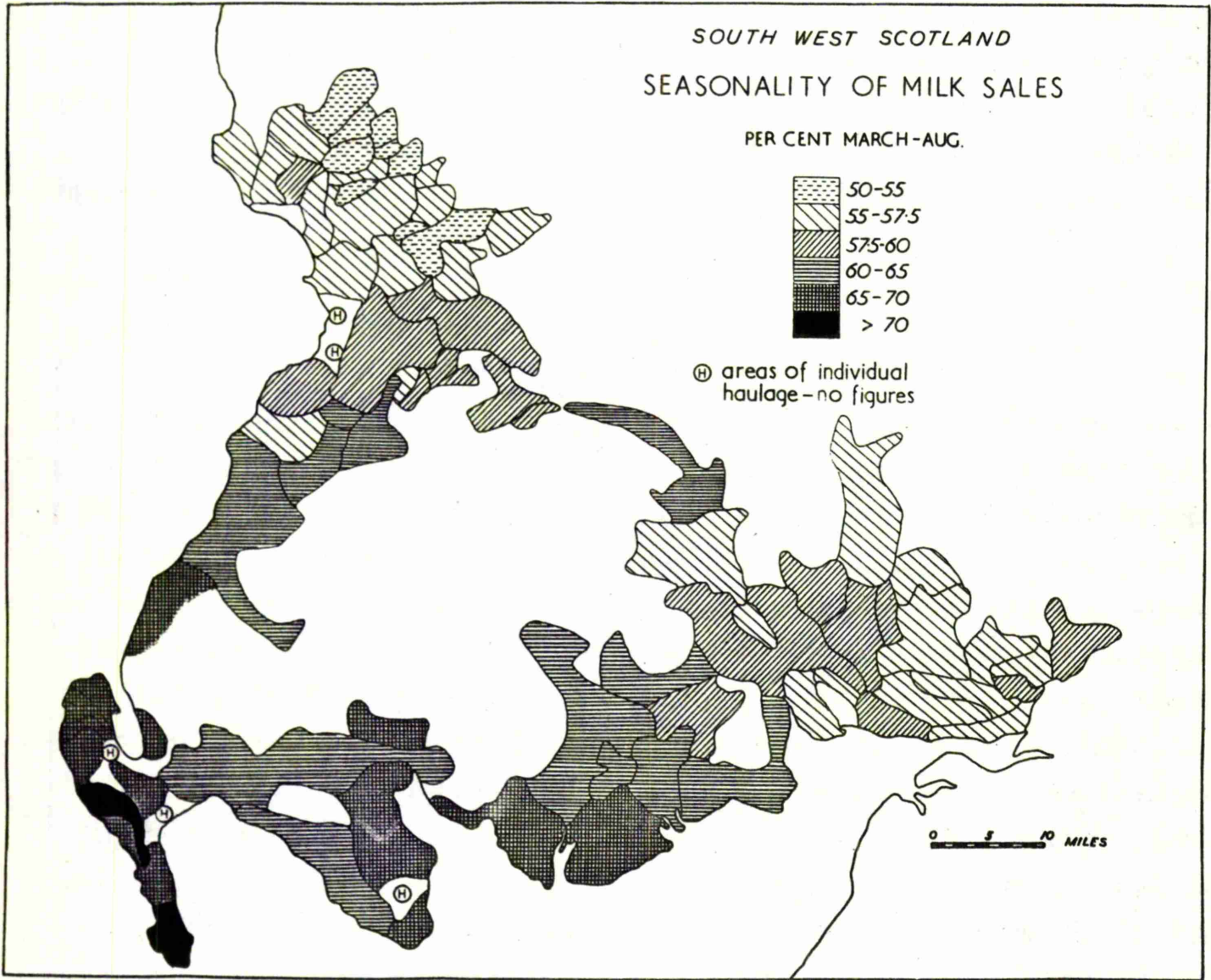
standard equipment on farms (Appendix B.) the suggestion may be reiterated in the future. An alternative solution may lie in improvements in the technique of milk condensing.

It is a well known fact that the seasonality of production varies widely, not only between individual farms but also regionally, yet the precise geographical pattern for Scotland does not appear to have been previously stated, far less adequately explained. Monthly production figures by counties supplied by the three Scottish Boards permit the construction of a generalised seasonality map as shown opposite (Figure 23).^{*} The percentage of annual sales produced in the period March-August was adopted, after a close examination of over a hundred schedules of monthly production, as the most reliable simple statistical means of representing seasonality. This is held to give a truer representation of seasonality than the April-September percentage which is customarily adopted by the Milk Marketing Boards and the Agricultural Colleges in treatment of the subject. The choice of this index is more fully discussed in the appropriate sections of Appendix A. The map clearly reveals the distinctiveness of the south west as an area of relatively seasonal production and apart from a weak reflection of this pattern in the extreme north east of the country the rest of Scotland appears to have a remarkably consistent seasonal production pattern being generally in the 55% - 58% range. Before any firm conclusion can be drawn a more detailed statement of the position within the south west is necessary.

Rationalisation of the pattern of milk transport has eliminated the previous uneconomic overlapping of the areas served by the haulage operators engaged by the Board to collect the milk from the farms. It has, therefore, been possible to map these hauliers' areas as separate units and to represent cartographically the seasonal pattern of each. This has been done on Figure 24. A more detailed statement of the position is presented in graph form in Appendix A. The blank areas on the map are areas/

* The figures refer to total sales including farm cheese gallonage. The latter only affects Kirkcudbright and Wigtown where the indices for liquid production alone are 65.4 and 68.1 respectively.

Figure 24



areas without any ordinary milk producers (producer-retailers are not included) and are for the most part areas of high moor, peat moss or blown sand. Those parts indicated as "areas of individual haulage" have an important dairying component but the milk is transported other than by private haulier. In some cases it is carried to the point of first delivery by the farmer's own transport, in others by the transport of a milk distributor. The remarkably even gradation in the seasonality pattern both north and east from the Rhinns of Galloway (particularly well developed in Ayrshire) suggests a simple explanation. In fact, the issue is far from straightforward and a number of influences appear to have been at work.

Previous Studies. It is relevant at this point to examine the conclusions of similar studies made elsewhere and it would not be unreasonable to expect a general applicability of these conclusions if they are in fact valid. Barnes (I.B.G. 1958) dealt with the subject for England and Wales and shows a general East to West increase in seasonality. He concludes: ".....seasonal cost difference varies much over the country according to farm practice. (grass or arable dominance, or the degree of transition, itself reflecting environmental conditions, largely determines seasonality. In the west, heavy purchases of concentrates needed for winter milking cows make winter milk production unduly expensive compared with the east, where dairying is mainly integrated in a system of mixed farming, grazing is less prolonged, and annual field crops grown on the farm are available as winter fodder often in the form of silage..... Most of the outstanding anomaliescan readily be explained by locally anomalous grass or arable bias in the dairying districts..... In some cases, however, the explanation of anomalies may be complex". Anglesey is cited as an example. (84)

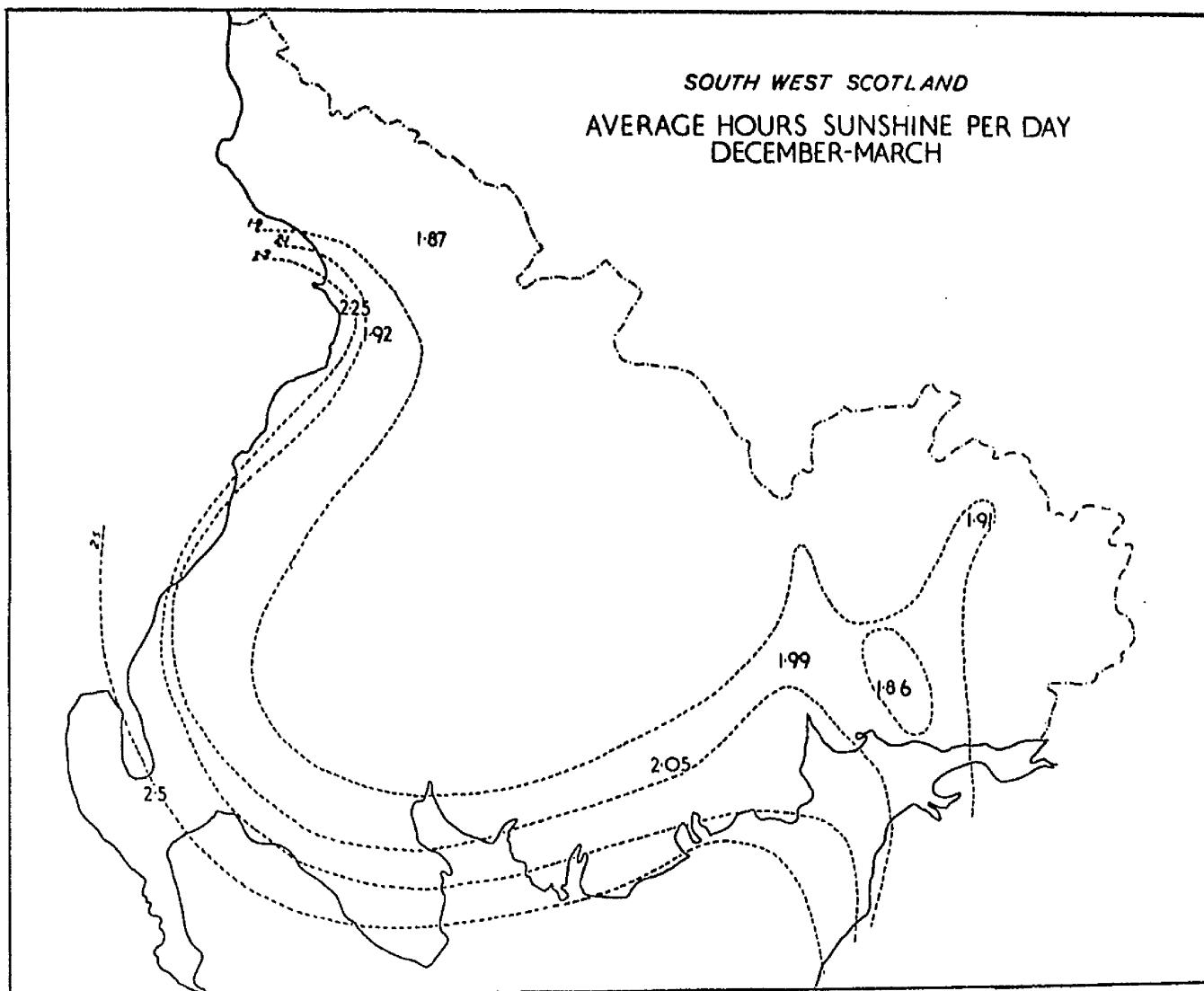
However true the above explanation may be for England and Wales a comparison of Figures 20 and 24 immediately proclaims its total irrelevance to south west Scotland. In fact, the relationship is here almost reversed. The area of greatest "grass dominance", north Ayrshire, is also the area of most level production, and the Rhinns of Galloway, one of/

of the most "arable" districts of the south west is at the same time distinctly the most seasonal. The occurrence of a much lower seasonality index in the comparably "arable" Dumfriesshire Lowlands further complicates the issue. It is not necessarily true, however, that no causal relationship exists in south west Scotland between the seasonality of milk production and the cropping pattern, but any such relationship is clearly more subtle than that expressed by a simple tillage/grass ratio. This will be elaborated later.

A very different explanation of regional variation in seasonality was put forward for north Wales by Phillips, Davies and Brown (Jour. Dairy Research 1949). These writers point to a general west to east increase in seasonality over that area. Interestingly they comment that, as in the case of south west Scotland, "There does not appear to be any relation between % winter milk production and % tillage area in the region". They conclude instead, "It is postulated that the west to east cline is dependent mainly upon factors other than husbandry and that climatic conditions, particularly the hours of bright sunshine during the winter months, have a marked influence upon the breeding performances of cows and heifers during the period December to March". (85) Briefly the argument runs as follows:- Under natural conditions cows will calve in the spring and give summer milk. If a winter milk supply is wanted, it is necessary to arrange for some of the cows to calve in the autumn and in order to achieve this it is necessary to bull the cows some time during the previous winter. Conception at that time of the year is relatively difficult to ensure and an empirical study suggests that the reason lies in the low daily sunshine totals. Since the average hours of bright sunshine per day in winter vary regionally in much the same way as the percentage of milk produced in winter, it is suggested that the two are causally related.

The argument is inevitably weakened by the fact that it fails to make adequate provision for other geographical circumstances, but it does contain the very important suggestion that the seasonality of milk supply may be only partially under the control of the farmer. If the theory contains/

Figure 25



contains even a germ of truth, then it is to be faced that the map of seasonality of milk production is partly a direct and automatic response to the physical environment. In view of the similarity between north Wales and south west Scotland (western peninsulas with mountainous interiors) the relationship, if it is valid, presumably applies equally in both cases. Relevant evidence in sufficient detail is understandably difficult to obtain, but Figure 25 shows in generalised form, and so far as the very limited records will permit, the winter sunshine pattern over south west Scotland in an average year. Once again the alleged relationship with seasonality of milk production appears, not only to be unsupported, but to be flatly contradicted. The very seasonal Rhims of Galloway are undoubtedly one of the sunniest (or least cloudy) parts of the south west, and the level producing Ayrshire-Renfrewshire borderlands one of the cloudiest. This in itself, however, does not by any means disprove the theory. It may only mean that the effects of sunshine totals in south west Scotland have been obscured by the influence of other more powerful circumstances. It is certainly true that farmers often have difficulty in getting their cows to calve in the autumn and it is normal for the calving dates of a cow to slip annually nearer the natural time in the spring - hence the association of the older cows with summer production. In addition, important year to year variations in monthly calving percentages are known to occur, and since these variations are almost certainly attributable to the condition of the cows when they are put to the bull, weather conditions at that time might well be responsible. It remains the case, however, that no empirical evidence has been found to suggest that the difficulty in ensuring winter conception is more pronounced in some parts of the south west than in others. Whatever the truth of the matter, it is clear that the chief explanation of Figure 24 lies elsewhere.

The Calving Pattern. With very minor exceptions it appears that the calving pattern (and therefore seasonality of production) is sufficiently under the control of the farmer to enable him to adjust it to his best advantage taking account of prevailing environmental conditions. The farmer/

Figure 26

MONTHLY CALVINGS - AYRSHIRES

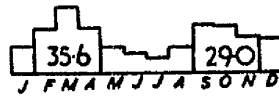
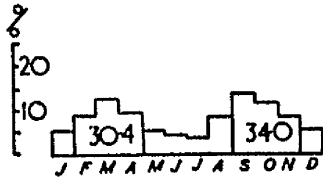
Milk
Recording
Society

Cows & Heifers 1955

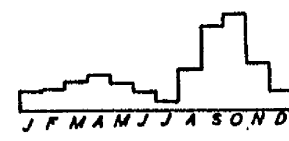
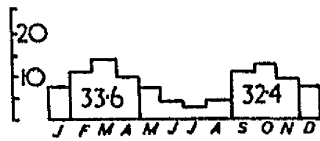
Cows 1955

Heifers 1958

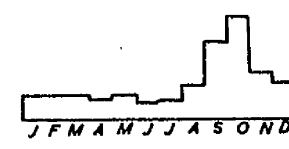
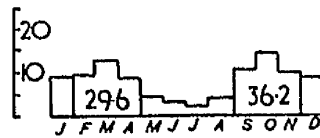
NORTH AYR



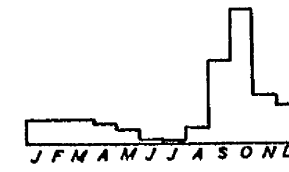
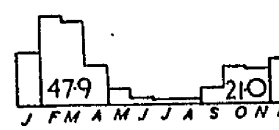
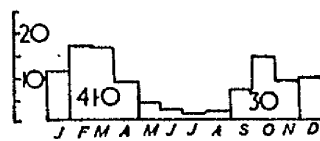
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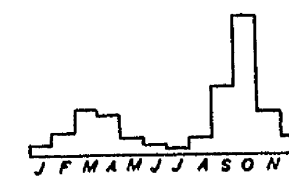
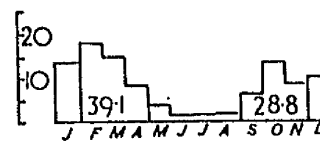
DUMFRIES



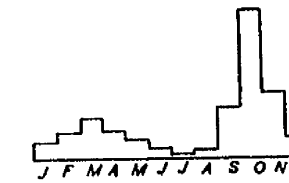
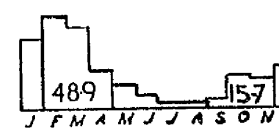
STEWARTRY



MACHERS



RHINS



farmer will naturally take the effect of the spring grass flush into account when planning his seasonal production pattern and regional variations in the date of the first flush mean that in order to achieve the same seasonality pattern slightly different patterns of monthly calvings will have to be followed in different areas. This is a relatively unimportant point, however, and the available information reveals a reasonably consistent relationship between the seasonality of calvings and the seasonality of milk production.

Figure 26 shows the seasonality of calvings in each of the six milk recording societies operating in the south west. The figures here represent about 35 per cent of all dairy cows in the region. 1955 is the most recent date for which totals are available. More recent figures (1958) are available in the case of heifers whose role in the seasonal pattern of milk production is a crucial one.

It was shown earlier that to ensure a basic supply of winter milk most heifers are calved in the autumn. These heifers will then calve for the second time between twelve and eighteen months later depending on the seasonal pattern of milk production aimed at by the farmer. As explained above, it is usual for the calving date of a cow to slip annually nearer the natural time in spring, irrespective of a policy designed to ensure autumn or winter calving. Consequently the farmer aiming at a level supply must make adequate provision for this and calve his heifers as early as possible in the autumn. This practice can be seen statistically on Figure 26. More precisely the percentages of heifers in each society calving in August, September and October, 1958 were:-

		<u>Aug.</u>	<u>Sept.</u>	<u>Octr.</u>
N. Ayr	...	13.0	23.2	16.9
S. Ayr	...	8.7	18.6	21.9
Dumfries	...	7.5	17.7	23.2
Stewartry	...	3.6	18.3	30.6
Machars	...	4.1	15.1	31.0
Rhins	...	2.3	11.6	32.9

The early calving of heifers in the least seasonal areas is quite clear.

All the graphs comprise two maxima, in spring and autumn. Level production/

production does not require an even calving rate throughout the year but merely an adequate balance between spring and autumn calvings with a few summer calvings to bridge any gap that may arise. Summer calvings are noticeably uncommon partly because cows calving in that season receive at neither end of their lactations the valuable boosting effect of the spring pasture flush. The effect of this flush of pasture also means that in order to achieve a level milk supply it is necessary to have distinctly more autumn than spring calvings.

The Farm Cheese Tradition. Figure 24 clearly shows that seasonality increases with remoteness from the main centres of demand - Glasgow and Edinburgh. At the present time space relations of this kind can have no effect since, apart from small differences in transport charges, the marketing facilities of all dairy farmers are identical. Prior to the Board, however, the general calving patterns shown on Figure 26 could be easily explained in terms of the importance of cheese dairying in the remoter parts, and of production for the liquid market nearer the cities.

Cheese dairying is purely a summer business for a number of reasons, chief of which is the fact that unlike liquid milk, cheese can be stored for long periods and can, therefore, be manufactured when milk is cheapest in summer. This was especially necessary in view of the highly competitive nature of the cheese market. In addition, cold weather itself has a detrimental effect on the process of coagulation and frequently results in an inferior product.

If the present seasonality map is to be explained in terms of distance from the consuming centres it must be conceded that the pattern is the reflection of circumstances which no longer apply. It is now twenty-six years since the creation of organised marketing destroyed the relevance of space relations and with the rapid decline of farm cheese-making the great bulk of the milk has for many years been sold liquid from the farms. Even at the inauguration of the scheme liquid sales accounted for 64.3 per cent of the total Wigtownshire production. The great question is whether sheer inertia in the calving policy can be responsible for the persistence of the pattern over such a long period. The weight of evidence suggests that it can. It is demonstrably true, for example, that there are farmers/

farmers in the remoter districts who have carried into liquid production the traditional calving pattern associated with cheese production (all cows and heifers calving in the spring) and consequently sheer inertia is without doubt a part cause at least of the pattern shown on Figure 21. The real difficulty is in measuring the importance of this tradition vis-a-vis other possible causes.

It must be remembered that very few farmers have the advantages of a really accurate costing survey. Farmers are guided by their bank books and so long as these show no serious turn for the worse traditional practices are apt to be continued. Especially is this the case with a matter such as seasonality of milk production for on account of seasonal variations in the pool price the relative profitability of winter and summer milk production is difficult to determine precisely and the subject is open to perennial debate. As a result wide variations in seasonality are known to exist between similar farms in the same locality. As an example, the following figures represent the percentage milk sales from April to September of sixteen dairy farmers who comprise a discussion group meeting in Castle Douglas. All are presumably progressive farmers with a keen eye on the profitability of their farms. Only two (unspecified) have made cheese within the last twelve years.

16 Galloway Farms, % Annual Sales, April-September.

36, 39, 48, 55, 56, 57, 58, 58, 62, 63, 63, 63, 63, 68, 68, 69.

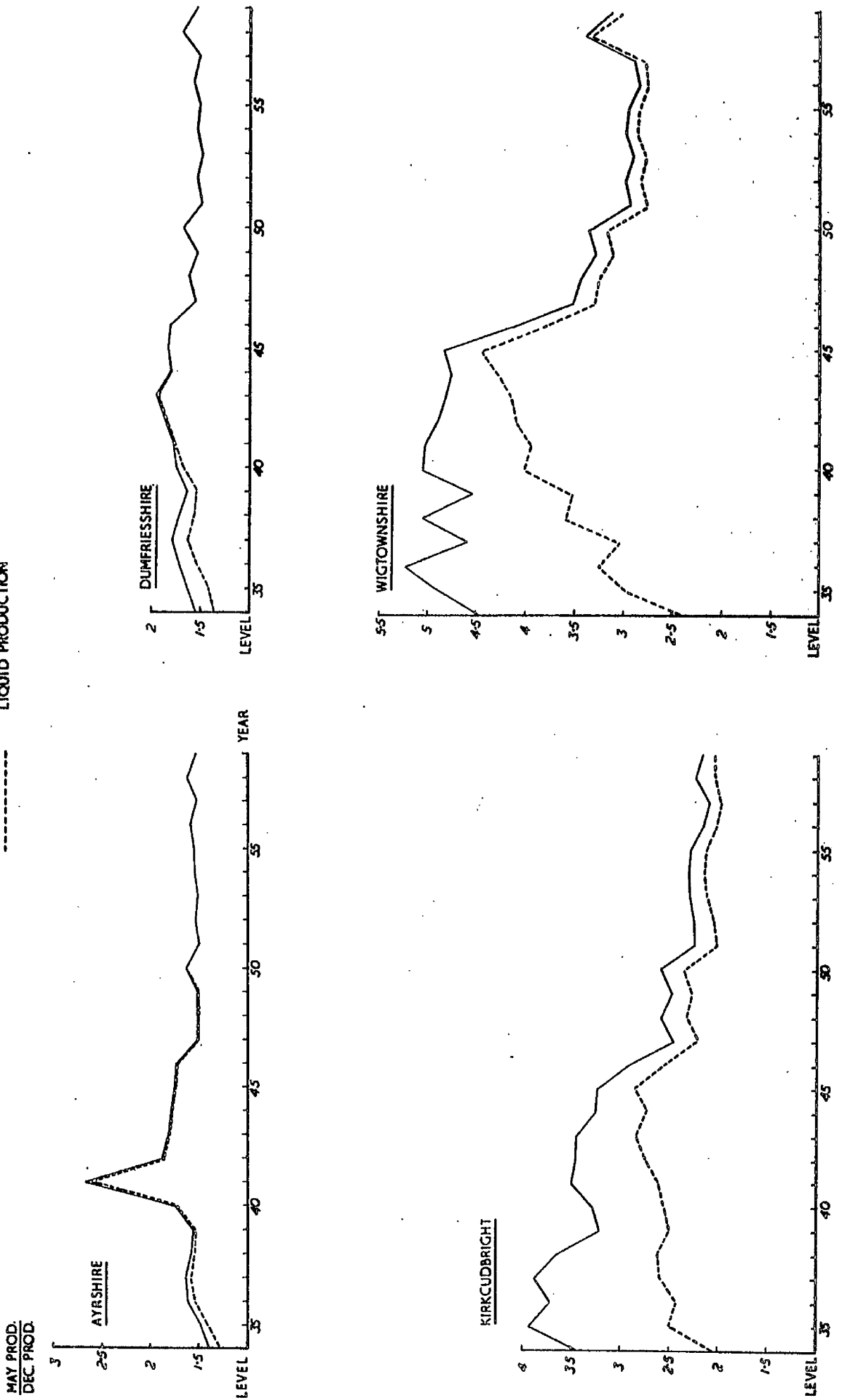
It will be noted that three are producing more milk in winter than in summer and one nearly twice as much.

A precise comparison of the seasonality map with the locations wherein farm cheese-making persisted longest is not possible since lists of cheese farms are not available for the period prior to the incorporation of the Company of Scottish Cheesemakers in 1954. However, supporting evidence may be drawn from the generalised seasonality map of Scotland (Figure 23). The most seasonal areas are all those with a former commercial cheese-dairying component in the farming system. The case of the traditional dairy region of the south west, including Argyll (mainly Kintyre) is/

Figure 27

SEASONALITY 1934 - 1959

— TOTAL PRODUCTION
- - - LIQUID PRODUCTION



is obvious enough, the extreme north east perhaps less so. Farm cheese is not made commercially in the latter region to-day and there is a total absence of any statistical record from which its former importance could be gauged. It is well known, however, that farm cheesemaking was of some considerable importance in Orkney prior to the Second World War. A number of Caithness farms were also known to make cheese in commercial quantities though on the national scale the farm cheese of these parts was of very minor importance. In view of the very different physical conditions prevailing in the extreme north east it would be rash to place too much emphasis on these facts. Shortage of home grown winter feed or freight charges on concentrates may serve to limit the winter supply in these remoter parts. It will suffice to note that the historical circumstances in the region do not conflict with the evidence for the south west. Throughout the rest of the country commercial cheesemaking on any scale has long been rare or absent. Such dairy farms as existed prior to the Milk Marketing Boards were for the most part liquid milk producers supplying nearby centres of population and, therefore, maintaining a level supply throughout the year. This level supply can be seen to-day in the remarkable consistency of the seasonality pattern throughout the east of Scotland.

Further light can be shed on the issue by an analysis of change in the seasonality pattern since the Board commenced operations. This is presented in graph form for each of the four south west counties (Figure 27). For the sake of statistical simplicity an index obtained by dividing the May production by the December production has been used; the more seasonal the production the greater the index. * There is no reason to believe that the result would differ appreciably had the index employed till now (March-August %) been used. It will be noted that the horizontal axis in each case represents unity, that is, level production (May sales = December sales). The graphs of seasonality of liquid production were calculated by/

* This simple index has not been used hitherto because May and December are not inevitably the months of maximum and minimum sales.

by extracting any gallonage represented by farm cheese from the total production figures in each year. With the decline in farm cheesemaking the two graphs come progressively closer.

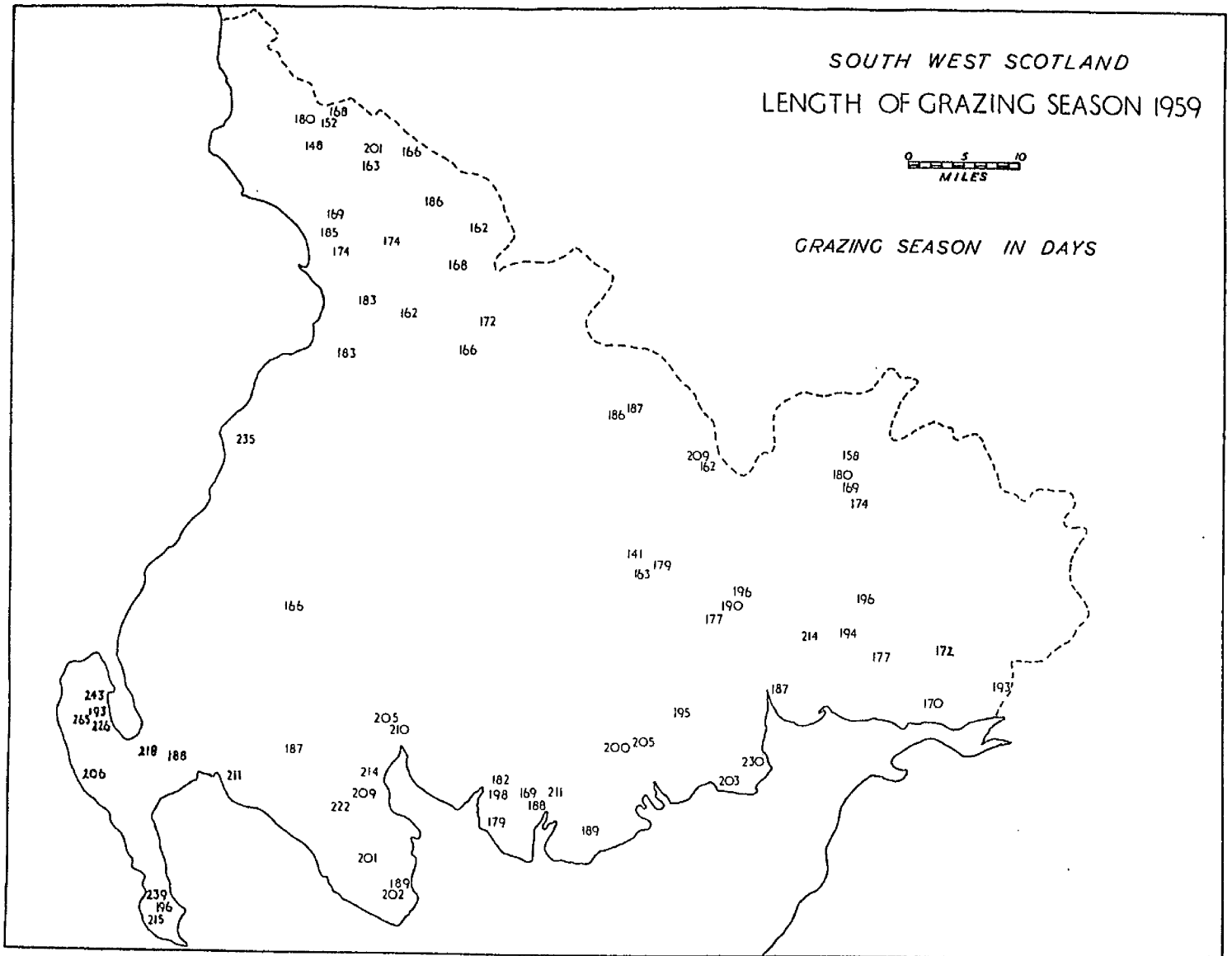
The major decline in the graphs of total production in the cases of Wigtownshire and Kirkcudbright is clearly a direct reflection of the decline in farm cheesemaking, and this is reflected in the early years by an increase in the seasonality of liquid production resulting from seasonal "cheese" milk being diverted to the liquid market. These trends were complicated during the war when shortage of feeding stuffs resulted in a general increase in seasonality. This was particularly marked in Ayrshire on account of that county's very important winter milk production and high dependence upon bought-in feed. Between 1940 and 1941 December production in Ayr dropped by 42%. In Dumfries, Kirkcudbright and Wigtown the figures were 8.9%, 10.3% and 7.1% respectively. Return to more normal conditions after the war coupled with a government policy of increased winter production resulted in a marked decrease in seasonality in all areas. In 1959 the seasonal pattern of liquid production^{had} almost returned to its 1934 position, though with the exception of Kirkcudbright it was still somewhat higher.

As it stands this could be taken as contradictory evidence to the hypothesis that the seasonality map is a reflection of the old farm cheese economy. The virtual extinction of farm cheesemaking since 1934 has apparently had little permanent effect on the seasonality of production for the liquid market. On the other hand, the evidence is incomplete for even before the Board started operations a major swing into the liquid market had already taken place. To gauge the full effect of the decline in cheesemaking upon the seasonal pattern of liquid milk production statistics (non-existent) for earlier years would be necessary. It is probable, for example, that the seasonality indices (liquid production) for Wigtown and Kirkcudbright in 1920 would be very much lower than the 1934 figures of 2.40 and 2.06 respectively.

Regional Variations in Length of Grazing Season.

The distinctly seasonal nature of milk production in the south west has/

Figure 28



has been casually attributed by a number of writers to the relatively long growing season of that region.⁽⁸⁶⁾ The relationship does not appear to have been examined in detail though the broad assumption is that a long growing season results in a plentiful supply of grass and consequently very favourable conditions for summer milk production. Even practising farmers will allude to the long grazing season as a special advantage for summer production.

The grazing season may be defined as that length of time in any one year during which the cows are on pasture day and night. The last day in spring and the first day in autumn on which the cows are brought in at night mark the two ends of the grazing season as defined here. This information has been obtained for 75 individual dairy farms in the south west and is shown on Figure 28. Even with this limited information a general correlation can be detected between length of grazing season and seasonality of production. The very wide range in length of grazing season is striking and in the extreme cases differs by over three months between north Ayrshire and the Rhinns. As a general rule there appears to be almost two months difference between these two areas, a month at either end of the season. A comparable though smaller difference exists between Dumfriesshire and the Rhinns. Equally important are the wide variations in length of grazing season within each locality. These local variations are attributable to a variety of circumstances including altitude, aspect, soil conditions, fertiliser policy, and whether or not the farm winters any sheep. The wintering of sheep is a popular sideline with many (probably most) dairy farmers but the practice takes its toll of the pasture and may delay the advent of the dairy herd's grazing season by as much as a month.

The very long grazing season of the extreme south west is without any doubt a very real advantage in dairy farming for grass milk is relatively cheap milk and if the cows can be on grass at those times of the spring and autumn when the high 'winter' prices are being paid there is obviously much to be gained. But it is not clear that simple length of grazing season is any special economic advantage for a very seasonal production pattern. The extra months of grazing can equally well be taken advantage/

advantage of by cows calving in the autumn, and if attention is directed to the existence of a very short stall feeding period it would not be difficult to argue in favour of winter production. Barnes has already touched on the advantages for winter milk production inherent in a long grazing season in the case of Anglesey.⁽⁸⁷⁾ Further, it is to be noted that Orkney, though more seasonal than the mainland, has a distinctly shorter grazing season (generally about 158 days) largely because of the retarding effect of sea spume on pasture growth.⁽⁸⁸⁾ Again, however, such argument by analogy must be cautiously presented.

On the other hand, where there is a long grazing season cows calving in the spring will be able to complete almost all of their lactation on grass with a minimum of feeding. There is a simplicity about this which is certainly attractive whatever may be the hard facts of economics. It reduces the problems of changing from grazing to feeding and vice versa to a minimum. It is difficult to measure this sort of advantage in money terms, but it is no less real for that and could well be responsible for the persistence, if not for the actual presence, of the seasonal production pattern in these parts.

The value of a long grazing season is modified by the quality of the pasture and it is an important fact that in the south west the "burning" or parching of pasture in summer is a real danger in the most seasonal parts which are generally areas of light soil. The very dry summer of 1959 created severe difficulties for many Wigtownshire dairy farmers while in the same year north Ayrshire farmers had one of the best pasture seasons in memory. Pastures which are susceptible to burning in summer cannot be held to provide a sound basis for seasonal milk production.

Farm Size. Farm size is quite certainly an important consideration in planning the most profitable seasonality pattern. Its influence is exerted in two ways.

1. Stocking density. As explained earlier small farms tend to be very heavily stocked, to the extent that summer grazing is frequently sufficient for little more than the maintenance ration of the cows and most of the production/

production ration comes from the feed bag. With, in consequence, a relatively small summer/winter cost difference advantage will naturally be taken of the high winter prices and a large percentage of the output planned for that season.

2. Labour. The importance of family labour on small farms weakens the validity of costings on a strict accountancy basis since much effort can be put into byre work in winter without registering as hard cash expenditure in the farmer's estimation. The small family farm is to that extent more favourably placed for winter production than the bigger dairy farms with a number of hired hands.

A comparison of Figures 7 and 24 reveal an approximate correlation between farm size and seasonality on a regional basis. This is particularly noticeable in the case of north Ayrshire where a system of family work in the fields in summer and in the byre in winter is of long standing. A similar relationship may be detectable in east Dumfriesshire and the association of big farm units with seasonal production in Galloway is quite clear.

Home Grown Winter Feed. The profitability of winter milk production depends to a large extent on the availability of home grown feed. As mentioned earlier the sheer quantity of tillage crops, as expressed through the percentage of arable land, is in itself inadequate as a guide to the degree of self-sufficiency in winter. This is especially so in view of the importance of hay which is not a product of the tillage area. Since different crops vary much in their efficiency as milk producing fodder close attention must be given to the actual composition of available home grown feed. This varies widely within the south west.

Four distinct categories of winter feed are grown on the dairy farms of south west Scotland. These are:-

1. Grass for mowing, chiefly for hay but also for silage and dried grass.
2. Cereal crops, chiefly oats and barley, both the grain and straw of which are used.
3. Roots, consisting of Swedes, turnips and mangolds.
4. Other succulents, mainly cabbage and kale.

The/

The last are especially valuable for bridging the gap between pasture and full winter feeding but in terms of acreage are relatively unimportant. Only in one parish (Closeburn, Dumfriesshire) did the 1958 figure amount to more than 4 per cent of the total acreage devoted to winter feed crops and for that reason they are grouped with roots in the subsequent calculations.

Figure 29 shows the relative quantities of each of the three main categories of home grown winter feed available in each parish in 1958. The term "available" home grown feed is employed as there is no information on how much of each is actually used for that purpose. There is no reason to believe, however, that the regional variations shown on the map are not closely reflected in regional variations in the composition of crops actually fed. The inclusion of wheat is dubious since the crop is rarely if ever used as cattle feed but in view of the very small acreage involved and the cartographic techniques used this should not materially affect the conclusions.

The map illustrates the great importance of hay as the basis of winter milk production in Ayrshire, particularly north Ayrshire, and the importance of roots and grain crops in Galloway and in Wigtownshire in particular. Roots are distinctly more important in the Rhinns of Galloway than elsewhere though according to official estimates the highest average yields of turnips are obtained in Dumfriesshire. The almost negligible importance of roots in the heavy soil area of north Ayrshire is striking. For example:-

<u>Parish</u>		<u>Roots as % of winter feed acreage.</u>
Beith	...	2.5
Dunlop	...	2.1
Muirkirk	...	3.0
Stewarton	...	2.6

In contrast, in the Rhinns of Galloway only in one parish, Portpatrick, does the acreage devoted to roots fall below 20 per cent of the total acreage devoted to winter feed crops. These regional variations have important repercussions upon the cost of winter milk production.

All home grown feed must normally be supplemented by bought-in concentrates/

concentrates to provide a full production ration but this is particularly necessary in the case of turnips and straw which, on account of their fibrous nature, can scarcely provide a full maintenance ration. In Wigtownshire turnips and straw have traditionally provided the winter keep for the dairy herd and since little milk was wanted in that season the diet was adequate. In the old cheese days it was very much a case of keeping the herd alive until the new season started. To-day the typical Wigtownshire dairy farmer with a seasonal pattern of production will feed this same basic diet including a bought-in "grain balancer" which, mixed with the grain, is designed to compensate any deficiency in the diet. As a general rule under these circumstances winter milk must be produced entirely from the feed bag, with consequent expense. Hay, on the other hand, while not enough in itself for both maintenance and production, does provide a good foundation for winter milk production. Much depends on the quality of the hay but good hay should provide a full maintenance ration plus some of the production ration. Consequently the important hay crop of north Ayrshire fills a vital place in the dairy farm economy. With so much attention given to winter milk a wet season resulting in a poor hay crop can have serious repercussions on annual farm profits. Dry summers ensuring good hay crops and, in this heavy soil area, involving no danger of pasture burning, promote maximum financial returns. In contrast, these same conditions can impose severe financial difficulties upon the Wigtownshire farmer through scorched pasture and meagre root crops. In this way identical summer weather conditions can have diametrically opposed consequences on dairy farm profits depending on soil conditions, the cropping system followed and the seasonality of milk production.

It was shown earlier (Chapter 11) that these regional differences in cropping are closely linked with differences in the physical environment, particularly in soil texture. The important hay crop of north Ayrshire, for example, is a reflection of the low tillage area of the region which may in turn be related to the prevailing heavy cold soil. Similarly the importance of roots in Wigtownshire can be related to the light to medium soils of the county. The special importance of roots in the Rhinns may/

may owe something to the fact that the very mild winters allow the crops to be left in the fields and collected as needed. Throughout most of the south west it is necessary for the turnip crop to be collected and stored for the winter. A comparison of the Rhinns and the Machers reveals a distinctly higher percentage of hay and lower percentage of roots and cereals in the latter. The difference can be attributed to the heavier land of the Machers.

A comparison of Figures 24 and 29 will reveal an approximate correlation between seasonality and the composition of home grown winter feed and the possibility of a causal relationship must be examined. The areas of most level production appear, as a general rule, to be those with the highest hay percentage and those with a marked seasonal pattern to be those where roots and cereals assume their greatest importance. This is particularly noticeable between north Ayrshire and the Rhinns. Dumfriesshire, with its important turnip crop, confuses the issue a little though even here there appears to be a rough correlation between the hay percentage and seasonality, especially in the southern parts of the county. The correlation also holds good between the Machers and the Rhinns. A more precise statement of the association is shown on Figure 30 where a distinct linear function is apparent.

To the extent that a causal link does exist between seasonality and the cropping pattern (and the evidence here strongly supports the hypothesis) it remains to discover in which direction it operates; that is, how far the cropping pattern determines seasonality and how far seasonality determines the cropping pattern. This is a very difficult point and though the answer obviously lies in the mind of the individual farmer a clear statement is difficult to obtain on account of the many other considerations relevant to the issue. Actual cases of farmers in the "turnip and straw" country of the south west who have decided on level production and who have an associated high (by local standards) mown grass acreage are not hard to find. At the same time, however, it is just as easy to meet farmers in the same areas who are planning level production yet have no intention of changing their traditional cropping pattern.

WINTER FEED CROPS 1939 - 1958

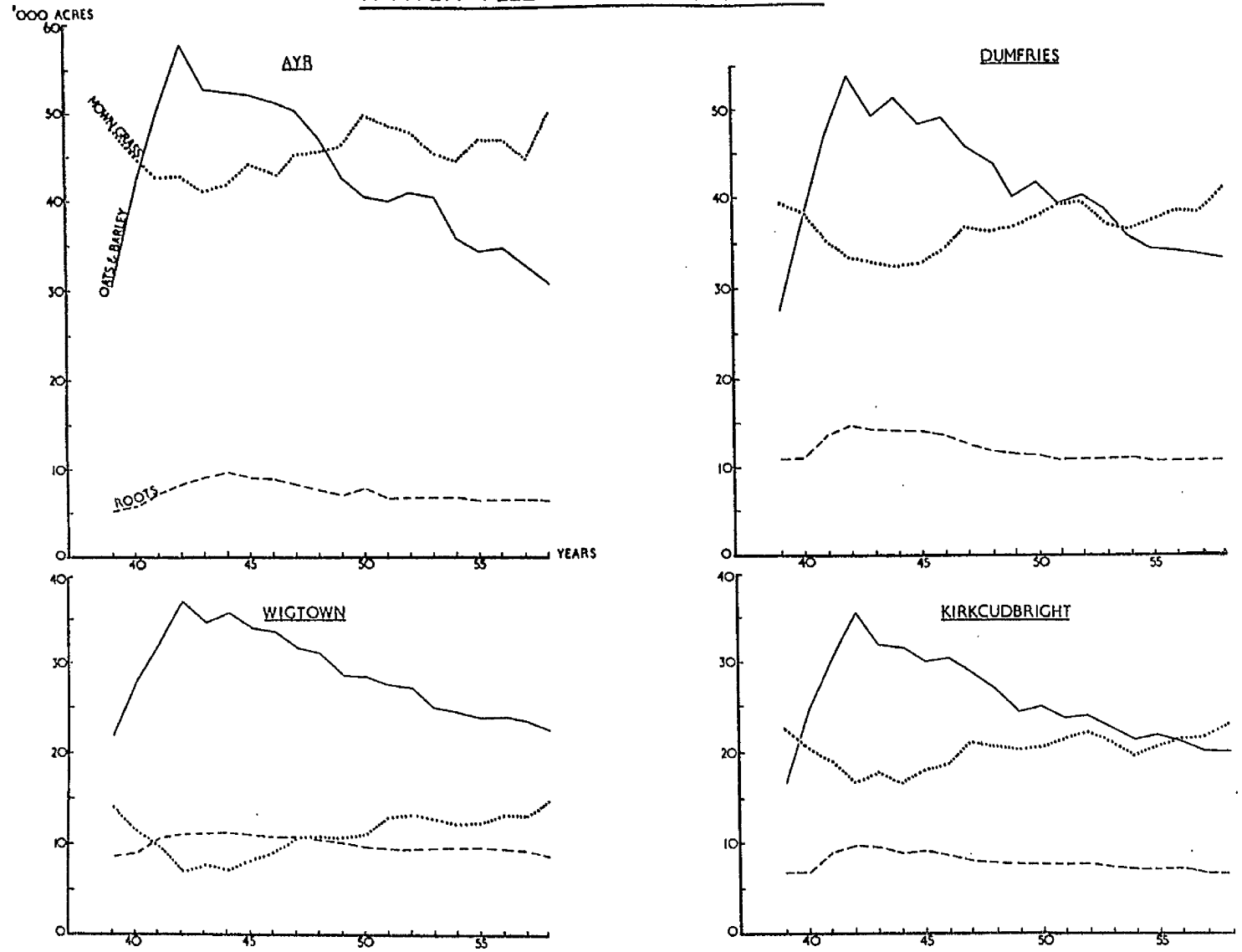


Figure 31

In so far as a causal link exists between the cropping pattern and seasonality the very marked decline in seasonality (total production) in Galloway since 1934 should be reflected in a *pari passu* change in the cropping pattern. In particular, an increase in the hay acreage/in roots and/or cereals would, other things remaining equal, prove the point. Unfortunately, the complexity of circumstances, including the wartime plough-up campaign, which have affected the cropping pattern seriously weaken this method of analysis. With the weaknesses of the method in mind a comparison may be made between the trends in winter feed crops in the four counties (Figure 31). A comparison of Wigtownshire and Ayrshire will be most instructive partly because these are the two most purely dairying counties and consequently the cropping figures approach closest to the cropping figures (unknown) for dairy farms alone, and partly because they represent the two extremes in seasonality of production. The relatively unchanging seasonality pattern in Ayrshire serves as a useful norm.

The distinctly greater percentage increase in mown grass acreage in Wigtownshire over the period of greatest decrease in seasonality (1945-57) supports the suggested relationship though the similarity in the trends of the other crops leaves much room for doubt. The evidence is inconclusive. Though individual trends (such as mown grass in Wigtownshire) may be cited in the argument, the weight of evidence clearly shows that the composition of home grown winter feed can, and does, vary within quite wide limits without any associated change in seasonality of milk production.

Conclusion. The variety of circumstances which may be reflected in regional variations in seasonality of milk production - sunshine totals, remoteness from consuming centres (and associated importance of traditional practices), grazing season, farm size and cropping patterns - caution against snap conclusions. Most, if not all, probably contribute to the pattern shown on Figure 24.

The relative weights to be assigned to each of these several factors are difficult to determine, but the even gradation in seasonality away from/

from the main centres of demand strongly supports the historical explanation. In particular, the distinct east-west change in seasonality in Dumfriesshire and the Stewartry of Kirkcudbright is difficult to explain in terms other than these. The importance of length of grazing season is doubtful in view of the general principle that the growing season decreases with altitude and distance from the coast. The seasonality map nowhere suggests a pattern of that kind. Regional variations in farm size and the composition of home grown feed are perhaps better regarded as disincentives to the modification of the traditional pattern than as determinants of that pattern. The effect of winter sunshine totals on the breeding performance of cows remains doubtful, certainly in terms of regional variations, and any effect it might have in south west Scotland has been obscured by much more powerful and contradictory forces.

CHAPTER 13.

CONCLUSION TO PART ONE.

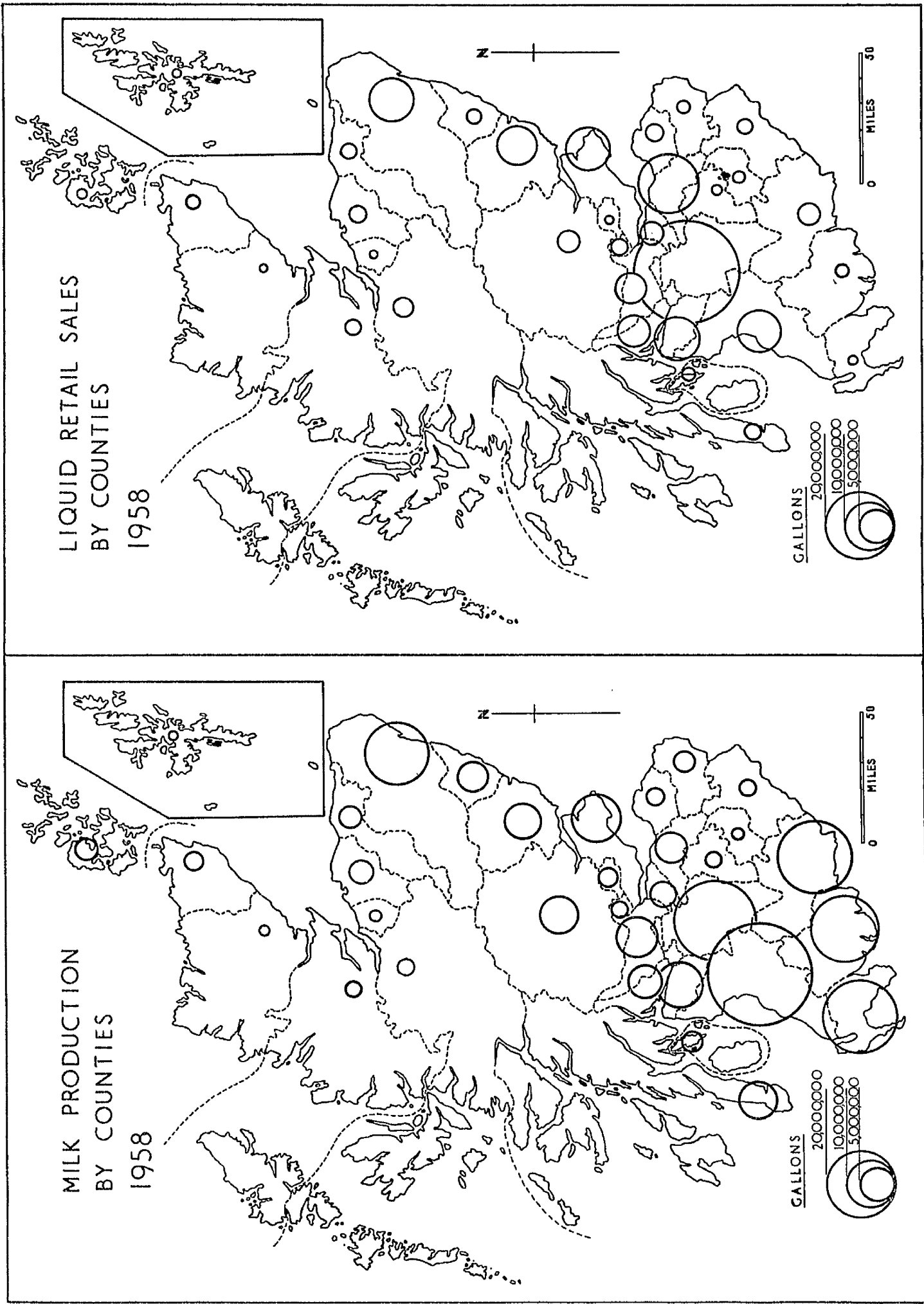
The great variety of forms which dairy farming takes within south west Scotland remains striking. Wide local variations in stock structure, cropping patterns and seasonality of production are superimposed on the more significant regional variations which are just as distinct. Generalisation can be dangerous, but it is safe to say that the two extremes of pure dairy farming in the south west are found in north Ayrshire and the Rhinns of Galloway, a fact easily explained by wide differences not only in soil and climate but also in farm size, historical development and location relative to the consuming centres. Elsewhere throughout the south west is found every intervening nuance.

There has been no attempt to paint a complete picture of dairy farming in the region; that would have involved pointless repetition of much that has been written elsewhere. Rather an attempt has been made to examine the reasons behind variations from district to district in some of the more important aspects of dairy farming. The study began with the historical evolution of the industry because that seemed the most natural approach. It is hoped that this has not prejudiced any subsequent conclusions for if any dominant theme has emerged it is in the extent to which many of the regional variations show reflections of the past and are only partially adjusted to the present geographical facts. The importance of "sheer tradition" in farming practice is difficult to gauge, for obvious reasons, yet some attempt to measure its effect, however crudely, is clearly necessary. At the same time, it is important that this projection of the past into the present is not inflated beyond its true significance. After all, few industries have either the flexibility or the vitality to keep abreast with changing geographical values. The dairy industry is no exception.

PART TWO.

MILK MANUFACTURE AND DISTRIBUTION IN SCOTLAND.

Figure 32



INTRODUCTORY NOTE

This study sets out to examine the various links between milk production and consumption - the development of systematic marketing, various aspects of the distributive trade and the pattern of milk manufacturing.

For reasons given earlier these subjects are treated with reference to the whole of Scotland. Since the production pattern has been discussed only for the four counties of the south west a general production map for Scotland is shown here (Figure 32) together with a map of estimated liquid retail sales.

CHAPTER 14.

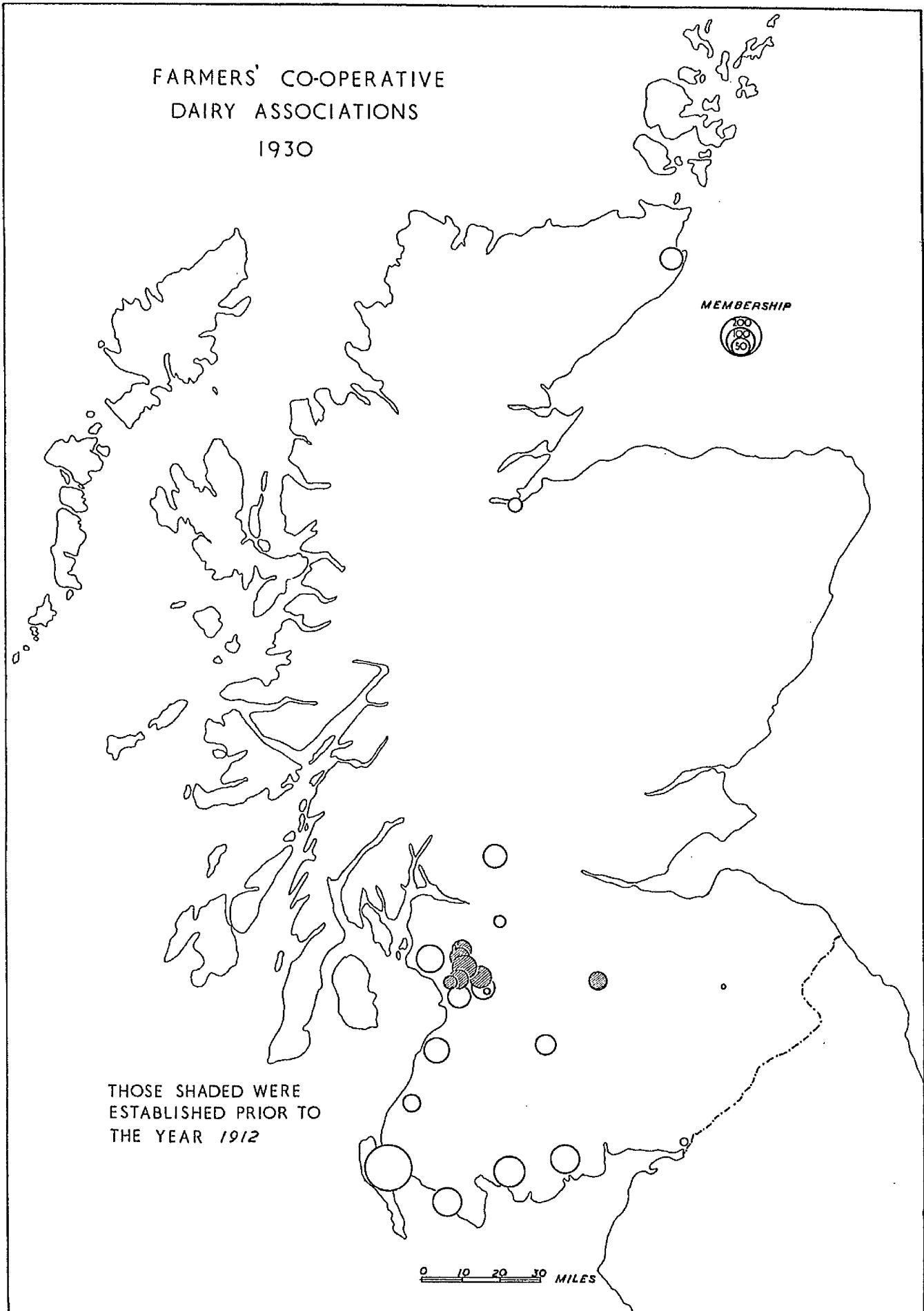
THE DEVELOPMENT OF ORGANISED MARKETING.

The creation of the Milk Marketing Boards in 1933 was the culmination of thirty years of piecemeal co-operation among farmers in an attempt to maintain, in face of mounting difficulties, a reliable and remunerative market for their production. The gradual decline in the relative profitability of farm cheese production as a result of increasing foreign competition has already been discussed.

From the late nineteenth century the liquid milk market developed in a haphazard manner as supplies were tapped from further and further afield. The prospect of cheap milk from the more outlying areas was an incentive to the city dairymen which offset the added risks of a long rail journey, and inevitably as the link between the producer and the consumer lengthened the wholesale dairymen rose to positions of authority in the industry. The situation, however, while clearly in need of rationalisation, was not serious so long as the disparity between the returns from cheese and liquid milk was not too great and in the period up to the First World War at least farm cheese production, where properly conducted, continued to give a good living. (89) Even so, in the first decade of the twentieth century there arose an awareness of the need to counter the growing bargaining power of the city dairymen in the liquid milk trade.

The first effective step towards co-operative milk marketing in Scotland was taken by Lord Rowallan when in 1903 he built a small creamery near Kilmarnock for the collection and dispatch of milk to the city. In 1906 this was handed over to a group of local farmers, thenceforth known as the Rowallan Co-operative Dairy Association. In times of low demand milk which could not find an outlet on the liquid market was manufactured in the creamery. 1905 saw the creation of the Scottish Agricultural Organisation Society which, though it had no directive authority, was in a position actively to encourage further co-operation among dairy farmers and before the outbreak of war in 1914 there were eight farmers co-operative dairy associations/

Figure 33



associations in operation in Scotland.

The locations of the earliest associations (shaded on Figure 33) are interesting. They form a broad arc roughly 20-25 miles from the Glasgow conurbation. This belt was at that time in a marginal position to the Glasgow liquid market and in summer fell partly outside the city's milk "shed". It was clearly in this zone that the role of the city dairyman, as an exploiter of an unorganised group of producers, would be most apparent. Nearer the city most farmers had an assured all-year market for their milk and consequently felt less need for co-operative action.

Detailed information on these early co-operatives is hard to come by and the precise motives for co-operation are not clear. Undoubtedly they were several and the following can be listed:-

1. Bargaining Power. The need to offer a solid front to the bargaining power of the city dairymen was clearly the most general objective
2. New Markets. There is some evidence to suggest that these co-operatives entertained hopes of establishing new outlets in the liquid market in order that manufacturing might be reduced. The clearest way would have been to establish a retail service. In fact only four associations succeeded in that direction though several had city depots from which they conducted a wholesale trade.
3. Need for improved capital resources. Undoubtedly co-operation brought proportionately greater benefits to the smaller producers whose dairy buildings and equipment tended to suffer from lack of capital. On the occasion of the formation of the Dunlop Co-operative (1908) the Glasgow Herald attributed the move to "demands by sanitary and medical authorities acting under the County Councils upon individual farmers". (90)
4. Labour Economies. This was a period of growing labour difficulties when families were becoming smaller and the city close enough to be a powerful magnet for young farm workers. Cheesemaking is a lengthy and tedious business and its centralisation must have been widely appreciated by the farmers' wives. Unfortunately the creamery cheese was often of an inferior type since the milk was frequently stored longer than was desirable in the hope of finding an outlet for it in the liquid market.
5. Cheddar Cheese. Co-operation removed the obstacles to Cheddar cheese production inherent in the small size of many individual producing units. While bulk manufacturing obviously allowed more latitude of this kind it is unlikely that this was ever an important consideration in the establishment of a co-operative association.

The/

The creamery, functioning mainly as a collecting centre for dispatch to the city, was an adjunct in nearly every case and this involved a capital expenditure which had to be covered by the economies of co-operation. With limited capital it was customary to buy over old property for conversion rather than to erect an entirely new building. Good transport facilities were of fundamental importance and all but one of the north Ayrshire co-operative creameries were sited on a railway. The exception was the Waterside Creamery of the Fenwick Farmers in which case the availability of an old woollen mill was a counter-attraction and, in any case, the district is not well served by rail. It is significant that the Fenwick Farmers pioneered the use of steam road haulage in the Glasgow district, (91) a neat reflection of the value of good transport links with the centre of demand.

After the War the co-operative system spread throughout most of the dairying areas and by the time of the creation of the Scottish Milk Agency in 1927 about half of all the producers in the south west belonged to one of these local associations.

These later associations tended to be bigger than the earlier ones, perhaps because the introduction of the motor lorry lengthened the radius of collection around the creamery. The meagre development of co-operative marketing among dairy farmers in Dumfriesshire may be explained in terms of the recent, and to some extent exceptional, development of dairying in that county discussed earlier. Discounting the small Gretna and Royal Four Towns associations, neither of which survived more than four years, the co-operative movement in Dumfriesshire took root only in upper Nithsdale which, like the adjacent part of Ayrshire, had a long established cheese dairying industry and was now suffering the strains of competition for entry into the liquid market.

In every case sale on the liquid market was given priority but the degree to which this was possible obviously varied with the location of the Association. Ancillary enterprises were not uncommon. The Upper Nithsdale Farmers, for example, opened a bakery with some success. In every case, though to a very limited extent, the co-operatives served a social/

social function and facilitated the exchange and dispersal of ideas. Membership in 1930 ranged from 2 (Gálashiels) to 283 (Stranraer) and only in these biggest groups would impersonality and suppression of the individual be possible dangers.

It would be rash to accord these early co-operatives with general success. Undoubtedly the solidarity they contributed to the price fixing mechanism was widely beneficial, but many farmers fortunate enough to have reasonably secure markets for their own milk joined with hesitation and later, when promised advantages (such as direct sale to the retailers) failed to materialise, regretted their decisions. The basic reason, of course, lay in the continued increase in liquid supplies, the depressing effect of which could only be masked by the co-operatives. On the other hand, the movement was much more successful in Scotland than in England where the milk wholesalers more clearly dominated the industry and largely forestalled any attempt by the farmers to organise marketing. So powerful did the wholesalers become that as early as 1919 a government commission considered their nationalisation. (92)

During the inter-war depression many farmers turned in a half-hearted way to the liquid milk market which was at least isolated from the direct impact of overseas depression. If a market could be found at all the returns, if not high, were frequent. The cheese market, on the other hand, being open to foreign competition, was severely hit and prices tumbled. In 1932 wholesale prices of both Dunlops and Cheddars in Glasgow were less than half what they had been in 1920. To some extent the position of the dairy farmer was mitigated by the low prices of imported cattle feed but the position of cheesemakers in particular was serious. Wherever possible cheesemaking was abandoned in favour of the liquid market, but demand was limited and farmers, especially in Wigtownshire, were hard pushed to find an outlet for their milk. Much of the Galloway milk was railed to the industrial centres of north east England. The Glasgow market was largely blocked by the copious supply of Ayrshire milk though some of the private creameries in the south west managed to break into the liquid market there with further depressing effects upon the price. Even in north Ayrshire/

Ayrshire the Clyde valley market could by no means be relied upon. One farmer near Kilmarnock sent milk in this period as far as Bristol while one of the farmers' co-operative associations, only twenty miles by rail from Glasgow, penetrated the London market and in so doing pioneered the bulk transport of milk by rail. *

From the early 1920's milk prices were negotiated by a body representing the National Farmers' Union of Scotland, the Glasgow Wholesale Milk Dealers' Association, the Federation of Co-operative Dairy Societies, the Glasgow Co-operative Societies and the Glasgow and District Dairymen's Association, but undercutting was common and disastrous. The position was aggravated by the development of motor transport which permitted even more widespread competition for entry to the market. Ultimately some distributors were refusing to make contracts at all and were in a position arbitrarily to select their suppliers. Trade was on a day to day basis and farmers were often forced to manufacture their milk at a few hours notice. To this day, and especially in Cunningham, the period is recalled with bitterness by many of the farmers.

An attempt to rectify the position was made in November, 1927 when a voluntary marketing scheme was inaugurated under the aegis of the Scottish Agricultural Organisation Society. Known as the Scottish Milk Agency the scheme embraced most of the local co-operative associations and included in addition about 900 individual producers. Each member undertook to market all his milk through the agency for three years. At first the scheme was successful but met with difficulties in the second year. In many ways it contained the seeds of its own destruction. The artificial support given to the liquid milk price induced more and more farmers to enter the liquid market. More especially, producers outside the scheme were in a position to take advantage of the prices maintained by it and undercutting became serious. Clearly something more than a voluntary association was needed. The result was the passing of the Agricultural Marketing Acts of the early 1930's and subsequently the establishment of the Milk Marketing Boards.

* Or so it is alleged. Three Scottish creameries claim the same distinction - a fact which in itself serves to underline the importance of long distance English markets at that time.

Figure 34

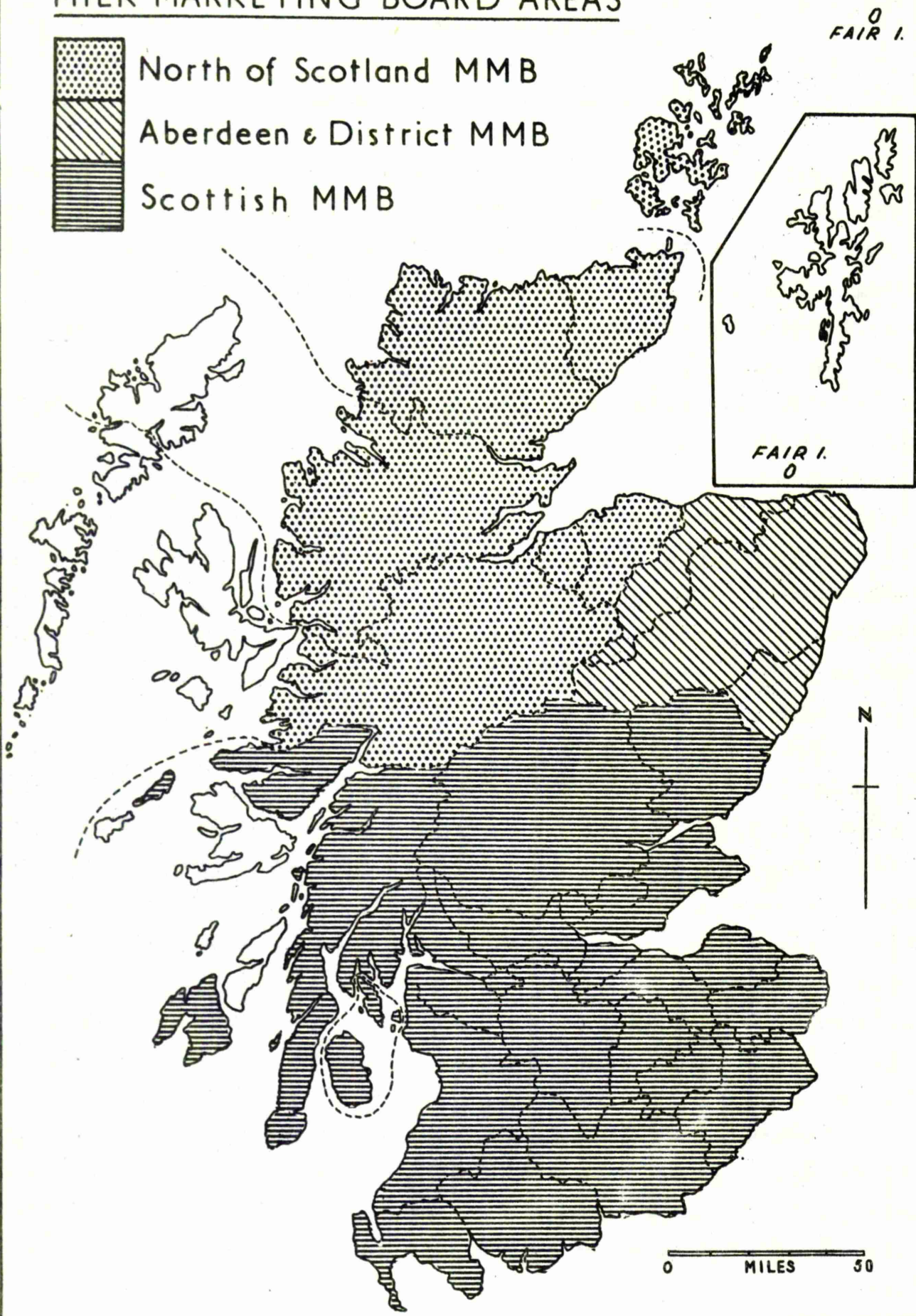
MILK MARKETING BOARD AREAS



North of Scotland MMB

Aberdeen & District MMB

Scottish MMB



CHAPTER 15.

THE MILK MARKETING BOARDS.

The Milk Marketing Boards, of which there are three in Scotland (Figure 34), were set up in the autumn of 1933 and were based on a scheme put forward by the Scottish farmers after the Marketing Acts of the early 1930's. They are, in essence, great farmers' co-operatives being controlled by representatives of the dairy farmers in their own interests. Obligatory hundred per cent membership of all milk producers in their areas (not counting some inconsequential 'exempt' producers) and statutory authority distinguish them from farmers' co-operatives in the true sense.

In view of the fact that there is a single Milk Marketing Board in England and Wales the existence of three separate Boards in Scotland requires explanation. The chief reason lay in the concentration of surplus manufacturing milk in the south-western parts. Since this realised only a fraction of the price of liquid milk it created special problems which the producers of the north and north east considered to be beyond their responsibility.

Even within the area of the main Board support for the scheme was by no means unanimous. A two-thirds majority of all producers was needed to launch the scheme and at a poll held in September, 1933, out of a total of 6163 votes, 4746 (77%) were in favour. The 23% who voted against the scheme were chiefly those producers who were already in a favourable position with regard to the liquid market, those near towns or railway stations and producer-retailers in particular. Such producers stood to gain least as they now for the first time faced the prospect of bearing part of the burden of surplus milk sold to manufacturers; some may even have lost, at any rate in the short run.

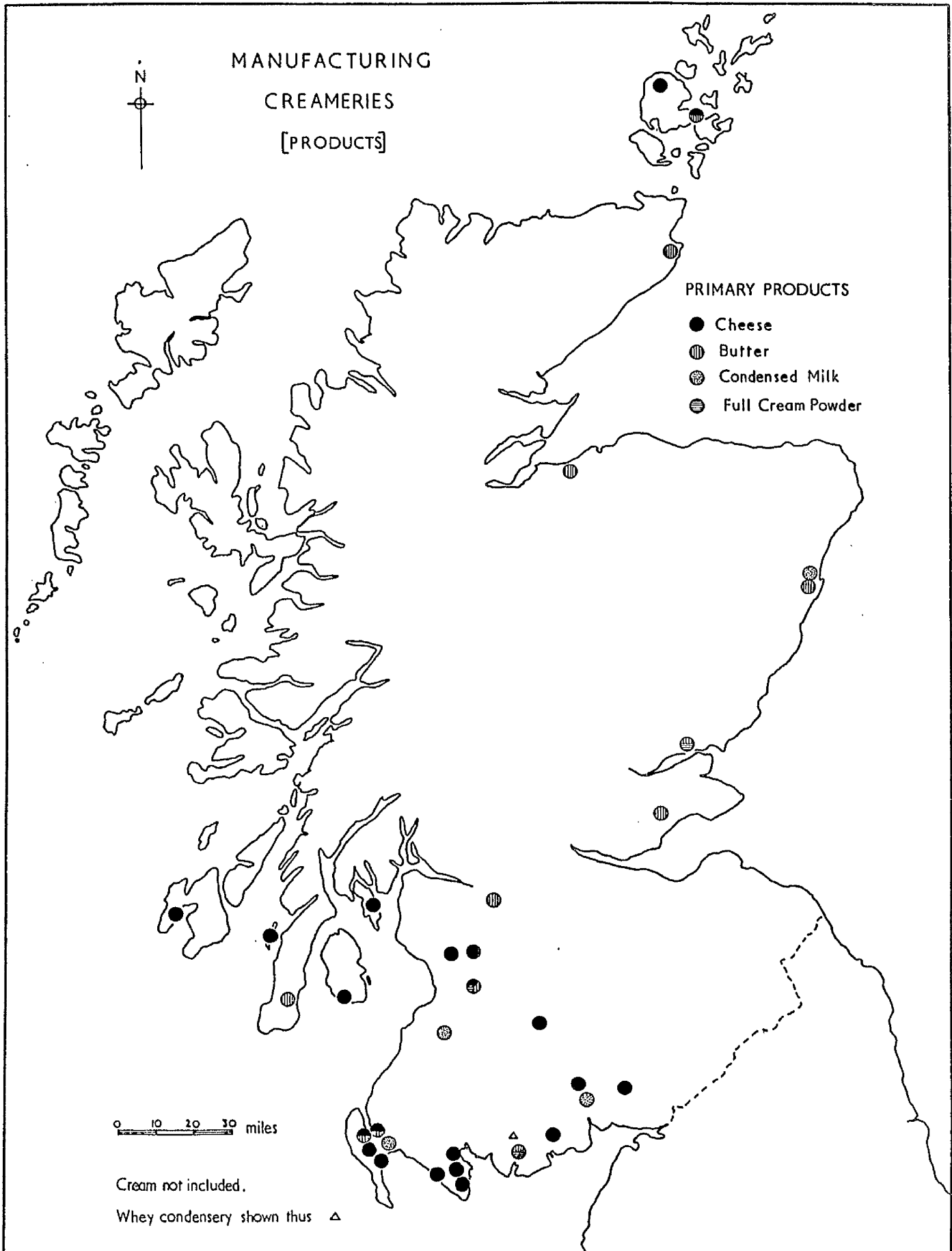
Unfortunately the votes were never classified on a regional basis; a map of the voting would be a most revealing document. It is well known however, that the dairy farmers of Galloway voted almost solidly in favour of the scheme for with cheese prices at a totally unremunerative level and entry/

entry into the liquid market difficult and seasonal their plight was a very real one. Within the south west the bulk of the opposition came from the Cunningham region though even here most of the producers were probably in favour of the scheme. Opinions varied with circumstances. The Kilmours Farmers in particular are known to have held out against the scheme because they had well established trading links with one of the leading Glasgow dairies. Most opposition came from the east of Scotland from farmers who were all producing for the liquid market and who looked askance at the prospect of subsidising the producers of the south west. Forming themselves into the East of Scotland Milk Producers' Federation they claimed preferential treatment on the debatable (Chapter 1.) grounds that their costs of production were higher than those in the west. The affair was finally settled by the addition of twelve new "haulage centres" (Chapter 7.) in the east which, by reducing the average haulage deduction payable, resulted in fact, in higher prices for the eastern producers.

Under the scheme the local farmers' dairy co-operatives lost their raison d'etre. Many of the co-operative creameries were taken over by the Scottish Board. Most of them were closed, some converted to cheese stores and other uses, and several improved and enlarged. The Kilmours Farmers and Fenwick Farmers would not sell to the Board and eventually became part of the East Kilbride dairy combine (E.K., Ross's, Hood's, Glasgow Dairy Company, Fenwick Farmers, Kilmours Farmers). Though the names "Fenwick Farmers" and "Kilmours Farmers" persist, being public companies, the local farmers no longer have any say in their administration.

The Milk Marketing Boards do not cover the whole country. All the islands, with the exceptions of those in the counties of Bute and Orkney and the islands of Islay, Coll and Gigha, are outside the schemes and milk marketing in these areas remains a matter of individual agreement between producer and buyer.

Figure 35



CHAPTER 16.

MANUFACTURING CREAMERIES.

(NOTE: Much of this chapter together with certain further observations on the problem of increasing milk surpluses is published in the Scottish Geographical Magazine, September, 1961.)

There are at present thirty-three manufacturing creameries in Scotland, * fourteen of which are owned by the Milk Marketing Boards (Figure 35). The remainder are private concerns buying milk from the Boards at prices which vary with the market values of their end products. The price of milk sold for butter manufacture, for example, is determined by the price of butter on the market which in turn is largely determined by the competitive prices of Danish and New Zealand butter. The relative prices realised for manufacturing milk vary with economic circumstances though milk sold for butter-making normally commands the lowest price and for condensing the highest. The following were the average prices per gallon realised in England during year ending March, 1959. Average figures for Scotland are not readily available but would be very similar.

<u>Product.</u>	<u>Milk price per gallon.</u>
Butter	10d.
Cheese	1/6
Condensed Milk	1/9 ¹ / ₂
Milk Powder	1/9 ¹ / ₂

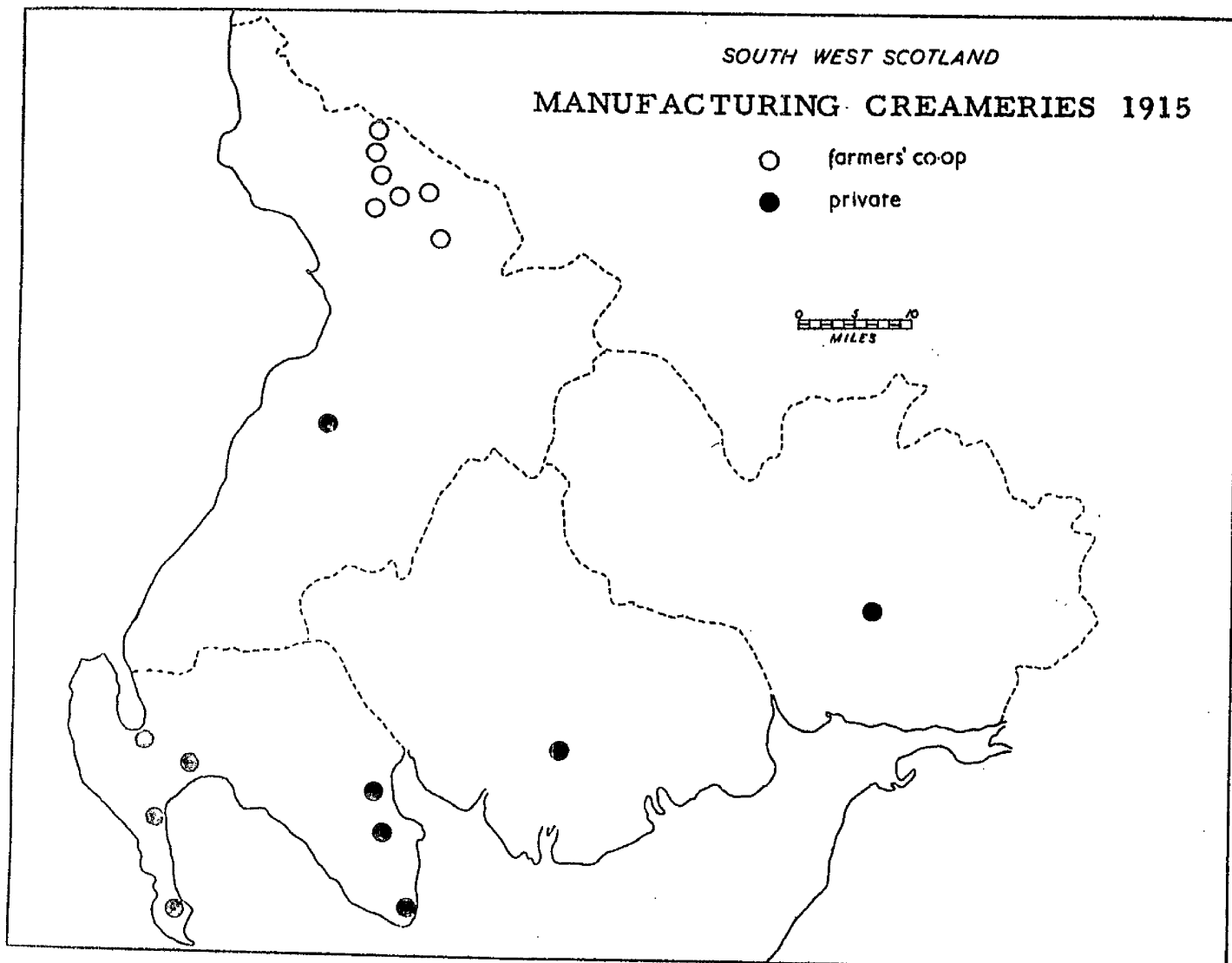
(Source: "Dairy Facts and Figures"; Milk Marketing Board, 1960).

All manufacturing milk prices are normally less than the average cost of production of the milk

Creamery production of dairy produce, like the co-operative system, was a relatively late development in Scotland To a large extent it/

* The separation of cream is not classed here as manufacture.

Figure 36



it is a feature of the twentieth century though the earliest creameries were built in the 1880's and 1890's. Just why they did not develop earlier is not clear; perhaps because competition with a well established farm manufacturing system was considered unwise. Certainly the farmers were for long opposed to the idea of factory manufacture. (93)

Historically the Scottish creameries fall into two distinct groups, the private creameries and those run by farmers dairy co-operatives, and the distinction was reflected geographically in the locations of the two groups. The private creameries, dependent upon cheap milk for manufacture, were inevitably sited in areas remote from the consuming centres where a surplus of low priced milk was available. The farmers' co-operative creameries, on the other hand, functioned mainly as collecting depots for liquid milk prior to its consignment to the city and manufacturing on these premises was principally a means of utilising surplus milk in summer. The location of these farmers co-operative creameries has already been dealt with and their early association with north Ayrshire in particular will be recalled. (Figure 36). The subsequent evolution of this basic pattern of creameries has been confused by repeated changes in function and ownership. Farmers' co-operative creameries were transferred to private bodies and vice versa in a most unpredictable manner. Very few of the nineteen private creameries in operation to-day are in the hands of the bodies which originally built them.

Creamery manufacture in Scotland started in 1882 with the opening of the Dunragit Creamery in Wigtownshire. This was a private concern owing much to the enterprise of Mr. Andrew Clement, the Glasgow Cheese Merchant referred to earlier, and was a clear instance of economies being effected through 'vertical integration', the wholesaler acquiring an interest in the manufacturing business. Like most creameries in the days before strict licencing it was a multi-purpose concern. Butter was made (significantly under the direction of a Dane), cheese to a lesser extent and large quantities of margarine, which at that time was a dairy product/

product in the real sense being about 30% butter. Margarine was clearly better suited to factory manufacture than any other dairy product and this fact coupled with the relatively low quality at that time of creamery cheese, might well account for its importance. Both cream and separated milk were regularly sent not only to Glasgow and Edinburgh but also to towns in England. (94) The creamery was supplied with milk from up to 2,500 cows and at peak intake probably handled 5-6,000 gallons per day. Whey was fed to 300 pigs housed nearby.

By the outbreak of war in 1914 there were ten private creameries operating in the south west - at Dunragit, Stranraer, Bladnoch, Sorbie, Whithorn, Sandhead and Drummore in Wigtownshire, at Tarff in Kirkcudbrightshire, at Lockerbie in Dumfriesshire and at Kilmichael in Ayrshire. The Bladnoch plant remains to-day a major margarine factory (S.O.W.S.) though technological developments have long ago removed its geographical raison d'etre.

The pattern of manufacturing creameries to-day is the product of seventy years of changing geographical circumstances and is, therefore, hard to analyse precisely. Several of the old co-operative creameries survive under new ownership. The creameries of the Penwick and Kilmours Farmers remain as remnants of an earlier concentration of farmers' co-operative creameries in that area. The circumstances of their survival have already been dealt with and may be ascribed in general terms to their links with the liquid milk trade in the City of Glasgow. Other early farmers' co-operative creameries remain where they were able to serve a special commercial function. Thus the former Upper Withdale Farmers' Creamery at Sanguhar was acquired by the Northern Wholesale Dairy Co. Ltd., initially as a collecting depot for milk sent to London.

Perhaps the most notable development in the manufacturing field since the 1930's has been the establishment in Scotland of a number of milk condenseries. Previously unrepresented north of the Border, these are regarded as particularly valuable assets by the Boards on account of the relatively high price received for milk sold for condensing. By far the/

the biggest of these is the General Milk Products ("Carnation Milk") plant in Dumfries. Southern Dumfriesshire has little tradition of milk manufacture and the 'Carnation' plant effectively absorbed milk previously sent to markets in north-east England. This very important export of milk from Dumfriesshire (and to a lesser extent from Galloway) to the industrial centres of north-east England was stopped in 1934 after negotiations between the Scottish and English Boards. Even so the available local supplies could not meet the requirements of the condensery and for many years a special milk train made a daily journey from Aberdeen, the nearest source of extra manufacturing supplies. This paradoxical situation was partially rationalised in 1958 when a subsidiary condensery was built by G.M.P. in Aberdeen. To-day a set of ten rail tankers carry several thousand gallons of condensed milk once a week to Dumfries for canning. In addition to the G.M.P. plants there are two other whole milk condenseries in Scotland, at Kirkmichael in Ayrshire and at Dunragit in Wigtownshire. Until it was taken over by the Nestle Milk Company in 1940 the old creamery at Dunragit was still used for the manufacture of margarine.

Of the fourteen manufacturing creameries owned by the Boards five were previously in the hands of local farmers' co-operatives. The remainder were specially built in areas of actual or potential surpluses and as such were planned with careful reference to ^{the} geography of milk production and consumption. The Mauchline Creamery, for example, was carefully planned at a point calculated to be just outside the Glasgow milk 'shed' throughout most of the year yet near enough to the city and conveniently enough situated to send milk there when required.

All the creameries in the areas of the two smaller Boards have been set up since the Boards were created. Since farm manufacturing was rare in these parts there was until recently very little surplus over liquid requirements. The creameries of the north-east could, therefore, be regarded as the tangible results of increased production in the security of an assured market. Production in the area of the Aberdeen Board is now double the amount consumed liquid in the same area. Similarly/

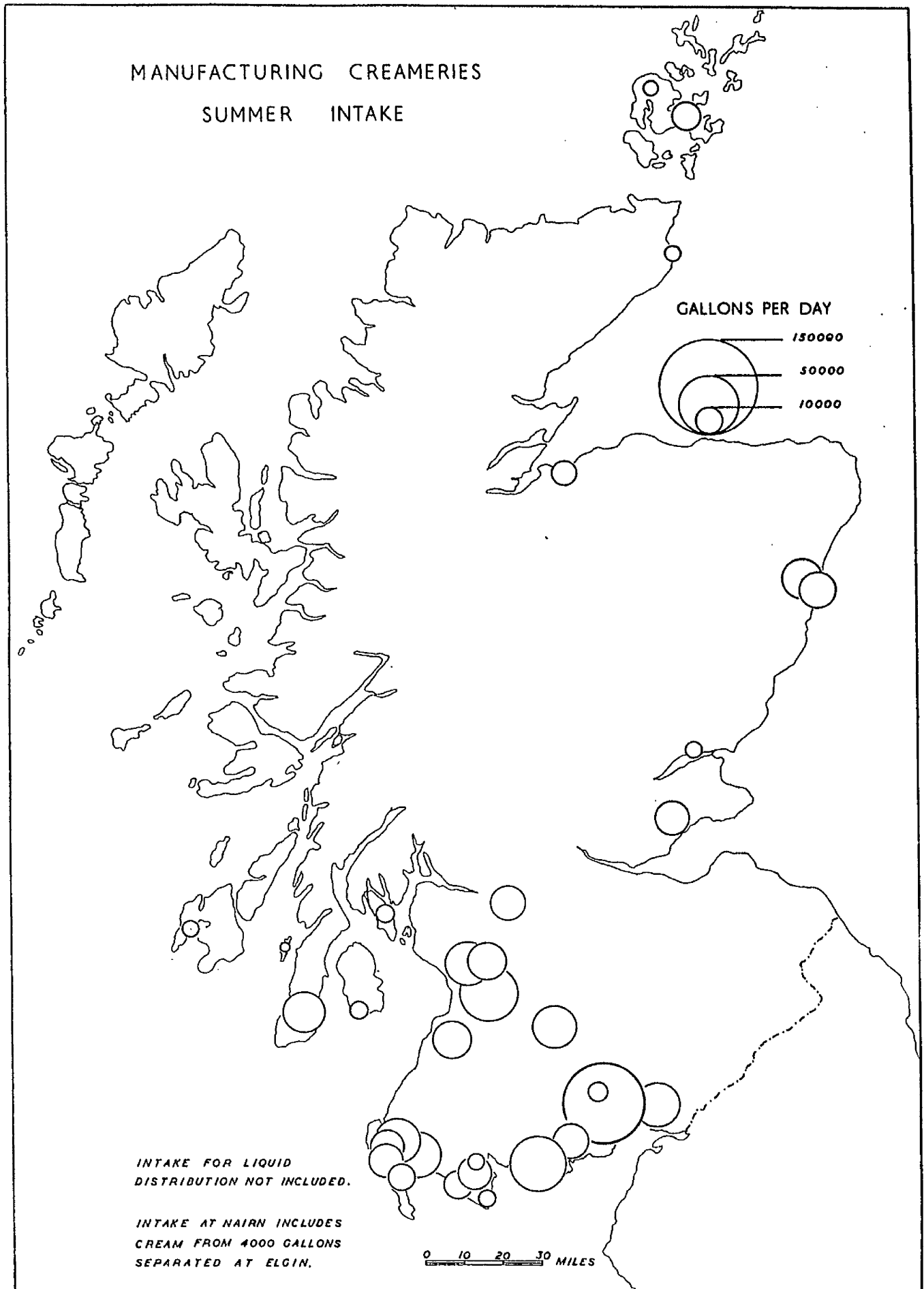
Similarly, the new Glenrothes creamery in Fife, built by the Scottish Board, is a simple response to increasing surpluses in that part of the country. Functionally unique in Scotland is the Scottish Board's Hogganfield creamery in Glasgow the purpose of which is to act as a balancing point collecting milk from areas where day to day surpluses arise, distributing milk to similar areas of shortage, and manufacturing the balance. Because of this its intake shows wide and irregular fluctuation.

For many years residues from milk manufacturing created a serious problem which extended beyond the sphere of economics to that of social welfare. Surplus whey in particular was responsible for widespread stream pollution. On the cheese farms whey was easily and profitably disposed of by feeding it to livestock, especially pigs, but in the case of a creamery with a daily whey output of several thousand gallons, the issue was less simple. Most of the cheese creameries did, in fact, have piggeries annexed though it is doubtful if these were serious commercial undertakings and the problem of surplus whey remained. Significantly the very first Bulletin of the Hannah Dairy Research Institute, published in 1929, dealt with this very problem. (95) At that time it was calculated that of the 5,715,000 gallons of whey produced annually by Scottish creameries, 4,287,000 gallons (75%) was disposed of as waste. In the case of whey produced on farms it was shown that the actual pig population of the area was considerably larger than the estimated number of pigs required to absorb the whey. The following table is reproduced. (96)

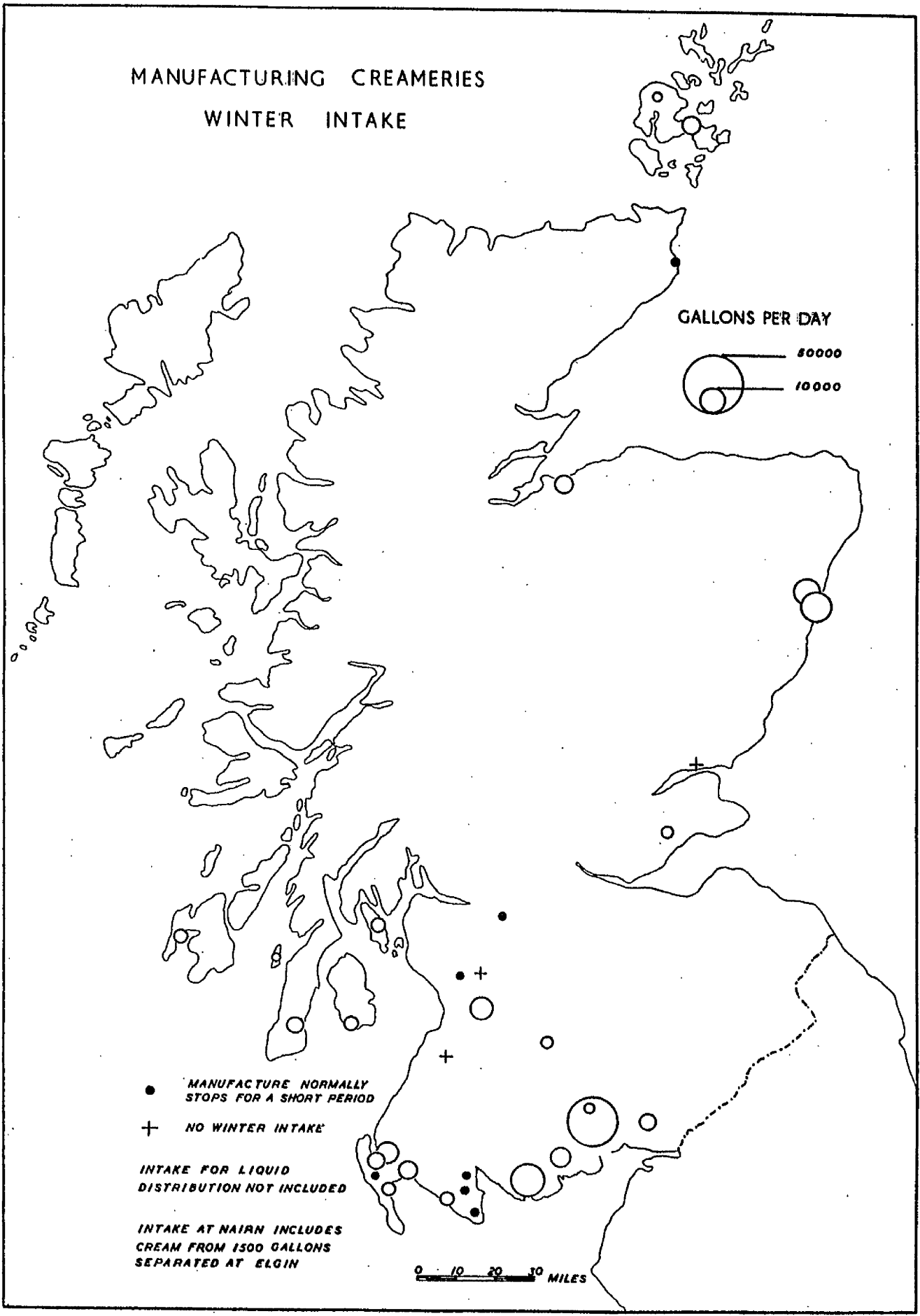
<u>County</u>	<u>Whey</u> <u>'000 gallon</u> <u>per day</u> <u>during season</u>	<u>Actual</u> <u>Number</u> <u>of Pigs</u>	<u>Estimated</u> <u>Number</u> <u>of pigs</u> <u>required.</u>
<u>Wigtown</u> ...	30	14,880	10,000
<u>Winkfield</u> ...	24	13,100	8,000
<u>Ayr</u> ...	19	11,200	6,300
<u>Argyll</u> ...	10	4,160	3,300
<u>Dumfries</u> ...	6	9,400	2,000

Since/

Figure 37



MANUFACTURING CREAMERIES WINTER INTAKE



● *MANUFACTURE NORMALLY STOPS FOR A SHORT PERIOD*

+ *NO WINTER INTAKE*

INTAKE FOR LIQUID DISTRIBUTION NOT INCLUDED

INTAKE AT NAIRN INCLUDES CREAM FROM 1500 GALLONS SEPARATED AT ELGIN

0 10 20 30 MILES

Since that time technological developments, particularly in the field of whey condensing, have virtually solved the problem and only occasionally now does the subject of creamery effluent enter into the minutes of the local authorities. One interesting feature is the United Creameries' whey condensery at Tarff in Kirkcudbrightshire. With a previous long history as a creamery the plant was converted in 1958 and to-day is supplied with whey from six cheese-making creameries in Galloway. In 1958 the condensery handled more than 4,500,000 gallons of whey or an average of about 20,000 gallons a day over its eight month operating period. Much of the lactose produced is used in the preparation of penicillin, an interesting example of the increasing uses of milk derivatives.

As the creameries function basically as outlets for milk which is surplus to liquid requirements their outputs suffer much greater seasonal fluctuations than does milk production. Wide seasonal variations in intake raise all the well known economic problems of providing for the peak period capacity which is partially redundant for the rest of the year. It is in the interests of the industry that the creameries be assured a certain minimum intake throughout the year. Even so, several creameries usually cease manufacturing for a few days in winter when their normal intake is diverted to the liquid market, and three creameries cease manufacturing entirely in the winter months. Fortunately this marked seasonality is not reflected in labour problems for the dairy trade has a quick labour turnover in any case and key workers are easily absorbed on maintenance work in winter.

The seasonal variations in milk manufacturing are shown on figures 37 and 38. It will be noted that there are wide variations in summer/winter intake ratios between creameries. The explanations of these variations are complex, but it is clear that in general terms they may be explained in terms of (1) the seasonality of milk production in the 'catchment area' of the creamery and (2) the extent to which milk in this area is tapped to maintain supplies to the liquid market in winter. The regional/

regional variations in seasonality of production have already been discussed in some detail and little need be added here except perhaps to point out that these variations are clearly reflected in the summer/winter intake ratios of the Dumagitt and Dumfries condenseries (5.6:1 and 2.5:1 respectively). Neither of these plants is noticeably affected by winter diversions to the liquid market.

Many of the creameries function in winter as depots for the collection and dispatch of milk to the liquid market a service for which they are paid a handling allowance by the Boards. This is particularly common in the Galloway creameries. Recent developments in bulk farm collection allow milk to be transported long distances direct from the farm to the city distributor so that the distributive function of the creameries is being progressively removed.

The extent to which milk is diverted from or through the various creameries in winter depends on a number of circumstances, the least important of which is distance from the liquid market. There is obviously a strong case for diverting milk first of all from those creameries which are paying the lowest price. The effect of considerations like this is perhaps best seen in the fact that in winter Edinburgh receives much of its supplies from the Wigtownshire cheese creameries while huge gallonages (about enough to supply the city two times over) are manufactured in Dumfries. With surplus milk much reduced in winter the Boards have clearly more opportunity to decide just where these surpluses should be.

In summer this element of choice is severely restricted by the manufacturing capacities of the creameries and in places this effectively limits the extent to which surplus milk can be absorbed in its area of production. The result is that creameries with available capacity find themselves absorbing milk which has "spilled over" from somewhere else. Several of the Ayrshire creameries, for example, normally receive milk in summer from the Hogganfield creamery the capacity of which is 18,000 gallons a day. As a general rule recent increases in production have meant that in May and June the milk produced within the Central Lowlands industrial zone has been more than enough to be absorbed in the region.

In/

Figure 39

INTER-CREAMERY MOVEMENTS
AND NON-LOCAL SUPPLIES OF
MANUFACTURING MILK



In this way it has become normal at that time of the year for milk to be passed through the premises of certain of the big wholesale dairymen and sent to manufacturing creameries in the remoter parts. Thus it is that in summer the Dalbeattie creamery in the Stewartry of Kirkcudbright commonly receives milk from Edinburgh, a curious reversal of the winter milk flow. Taking the creameries of the south west together there is at present no overall shortage of manufacturing capacity (though certain ones at times "spill over" into others) and in recent years they have been able to manufacture additional supplies imported from Cumberland where increased production has far outstripped local markets.

From the various cases given here it can be seen that the creameries do not all draw only on milk from farms in their own localities; the movement of milk from point of production to point of manufacture is more complex than that. These complications are summarised on figure 39 which is generalised from information for the year ending March, 1961. On this map the word "creamery" includes non-manufacturing creameries (milk depots). Most of these movements have already been explained. The milk from the Oban area to Glasgow is non-T.T. milk which is now barred from the liquid market in the Scottish Board's area and must, therefore, be sent for manufacture. The cream from the island of Coll is separated by the farmers to save haulage charges. The milk production of Coll is treated more fully later. The summer movement from Colpsle to Wick is explained by the fact that production in the Moray Firth area exceeds the liquid demand at that time of the year. This movement is the precise analogy of that from Edinburgh to Dalbeattie in the south.

Because of increasing production and a virtually unchanging level of liquid demand milk manufacturing in Scotland is now at a higher level than ever before. The total amount of milk manufactured in year ending March, 1960 was 95,621,000 gallons or about 44% of the total production. The percentages for the three Boards separately are:-

Scottish/

Scottish Board	43%
Aberdeen and District Board	52%
North of Scotland Board	39%

The percentage break-down by products is as follows. (Failure to total exactly due to rounding).

Cheese	37.1
Condensed Milk	30.3
Butter	28.3
Cream	3.3
Milk Powder	<u>0.3</u>
Total.	<u>100.0</u>

The predominance of cheese appears to be a direct outcome of the traditional importance of cheese production on Scottish dairy farms. The cheese creameries are for the most part in areas where farm cheese was at one time important. (Figure 35).

CHAPTER 17.

THE GENERAL PATTERN OF MILK DISTRIBUTION.

The responsibility for the collection of milk from the farms and its delivery to the buyer rests with the Boards. The individual farmer (unless he is also a retailer) has no say in where his milk is delivered and the buyer has no say in where his supplies are produced. The Boards are, therefore, able to organise the principal movements of milk from the farm to the distributor on a regional basis with consequent economies. The farms are carefully grouped into haulage areas within each of which one haulier operates. In this way wasteful overlapping of routes is avoided. The Scottish Board contracts most of its transport to local hauliers but the Aberdeen and North Boards operate mainly with their own lorries. To-day the railways play an almost negligible part in the movement of milk from farm to its first delivery point. The only four areas in Scotland where this occurs are:-

- (1) The Appin district in Argyll. Here milk is sent by rail to Oban. A major reason is the presence of the Connell Ferry railway bridge and the tolls for lorries using it.
- (2) Some farmers in the upper Spey Valley send their milk by rail to Dingwall.
- (3) Milk from Great Cumbrae in the Firth of Clyde comes to Glasgow by rail, principally because it has to start its journey on the B.R. steamers in any case.
- (4) Farmers in the Oban area who do not have T.T. licences send their milk by rail to Glasgow where it is manufactured. Non-T.T. milk has been barred from the liquid market in the Scottish Board's area since April, 1960. In the north of Scotland the railways form an important link in the supply of milk from the depots to the retailer but this will be considered later.

Once milk passes from the Boards to the buyer (distributor) the subsequent movement of that milk to the consumer is completely outside the/

the control or direction of any central authority and, subject to the requirements of the sanitary authorities, the laws of free competition apply. Government price fixing does exercise some restraint on the movement of prices but since the prices laid down are in every case maximum price undercutting can and does occur.

With the exception of the North of Scotland Board (the special circumstances of which will be treated later) the Boards play little part in the actual business of milk distribution. The North Board alone retails milk, though at Rothesay the Scottish Board operates a wholesale trade in bottled milk. The Boards are legally entitled to extend their business right to the consumer's doorstep but such developments would provoke considerable ill feeling among the existing distributors (as the English Board has proved) and is politically unhealthy. The dairy industry, with its close interdependence of producers and distributors cannot afford to endanger existing goodwill.

Milk passes from the producer to the consumer in a variety of ways. These may be listed as follows:

(1) Directly from the producer to the consumer. Where this occurs the producer is referred to as a producer-retailer. These form a special class in the industry and have their own special problems which will be considered later.

(2) From producer to consumer via a retailer.

(3) From producer to a wholesale depot and thence to a retailer (either an independent retailer or a retail branch of the wholesale company). This is by far the most important sequence.

There are some complications such as milk being passed through more than one depot before arriving at the retailer's premises, but these are exceptional and will be dealt with when they arise.

In Scotland as a whole there are about six hundred distributors buying milk from the Boards. These are classified by size groups in the following table.

Gallons per day	10,000+	5-10,000	1-5,000	1,000
Number of distributors	7	13	44	550

Since/

Since the distributors are for the most part concerned with urban markets their premises are almost invariably situated within the urban areas. The "country depot" which plays such an important part in milk distribution south of the Border is rare in Scotland. The only real example is that at Lairg in Sutherland which serves isolated communities on the west coast. In the main milk producing areas in the south west some of the manufacturing creameries function as "country depots" in winter, but with the introduction of bulk farm collection even this is declining. So far as the main centres of population are concerned the movement of milk from the farm to the city buyer is usually completed in one simple operation under the direction of the Board. The biggest distributors operate in the biggest urban centres and of the seven who handle upwards of 10,000 gallons a day three are in Glasgow, three in Edinburgh and one in Aberdeen.

Most distributors supply milk to retailers and/or consumers only in their own immediate area. A few distribute milk to retailers in other towns, but this is not common. The greatest exceptions are found in the remoter parts where the distributor may supply milk to retailers some considerable distance away (the Oban branch of the S.C.W.S. supplies Barra for example) but in these cases the retailer inevitably pays the additional transport charge so that the actual distance involved is of little concern to the wholesaler. Milk supplies in remote areas are, however, a special problem and it would be premature to discuss this here.

Although the actual movement of milk from producer to consumer is normally a straightforward matter seldom involving any more than two depots and a retailer, it can be lengthy in terms of miles, especially in winter. Fortunately the main centre of liquid demand, the Glasgow conurbation, is situated in close proximity to the main milk producing region and as a general rule the city does not have to go far for its milk supplies. Elsewhere things are not quite so simple. Edinburgh being situated in a region where the dairy farm is the exception has to seek much further afield for its milk than has the very much bigger concentration/

Figure 40

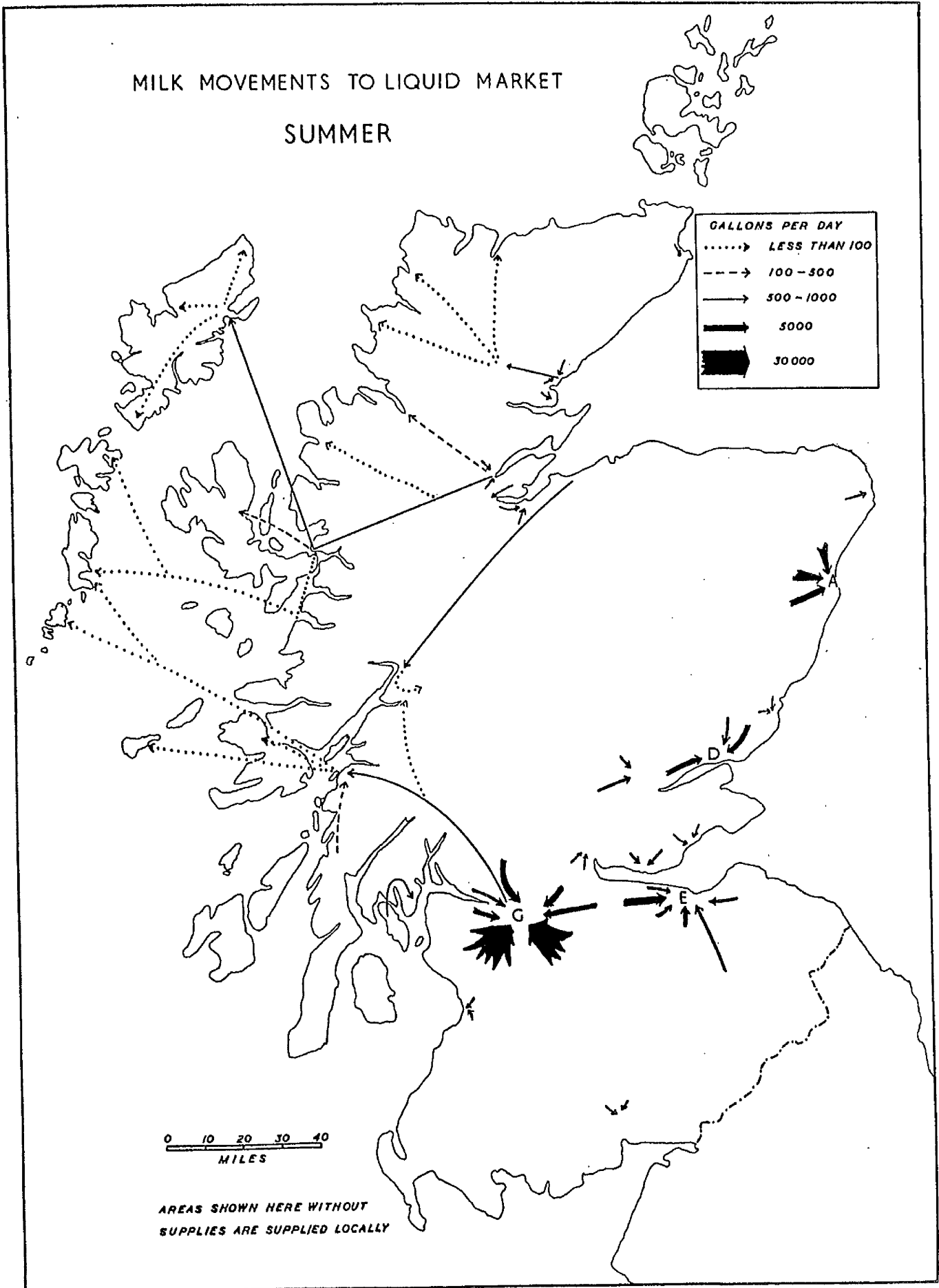
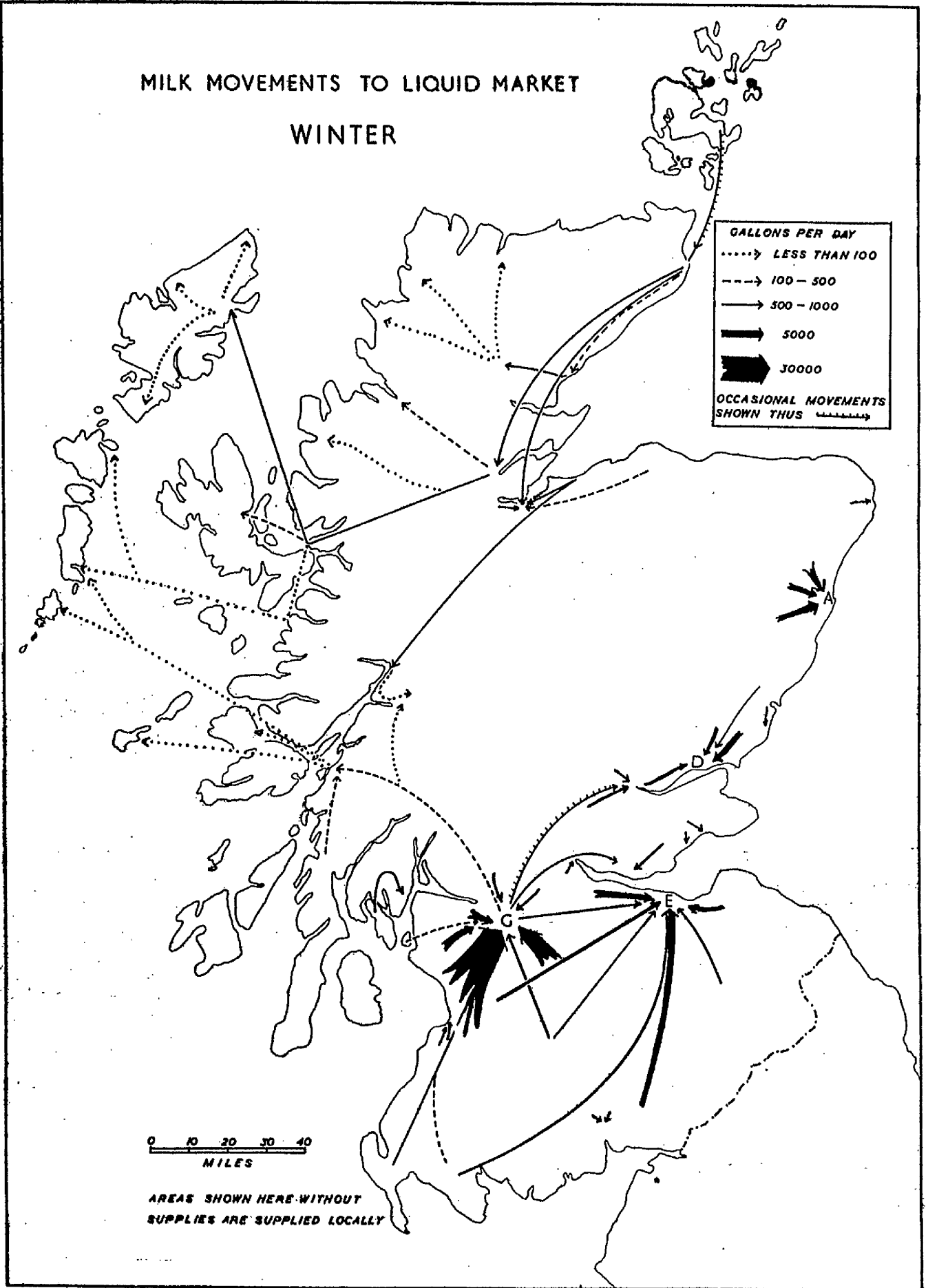


Figure 41

MILK MOVEMENTS TO LIQUID MARKET WINTER



concentration of population in the west. Aberdeen is in a similar situation to Glasgow as regards milk supplies, having had for many years an adequate local supply.

Owing to the seasonality of milk production (Chapter 12) the area from which the liquid market draws its supplies varies seasonally being much more extensive in winter than in summer. These seasonal variations are shown diagrammatically in figures 40 and 41. In summer most areas with the exceptions of the Western Highlands and Islands, can be supplied from their own immediate vicinity. It will be noted in particular that Glasgow can obtain all its supplies from within about twenty miles of the city at this time of the year. At the point of peak production very little Ayrshire milk is sent to the Clyde Valley markets. (In fact there are minor complications; a farm collection tanker, for example, routed up the Ayrshire coast, brings milk to Glasgow throughout the year. But this is the result of the current transition from can collection to bulk collection and is not very meaningful in the present context. It has accordingly been omitted from the diagrams. Similarly milk from Kilmaurs creamery, which comes into Glasgow because of that company's own trading links in the city, has been omitted).

It is in winter that the basic geography of milk production and consumption have their greatest reflection in the movement of milk. With the conspicuous exception of Aberdeen all the bigger towns and cities have milk brought from much further away in winter than in summer. Even Glasgow, situated as it is within the main dairy region and in an area where the seasonality of milk production is not very great (figure 25) draws on most of Ayrshire and to a limited extent on Wigtownshire to maintain its supplies. To some extent this tapping of supplies in the extreme south for the Glasgow market is the result of the diversion to Edinburgh and other east coast towns of milk produced east of the City. "Buffering" supplies in this fashion in order to reduce transport costs and ensure maximum freshness of supplies, is standard milk marketing practice.

m/

In many ways the demands of the City of Edinburgh on the reduced winter supplies of the east of Scotland dominate the entire pattern of milk movement in the south of Scotland. Milk production in the east is totally inadequate for the city's requirements and milk from as far away as the Machers of Wigtownshire is drawn on to keep up supplies. Again, however, the pattern is to some extent artificial. Prior to the Board Dumfriesshire was the chief source of milk for the capital and at the same time that county was able to supply milk to industrial Tyneside. Since then production in Dumfriesshire has more than doubled but most of this production is retained for manufacture in the County. The explanation of this paradoxical situation rests in the fact that to obtain liquid supplies in winter from the Solway counties means diverting milk away from the manufacturers and, therefore, considerations relating to individual creameries have to be taken into account. For example, other things remaining equal, it is best to divert milk first of all from those manufacturers who are paying the lowest price. In addition, some creameries are equipped to handle bulk milk while others are not. In short, distance from the liquid market can be of very secondary importance in deciding where extra supplies have to be obtained.

In the north of Scotland the situation is complicated by the fact that most of the West Highlands and Islands are deficient in local supplies and have to obtain milk from the east of Scotland. The milk supplies of these remoter parts are treated in more detail later, but it is relevant at this stage to point out that this movement to the west coast shows very little seasonal variation despite the fact that the limited commercial milk production in the crofting areas is concentrated in summer. The explanation rests in the large summer influx into the Islands, not tourists so much as islanders now working on the mainland returning for their summer holidays. The towns of the Moray Firth area have to draw on Caithness milk in order to maintain their supplies in winter (c.f. Edinburgh and Wigtownshire) but it is not the case that any of this milk is passed on to the islands. In order to minimise the time taken in transit milk for these/

these parts is taken from the Dingwall area. The milk brought south from Caithness effectively compensates this outward movement.

The above is only the briefest outline of the principal movements of milk to the liquid market in Scotland. The essential link in the chain is the distributor without whom there can be no supplies available for consumption. To-day the production of milk in an area implies no availability of that milk for consumption in the area. There are many instances of people living in the heart of the dairy region who find it difficult to obtain milk supplies. The clerical work involved dissuades many farmers from retailing small quantities to local hamlets and the small scale of operation does not favour a specialised distributor. Until recently in Wigtownshire, where the ratio of production to liquid consumption is 32:1, one school was supplied with National Bred Milk. Increasingly the distribution of milk in rural areas is becoming a distinct problem.

CHAPTER 18.

THE DISTRIBUTORS' MARGIN AND THE FINANCIAL BASIS OF THE TRADE.

No discussion of the present pattern of milk distribution can reasonably be attempted without some preliminary statement of the financial basis of the trade. This is closely controlled by the Government (Department of Agriculture and Fisheries for Scotland) and is in essence simple - probably too simple.

The price at which the distributor buys from the Board is referred to as the standard price. This is fixed by the Government and is at present 3/8d. a gallon. The maximum retail price of milk is similarly fixed by the Government and the difference between these two is the distributors' margin. Since not every distributor handles the milk at every stage from the Board to the consumer the margin must be divided between wholesalers and retailers. This is done by agreement within the trade. The size of the overall distributors' margin is determined by

- (1) what the government calculates is the average cost of distributing milk plus
- (2) what the government decides is a suitable margin of profit. This "target margin", as it is called, is at present 2d. a gallon.

Most complaints from the trade are concerned with the method of estimating costs. It is clearly not possible to calculate the costs of every distributor so each year a sample of about 35 distributors are investigated in order to establish their average costs. The result of this investigation determines the eventual distributors' margin. There are numerous objections to this system, most of them obvious, and the main ones can be listed here.

- (1) Since the margin is applied universally it takes no account of the wide differences which exist in the costs of distribution in different areas. In particular, the rural distributor who performs an important service to the community may find difficulty in covering his relatively high transport costs.

(2)/

(2) The 35 or so firms investigated are not really representative of the trade as a whole. This is probably true but since individual firms can only be persuaded, not forced, to make their records available for the sample a representative cross-section is difficult to obtain.

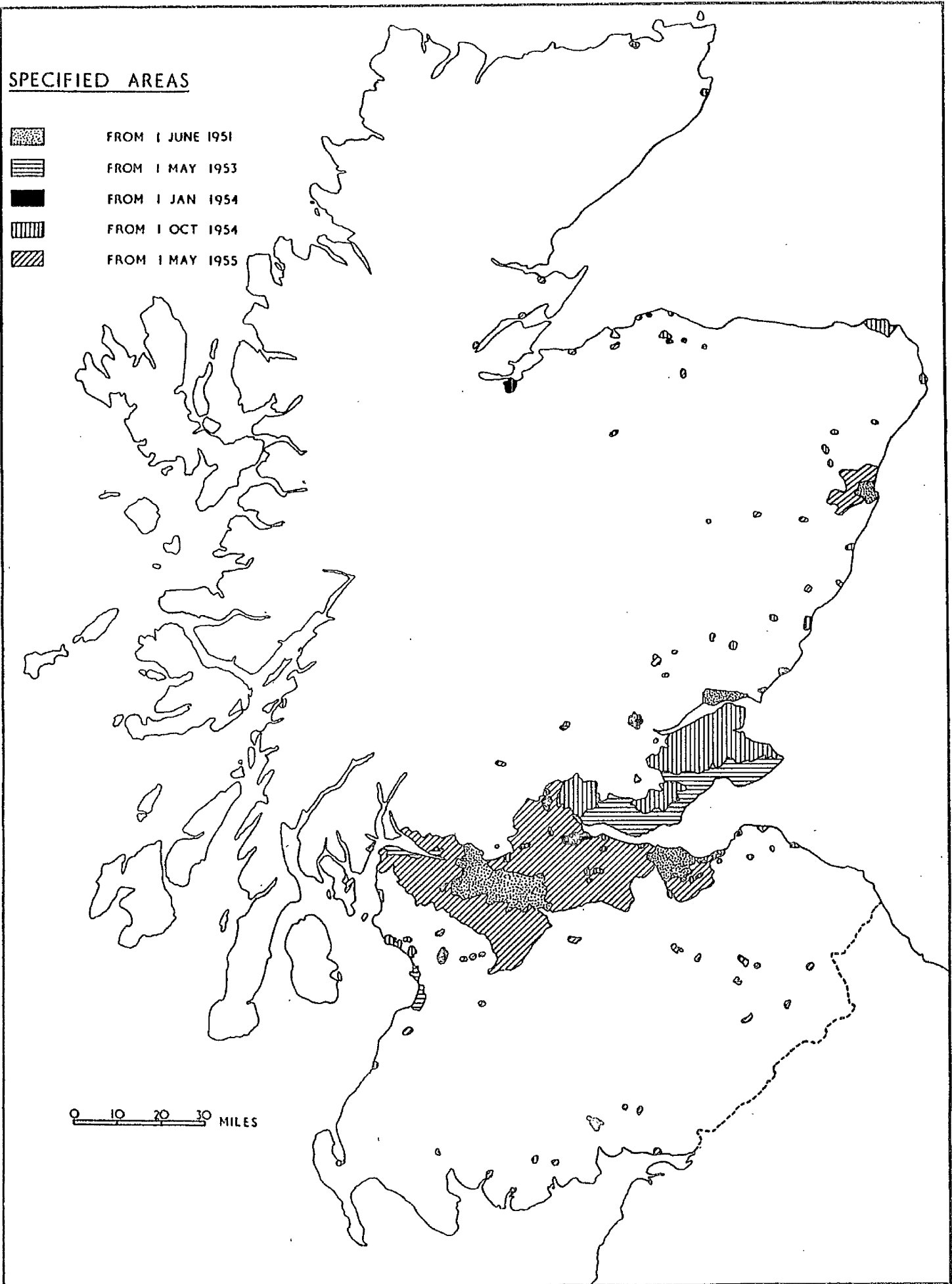
(3) A simple and not a weighted average is used in the calculations. This means that a small firm with particularly high or low costs resulting from some peculiar circumstance can significantly alter the overall distributors' margin. The Government justify this by pointing out that although a small firm in the sample may be of little importance by itself, the great number of such small firms in the trade means that due allowance must be made for them in calculating the average.

The most important criticism from the geographical point of view is clearly the first for it could mean wide variations in the availability of milk between different areas. This depends on just how widely costs vary from area to area. The information contained in the costings is highly confidential but the following general facts have been acquired. Firstly, costs vary "widely"; it has been hinted by as much as 5d. a gallon on either side of the average. Secondly, the highest costs are found in the case of the big city distributors. This would surprise many people, particularly the rural distributors, but could be explained in terms of high labour and property costs. The next highest costs are found among rural and semi-rural distributors. These, with a delivery rate of perhaps only a few gallons a mile, suffer from unusually high transport costs. The lowest costs appear to be found in the cases of medium-sized distributors operating in the smaller towns. Low distribution costs are also characteristic of the co-operative societies. These are distinctive in that they usually run their milk business as part of a bigger and more general entity. This means that when the rounds are completed in the morning the lorries and their drivers can be employed elsewhere, thus reducing transport costs. It is only fair to add that there is some doubt about how realistic the costings are in cases where milk distribution is part of a bigger trading organisation.

Prices determined in the manner outlined here are in every case maximum /

maximum prices so that price competition can take place. In fact, price competition occurs in certain types of sales (school milk for example) much more than in others (retail deliveries for example) and these will be examined in more detail later. In certain instances prices above the maximum price can be charged but only where special costs are incurred and these must be carefully separated from the price of the milk in the invoice. For example, a retailer can charge for extra transport costs where he supplies some of the remoter parts. He may also charge extra for cartoned milk. In each case he must make only a "reasonable" charge - the regulations are vague, probably deliberately so.

Figure 42



CHAPTER 19.

SPECIFIED AREAS AND THEIR EFFECT ON THE PATTERN OF DISTRIBUTION.

The creation of "specified" (or "Designated") areas is part of the national programme for safe milk supplies and has had important repercussions on the pattern of distribution in the areas involved. Briefly the Act (1949) laid down that in a specified area any milk which was not T.T. or Certified (the highest grade bottled on the farm) had to be pasteurised or sterilised. The Specified Areas scheme has been outmoded in Scotland since all milk sold on the liquid market is now T.T. but it has had an important historical effect. Areas were specified in stages, the main centres of population first, in order to give the maximum opportunity to distributors to adjust their businesses accordingly. This is shown on figure 42.

One of the consequences of these restrictions was that any small distributors handling non-T.T. milk in bulk could not afford to install pasteurising plant and turned retailer buying bottled milk from a wholesaler. Pasteurised milk could not be termed "pasteurised" if it was not bottled where it was pasteurised. The result was a very big reduction in the number of people buying directly from the Board. More conspicuously affected than the city distributor was the producer-retailer. Many of these had built up sizeable businesses but only a handful had pasteurising plant. Even where a producer-retailer had a T.T. licence the Act required that his milk be sold in an approved container and the expense of installing bottling plant was a strong disincentive to many. The effect of area specification on producer-retailing is examined more closely later.

CHAPTER 20.

MILK DISTRIBUTION IN URBAN AREAS.

Prior to the development of mechanised transport the towns could only draw on their immediate surroundings for their milk supplies and the area of supply was effectively limited by the distance a horse and cart could reasonably travel in a day. This could be as much as ten miles one way, but only rarely was whole milk carried so far and most towns drew only on those farms within an approximate two mile radius. Farms from slightly further afield commonly engaged in the town buttermilk trade.

These restricted transport facilities coupled with lax or non-existent sanitary regulations inevitably stimulated the development of town dairies. To a very large extent most of the bigger towns supplied their own milk in this way. The freshness, as distinct from the cleanliness, of these supplies gave them a competitive advantage in the market. Typically these town dairies were on a small, almost minute scale. Two or three cows was the normal 'herd' size and these were housed in odd corners of the town, often under the most unhygienic conditions. There was, however, a degree of uniformity in the management of these town dairies. The cows were normally bought in from country districts soon after they had calved. They were milked for one year only and then fattened for the butcher. A town cow-keeper would normally hope to recoup the original cost of the animal when he sold it again. Rye grass hay was bought in as fodder, but in addition the cows were fed on all the vegetable by-products of an urban community. Brewers' draff was common, especially in Edinburgh, and the diet was varied with "the refuse of flour, oats, beans..... and the offals of gardens". (97) To a limited extent some of the cows were grazed in grass parks in or near the town, but that was unusual.

Though characteristically conducted on a very small scale the business of keeping a town dairy was developed on a big scale by William Harley of Glasgow. Harley's model dairy, which was renowned throughout Europe/

Europe, and realised over £200 a year in visitors' admission charges, has been amply described elsewhere and little need be added here. (98) It will be enough to note that this remarkable establishment, built at what is now the corner of Bath Street and Renfield Street, in the year 1809, was quite exceptional and although it incorporated many ideas since adopted on dairy farms it was not the prototype of a new category of town dairies. Lack of capital presumably held back most of the small cowkeepers and in any case it was not long before the advent of the railways heralded the decline of the town dairies.

In the dairy region of the south west, though to a much lesser degree elsewhere, there was an important trade in buttermilk from those farms within striking distance of the towns yet not near enough to engage in the more profitable whole milk trade. Glasgow in particular had an important butter-milk trade of this kind which persisted right up to the inter-war period. The chief area of production lay between about five and twelve miles from the city, especially to the south. The East Kilbride area was perhaps the most important source of supply. In 1885 Speirs wrote, "It is probable that no road is so thickly crowded with (butter-) milk carts in Britain, or even in the world, as the one leading from East Kilbride through Rutherglen into Glasgow. Before the opening of the railway to East Kilbride from 200 to 300 carts went through Rutherglen to Glasgow every morning and in winter from one-third to fully more were usually on the road". (99)

The extinction of farm butter churning consequent upon the establishment of the Milk Marketing Boards in 1933 finally ended the butter-milk trade though instances were still to be found (in Bate for example) in the post-war period.

Although it was in Glasgow that Harley built his dairy it was in Edinburgh that the town dairy was most commonly found. Until quite recently the town cowkeeper played an important part in the supply of milk to the city and even to-day there are still about a dozen milk producers within the city boundary who retain many of the features of the traditional cowkeeper. However, /

Figure 43

"TOWN DAIRIES" IN GLASGOW & EDINBURGH 1925 - 1958

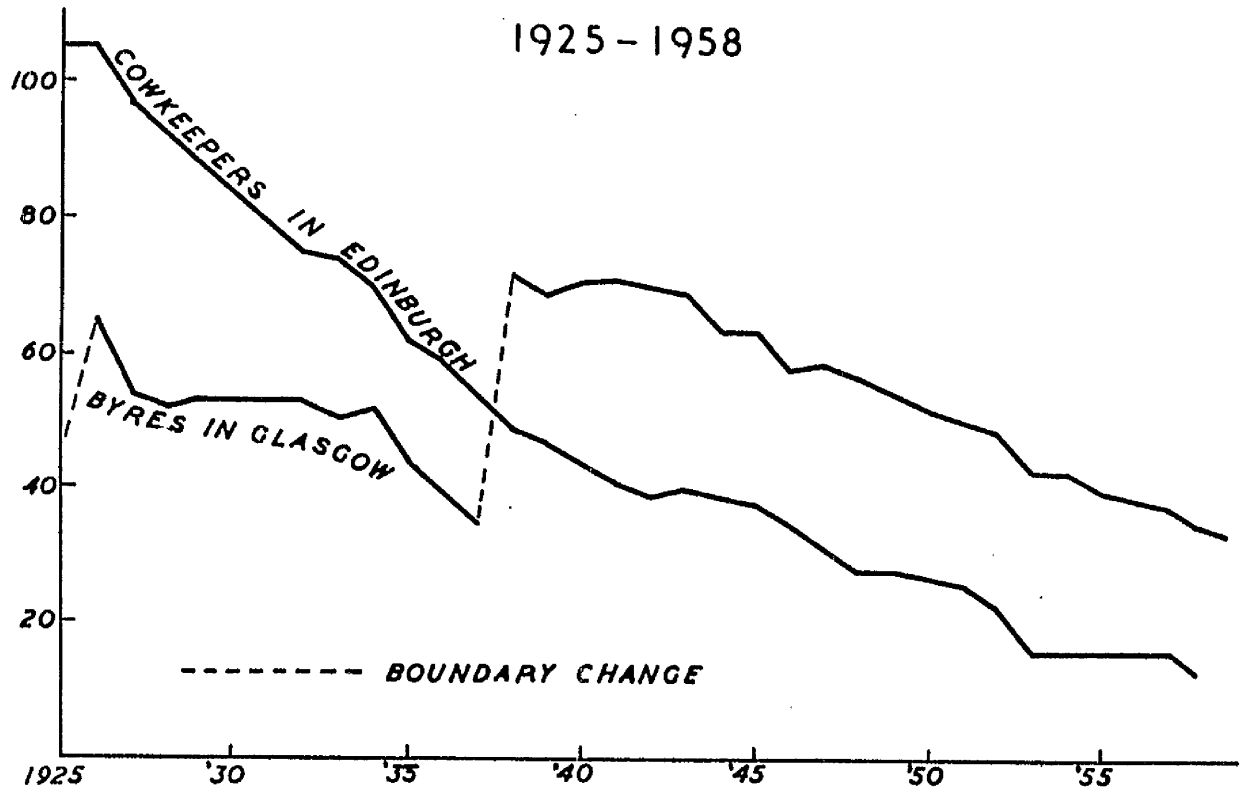
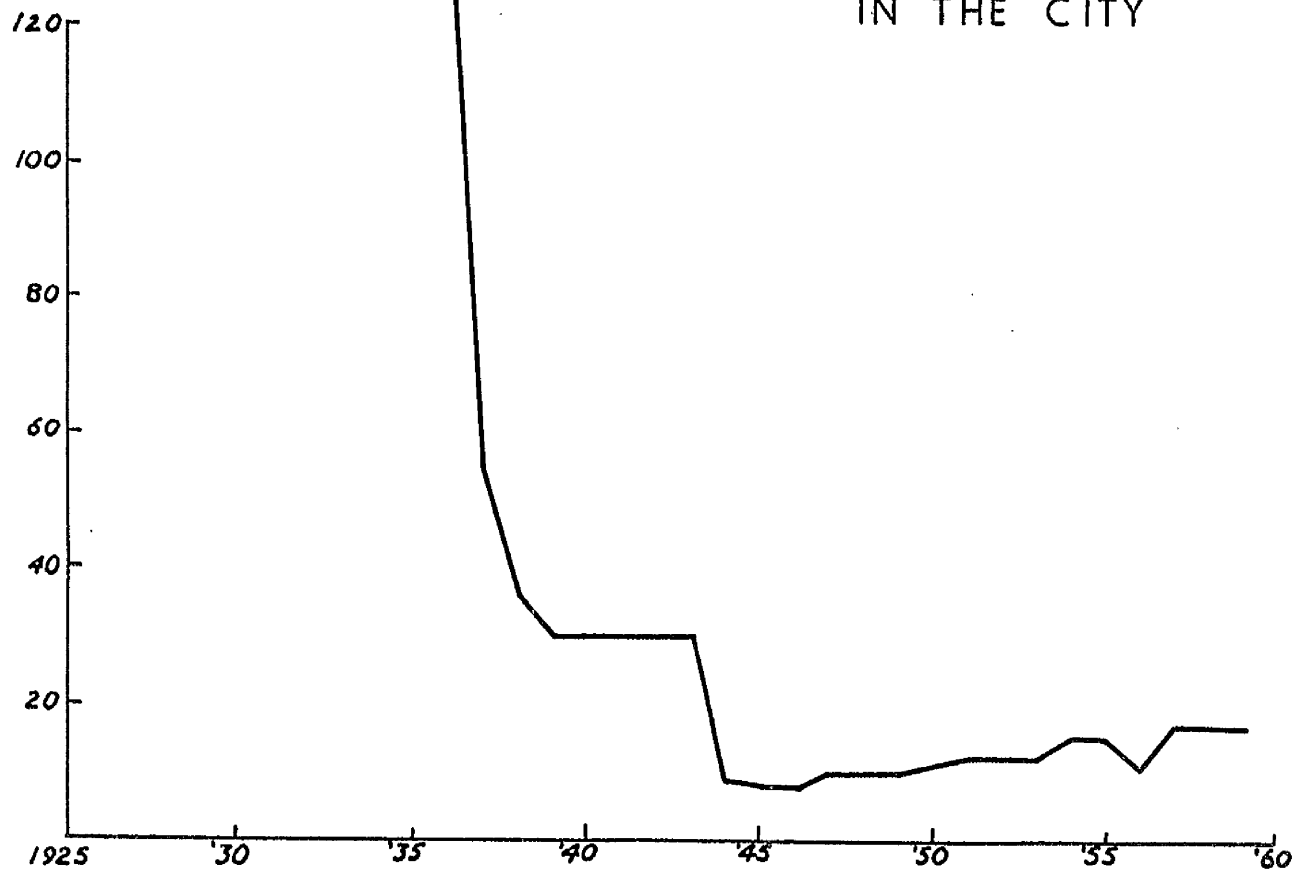


Figure 44

VEHICLES FROM OUTSIDE GLASGOW RETAILING IN THE CITY



However, the true town dairy with no grazing facilities at all is now extinct in Scotland. The greater importance of the town dairy in Edinburgh than in Glasgow was a simple reflection of the fact that the latter is within the traditional dairy farming region while the former is not. Glasgow was able to draw on milk supplies from nearby farms much more readily than could Edinburgh. This basic difference between the two cities has had a lasting effect on their patterns of milk distribution. For many years Edinburgh had the choice of obtaining its milk from within its own boundaries, with consequent feeding and labour expenses, or of importing it from a considerable distance with consequent transport costs and the need for a well developed distributive organisation. There has always been a certain amount of milk produced in the Lothians but even to-day the total production of the three counties together is sufficient for only a little over half of the city's requirements. In Glasgow the proximity, not only of milk supplies, but of a superabundance of milk supplies, allowed the city's pattern of milk distribution to evolve in a more haphazard fashion.

The continuous downward trend in city milk production in Glasgow and Edinburgh is shown on figure 43. Since one producer may have two byres the number of producers represented by the graph for Glasgow will be somewhat less than the figures shown here.

As it is not uncommon for small dairy farms to be within a city boundary it can only be guessed how far these figures refer to "town dairies" in the real sense, but a comparison of the two cities is nevertheless instructive. Most striking is the fact that until the last major extension of the Glasgow city boundary which took in thirty dairy farms, there were many more milk producers in Edinburgh than in Glasgow, despite a much smaller population. In addition, a much larger proportion of these would be cowkeepers in the traditional sense. Increasing competition from cheaper milk produced by grazing cattle, together with the stringent demands of the sanitary authorities have been mainly responsible for the extinction of the true town dairy.

In/

In Glasgow the place of the town cowkeeper was largely taken by the small dairy farmer nearby who retailed his milk (or perhaps buttermilk) daily in the city. The development of milk collection by motor lorry and the increasing importance of the big wholesale distributor effectively ended this trading by individuals. The collapse of this method of supplying the city's requirements is shown on figure 44. The few remaining vehicles coming into the city to retail milk are mainly milk delivery vehicles operating rounds in the city but belonging to distributors licenced outside the city.

The increasing concentration of the wholesale milk trade into the hands of relatively few firms has been a feature of the twentieth century. In 1937 there were about 70 wholesale milk distributors in Glasgow and since then the number has dropped to 17. The downward trend was accelerated in 1951 when the city was declared a specified area within which all ordinary milk had to be pasteurised. Many of the smaller wholesalers could not afford to install pasteurising plant and either sold out to the bigger distributors or became retailers. The situation appears to have attained some stability now although a further concentration of the trade into the hands of a few firms is not impossible. Most of the bigger towns and cities have experienced a trend of this kind but there are notable variations in the extent of the decline. The following table compares the situation in a selection of Scottish towns and burghs.

Number of Wholesale Distributors 1937 and 1960

	<u>1937</u>	<u>1960</u>
Glasgow	70	17
Rutherglen	20	2
Greenock	6	3
Airdrie	4	2
Kilmarnock	1	1
Dumbarton	2	1
Falkirk	1	1
Perth	4	1
Aberdeen	6	4

The available information is too meagre to provide a firm base for argument but the figures do illustrate to a limited degree the early proliferation/

proliferation of small wholesale distributors in the bigger centres of the west. In the non-dairying regions of the east the wholesale situation appears to have been relatively unchanging with a few distributors holding the market and being supplemented by local producer-retailers and (formerly) town cowkeepers.

With very few exceptions all these wholesale distributors pasteurise and bottle the milk, services with which they are becoming more and more exclusively associated. Pasteurisation is not legally compulsory anywhere provided the milk is T.T. or Certified, but in fact very little of the milk sold in the larger burghs and cities is not pasteurised. In year ending September, 1960 just over 10½ million gallons of milk were pasteurised in Scotland, or about 78% of the total liquid sales. The figures in the cities are well over 90% in every case though progressively less in the smaller urban centres, especially in the eastern parts of the country, where producer-retailer sales are relatively important.

In the industry "pasteurising" plants are normally distinguished from "heat treatment" plants which hold the milk at a lower temperature but for a longer time. The distinction is of little significance here and is consequently ignored. A search has failed to reveal when and where the first milk pasteurising plant was established in Scotland. The earliest one found was established in Edinburgh in 1923 but it is not unlikely that one was in operation in Glasgow before that. The following table shows the changes that have taken place in the numbers of pasteurising plants in Scotland in the post-war period:-

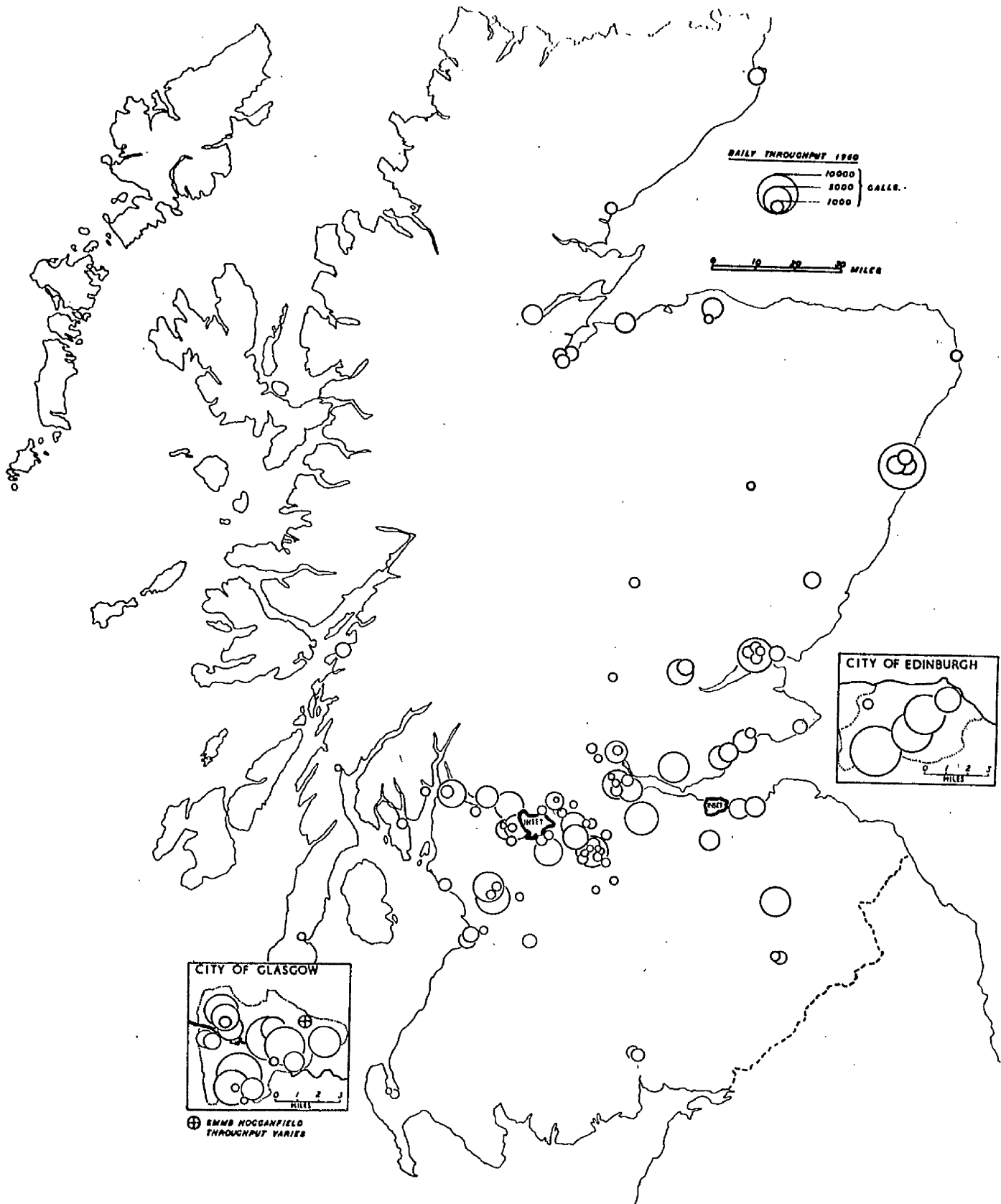
<u>Year</u>	<u>Plants</u>	<u>Year</u>	<u>Plants</u>
1946	71	1955	141
1948	100	1956	140
1950	110	1957	138
1952	129	1958	135
1953	136	1959	132
1954	134	1960	132
		1961	130

(Source: Department of Health for Scotland).

The/

Figure 45

PASTEURISING & HEAT TREATMENT PLANTS 1960



The decline in the total since 1955 is a reflection of the concentration of the wholesale trade into fewer hands as discussed above. The present distribution of these plants together with their average daily throughput is shown on figure 45. A throughput of at least 500 gallons a day is normally considered necessary if a pasteuriser is to be a worthwhile investment though there are 27 plants working at less than that. One, in Kirkintilloch, has a throughput of less than 100 gallons a day. Most of these smaller plants are concentrated in the Glydo Valley area. They are relatively uncommon in the east of Scotland where the big wholesaler tends to dominate the market more so than in the west.

Having purchased the milk from the Board and (probably) pasteurised and bottled it, the wholesaler can dispose of it in a variety of ways. These may be listed as follows:

- (1) To an independent retailer.
- (2) Sold through retail branches of the wholesale company.
- (3) Delivered to the consumer direct by vehicles.
- (4) Semi-retail sale; i.e. school milk, hospitals, restaurants, etc..

Most of the bigger distributors engage in all of these and a pure wholesale business, in the sense that all the milk is passed on to other distributors for retail, is uncommon. On the other hand, it is usual for one method of distribution to be preferred and fostered by each though there is no uniformity in this, the type of disposal preferred depending very much of the existing nature of the company's business. Where there is in existence a chain of retail branches sale of milk through these is clearly more profitable than any other method of distribution and is normally encouraged as much as possible. Sales through shops, though rarely approaching in importance sales from rounds vehicles, are very much greater in Scotland than in England and are sufficiently important to be given special encouragement. A few of the bigger distributors have no retail branches and concentrate on deliveries by rounds vehicles. Scottish Farmess (a subsidiary of Express Dairies distributing in Glasgow) are of this/

COUNTER SALES as a PERCENTAGE OF TOTAL RETAIL SALES.

ENGLAND & WALES.

Shrewsbury	11.9
Stockton	4.1
Bradford	3.0
Cardiff	2.5
Crewe	2.1
Sheffield	1.8
Norwich	1.0
Barnsley	0.7
Birkenhead	0.6
Bristol	0.6
London	0.3
Burton-on-Trent	0.1
Nottingham	0.1
Coventry	"almost nil"

SCOTLAND.

Glasgow (St. George)	20.0
Port Glasgow	10.0
Greenock	39.3
Lochgelly	34.0
Glasgow (Cowairs)	33.3
Glasgow (South)	29.0
Wishaw	23.7
Rutherglen	20.0
Uddingston	20.0
Coatbridge	16.3
Clydebank	16.0
Dunfermline	15.0
Forth	14.1
Cowdenbeath	13.0
Montrose	11.3
Kilmarnock	10.2
Inverness	8.1
West Calder	6.3
Edinburgh (St. Guthberts)	5.7

this type and run two hundred delivery vehicles operating from seven depots strategically located in different parts of the city.

The pattern of town retailing.

The retail sale of liquid milk is the foundation upon which the entire industry rests. Trends in retail sales are soon reflected in every branch of the industry and it is in recognition of the importance of this that in Britain there is presently being spent over a million pounds a year in advertising directed at the consumer.

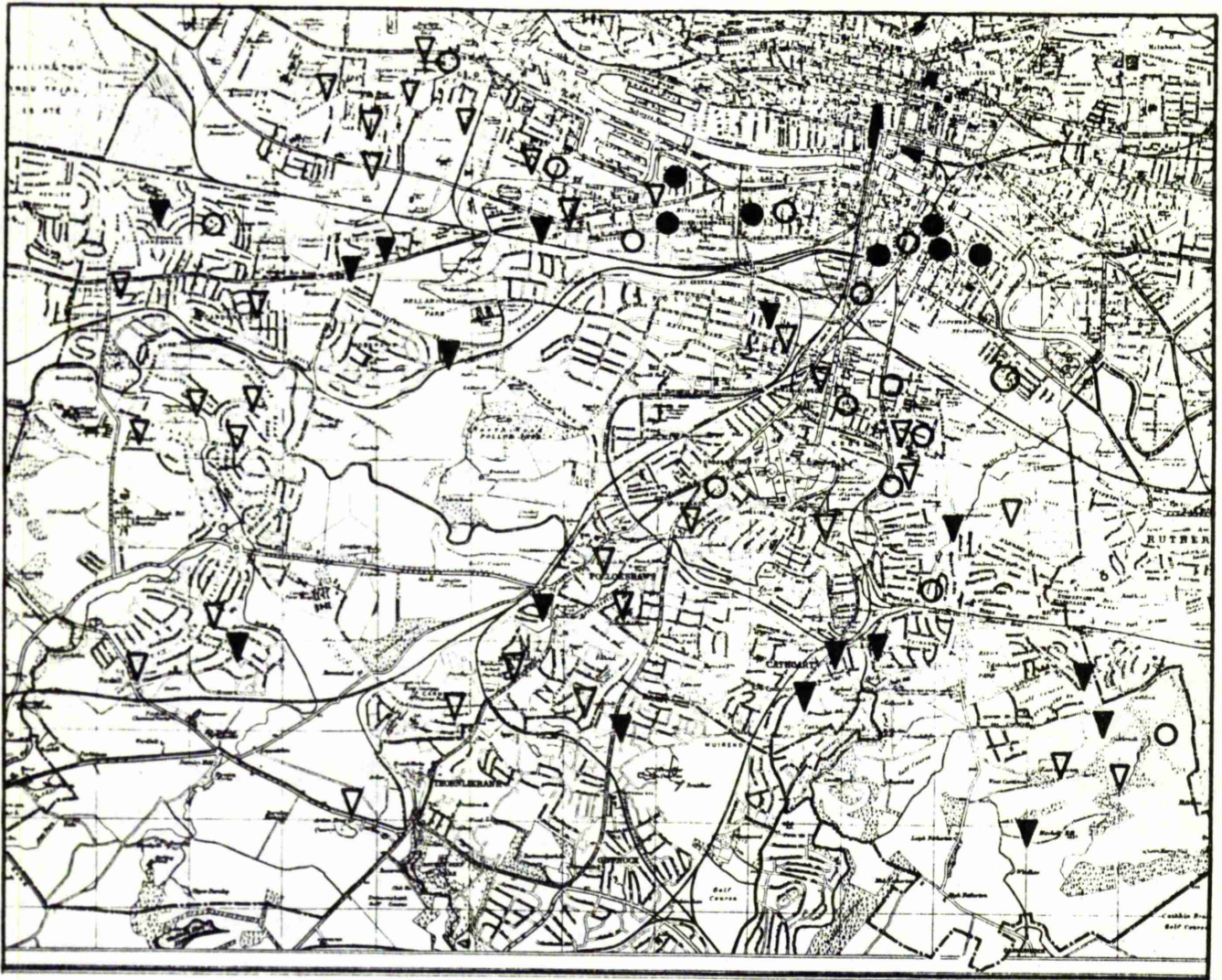
Retail sales are of two types, delivery sales and counter sales. The former is by far the more important, and increasingly so, but there are wide variations between towns and the subject has interesting geographical implications. Unfortunately there are severe difficulties in the way of calculating the exact percentage of sales by either method since many small retailers, particularly in Glasgow, deliver milk to local customers usually by school boys with a barrow or just a couple of baskets. Short of an exhaustive survey of thousands of retailers the precise facts must remain unknown. However, since the consumers' co-operative societies are usually self-contained as far as milk distribution is concerned (that is, few sell milk to other retailers and nearly all engage in both deliveries and counter sales) their ratio of counter sales to deliveries should reflect fairly accurately the general pattern in their districts. It is admitted that this is not a foolproof criterion but it should give a fairly accurate guide, especially where, as here, it is used mainly for comparative purposes. A random sample of consumers' co-operatives throughout Britain was circularised and 37 replies received. Four societies had no facilities for counter sales and their replies were, therefore, rejected as unrepresentative. The remaining 33 are listed opposite with the English societies separated from the Scottish. The difference between the two lists of figures is striking; with only one exception the English figures are all below those for Scottish towns. That a difference should exist on the national scale is surprising and not readily explicable. The most likely rational explanation lies in the effect/

effect of different housing patterns on the consumers' shopping habits. It appears that high density tenement housing, especially where associated with a high density of retail points, is particularly conducive to a high proportion of counter sales. The reason for this is difficult to ascertain. The relationship is probably partly due to the actual physical conditions of housing (the numerous tenement stairs are a strong disincentive to the provision of a delivery service) and partly to social conditions. In the more densely populated tenement areas cash payment is often regarded by both parties as safer and wiser than a weekly bill. In addition, where the dairy is in close proximity to the customer's house a delivery service is of less obvious benefit.

How far relationships of this kind apply on the national scale is more doubtful. It is true, however, that with a certain degree of generalisation distinct differences can be detected between the morphology of typical English and Scottish towns. The Scottish town is, as a rule, more compact than its English equivalent. The tenement block is the best illustration of this, but even in Scottish towns where there are no real tenements there are 'closes' and blocks of flatted houses to a much greater degree than south of the border. The result is that people tend to live in much closer proximity to the retail point. Rows of terraced or semi-detached houses, so typical of the English town, favour retail deliveries, both because the consumer is that much further away from the retailer on average, and because the actual arrangement of the houses facilitates deliveries.

A closer inspection of the figures for the Scottish towns reveals what may be a further geographical refinement. With only one exception, Lochgelly, all those where counter-sales represent 16% or more of total retail sales are situated in the western part of the Central Lowlands industrial zone, all, in fact, in the Lower Clyde Valley. Similarly, with one exception, Kilmarnock, all those with less than 16% sold over the counter are situated in the eastern parts. This could be fortuitous, but on the other hand the Clyde Valley towns have their own individuality in the/

Figure 46



COUNTER SALES AS A PROPORTION OF TOTAL SALES
IN BRANCHES OF THE GLASGOW SOUTH CO-OPERATIVE

one mile

AVERAGE FOR THE SOCIETY - 29 PER CENT

- MORE THAN TWICE AVERAGE
- MORE THAN AVERAGE
- ▽ LESS THAN AVERAGE
- ▼ LESS THAN HALF AVERAGE

BRANCHES WITH NO DELIVERY SERVICE ARE OMITTED

the predominance of the tenement block and there is no reason to doubt this major east-west difference in the pattern of milk retailing. The low figure for Edinburgh is perhaps unexpected for the city has large numbers of tenement buildings and is in many ways similar to Glasgow in that respect. Because of this anomaly a cross-check was made with the records of the Edinburgh and Dumfriesshire Dairy Company which is the biggest distributor in the city and engages in both deliveries and counter sales. With surprising conformity the percentage for the company was discovered to be 5.7, precisely the same as for the St. Guthbert's Co-operative. There can be no doubt that counter sales are much less important in Edinburgh than in Glasgow and the west in general.

Variations in the importance of counter sales are found not only between towns but also within individual towns. This is shown for the southern half of Glasgow in figure 46. The information relates to branches of the Glasgow South Co-operative Society and can safely be taken as representing the general pattern of retail milk sales in that section of the city. The general association of high counter sales with high density tenement housing in the central parts of the city is quite clear. It is to be noted that none of these branches is in what might be described as the central shopping district. Consequently the high proportion of counter sales is not to be explained in terms of shoppers from the more outlying parts. In any case, milk is not a commodity which the suburban purchaser will normally buy "in town".

The pattern is, however, changing and counter sales appear to be becoming progressively less important. These figures for the Glasgow South Co-operative show the trend:

Year	1947		1951		1959	
	'000 gals	%	'000 gals	%	'000 gals	%
Deliveries	1,034	38.4	1,870	50.8	2,848	68.6
Counter sales	1,657	61.6	1,808	49.2	1,305	31.4
Total	2,691	100.0	3,678	100.0	4,153	100.0

The/

The increasing importance of deliveries can probably be explained in terms of (1) slum clearance and the creation of new housing schemes which, although they are frequently of the high density tenement type, do not have a high density of retail points within them, and (2) increasing competition between retailers, especially in the new housing schemes.

In conclusion it should be noted that on the world scale it is the English pattern of high delivery percentages which is the exception. The Scottish sales pattern conforms much more than does the English to the pattern both on the continent and in the U.S.A. It would not be reasonable, however, to extend the argument regarding housing patterns to international comparisons because at that scale a number of other factors become important. Of these the most important is the existence or absence of a delivery charge for milk. This is unusual in Britain but normal in the United States. (100)

The varying importance of counter sales from place to place is only one illustration of the effect of social factors on consumer behaviour in the field of milk sales. The early morning delivery of milk is another which has little relevance to present day channels of distribution. Without exception all the distributors interviewed complained about the demand of the consumer for early deliveries. Very few milk rounds start later than 6 a.m. and many are much earlier. At the Dundee Pasteurised Milk Company work starts at 3.30 a.m. This creates severe labour problems and if, as the distributors claim, it is unnecessary, it represents a waste of resources.

Before the emergence of the modern channels of milk distribution early morning milk was necessary. Morning milk was fresh milk straight from the farm and to have it in time for breakfast meant it had to be delivered at a very early hour. But these circumstances no longer apply. In most towns milk which arrives at the distributor's premises in the morning is bottled that day and delivered to the consumer the following morning after having been in cold storage overnight. The distributors claim that to keep it the few extra hours necessary to allow delivery during/

during the day would result in no deterioration in the quality of the milk. It would even be possible in many cases for milk to be delivered on the same day as it left the farm. So far consumers' preferences and prejudices have thwarted any plan to change the basic pattern of deliveries. The explanations of this conservatism can be listed as follows:

- (1) Early morning milk has a special illusion of freshness and the milk need only be kept in the home from morning till evening and not, as would otherwise be necessary, for twenty-four hours. Distributors claim that the milk will keep perfectly well for twenty-four hours, but this is not readily accepted by the consumers.
- (2) The arrival of the milk acts as an 'alarm clock' in many districts and, therefore, is an important part of the daily routine.
- (3) Housewives find budgeting milk for a day is much easier when the day ends at bedtime than when it ends at, say, 2 p.m. The relatively big demands on milk for breakfast is related to this.

A practical attempt by the Dundee Pasteurised Milk Company to break the deadlock by giving each household in a round an extra free supply delivered during the day together with a request to continue on that pattern ended in failure. Consumers continued to work on the old routine and "just drank" any milk that was left at the end of the day. One real advantage to the distributor of early morning deliveries is the fact that it allows the employment of school boys. This would not normally be possible during the day. The whole issue is very much bound up with increasing labour difficulties but since this is somewhat marginal to the main theme here it is not discussed in further detail.

Density of retail points.

The number of places in a town where milk can be bought is clearly related in some way to the population of the town. It was decided to investigate whether any clear relationship was present between population and the number of retail points and how, if at all, any anomalies could be/

be explained. A "retail point" was taken to include any shop or other building where milk could be bought (excluding those where milk was only part of a catering service), retailers registered outside the town but retailing in the town by delivery, and vending machines where these were not in or at a shop already selling milk. Information was obtained for all the Scottish cities and large burghs and for seven of the small burghs. This is shown diagrammatically in figure 47. A number of general points emerge from this. Firstly, the small burghs show much greater variations in the ratio of retail points to population than do the large burghs and cities. Statistically this is not unexpected since in a small town one retailer more or less could alter the ratio considerably; consequently the point is of little significance. The cities and large burghs show a greater degree of conformity and taking the two together the inter-quartile range extends from about 620 to about 1100. There does not appear to be any rational explanation for the variations between individual burghs but the four cities are all conspicuously low down in the diagram. It would appear that as a very general rule the ratio of retail points to population rises with the size of the town. This relationship does not hold between individual towns. The four cities, for example, do not appear on the diagram in order of size.

Glasgow has long boasted a high density of dairies but while this is undoubtedly true the position in Glasgow is no way compares to that in Dundee where in 1958 there was one retail point for every 34.0 people or, roughly, for every 85 households. This is quite exceptional but a large part of the explanation probably lies in the following extract from the Annual Report of the Dundee Sanitary Department for the year 1923. ".....there is a large increase of persons registered under this head (milk purveyors) as compared to former years..... included in the figures given as purveyors from shops are 336 whose registration only covers the sale of sterilised milk in sealed bottles". In 1923 a soft drink firm in the city started the production of sterilised milk and many of the retailers became permanently engaged in the milk business in this/

this way.

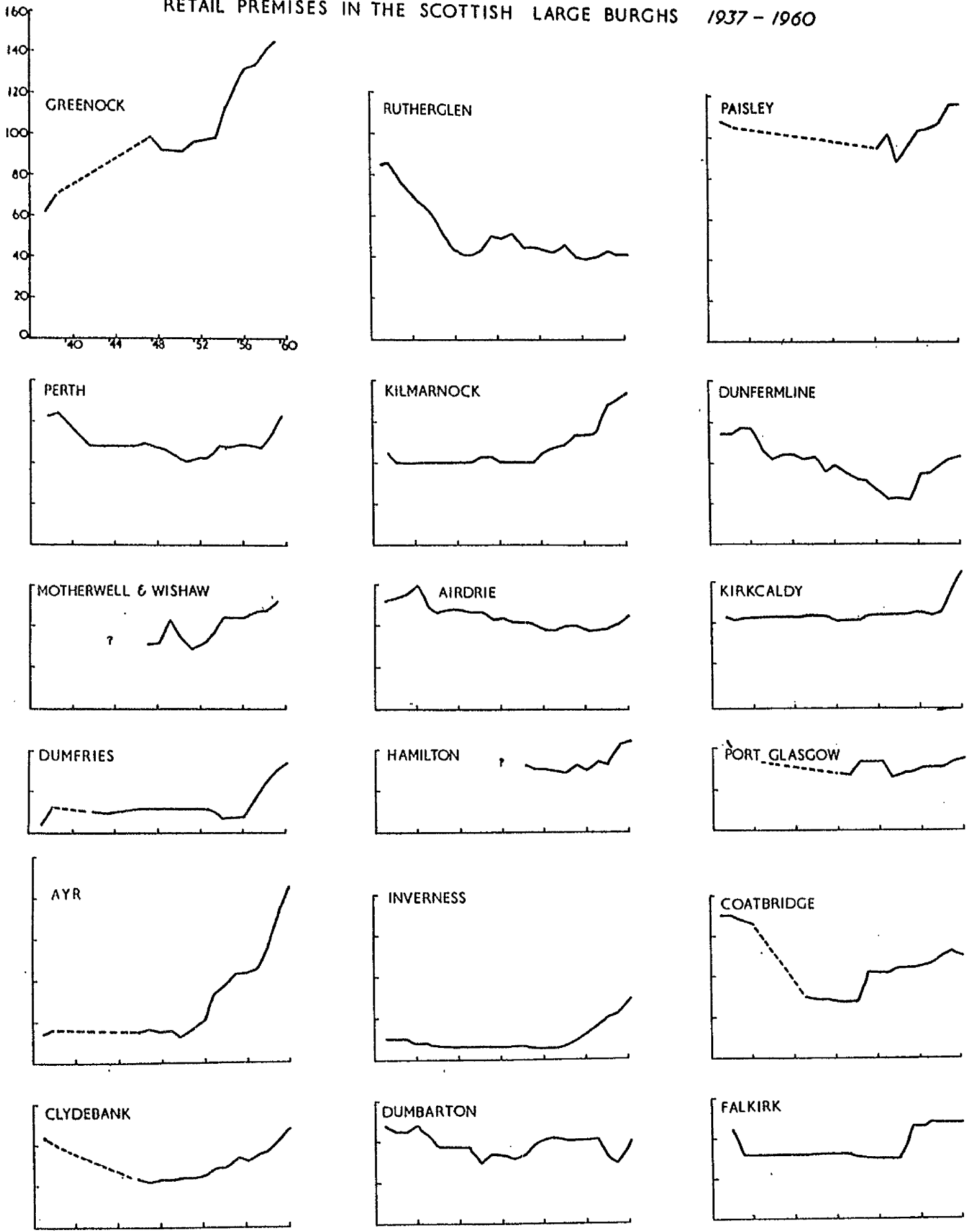
Sterilised milk, which will keep indefinitely but has a distinctive caramel flavour, forms a very small proportion of total Scottish milk sales. This is in direct contrast to certain parts of England notably Birmingham, where sterilised milk represents about half the total sales. The total consumption of sterilised milk in Scotland averages less than three thousand gallons a week. All of it is produced by the Edinburgh and Dumfriesshire Dairy Company and as a result it is more easily obtained in the east of Scotland than in the west. Most of it is still sold in Dundee. A little filters through to Glasgow but as a rule it is rarely seen in the Clyde Valley area. The great advantage of sterilised milk is its ^{keeping} quality and it is sometimes used in places where consumption is erratic, for example in youth hostels. A major disadvantage is that it must be transported in bottled form with consequent heavy freight costs. In Stornoway where there is some demand for sterilised milk, it sells for 1/4d a pint. In Edinburgh the price is 8½d. The sales of sterilised milk are said to be rising gradually, but there is no prospect of it assuming any real importance in Scotland.

Changes in the pattern of milk retailing.

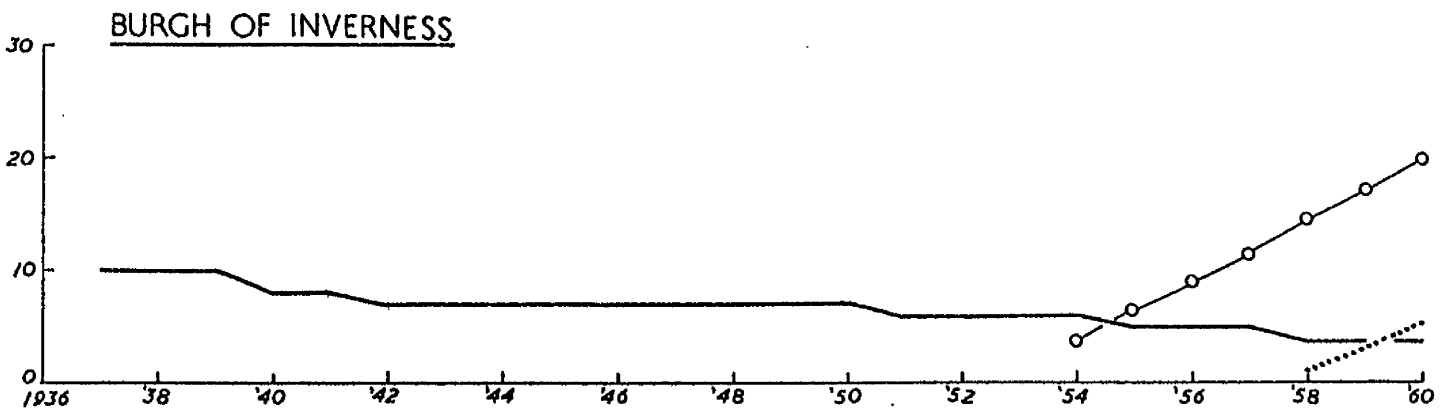
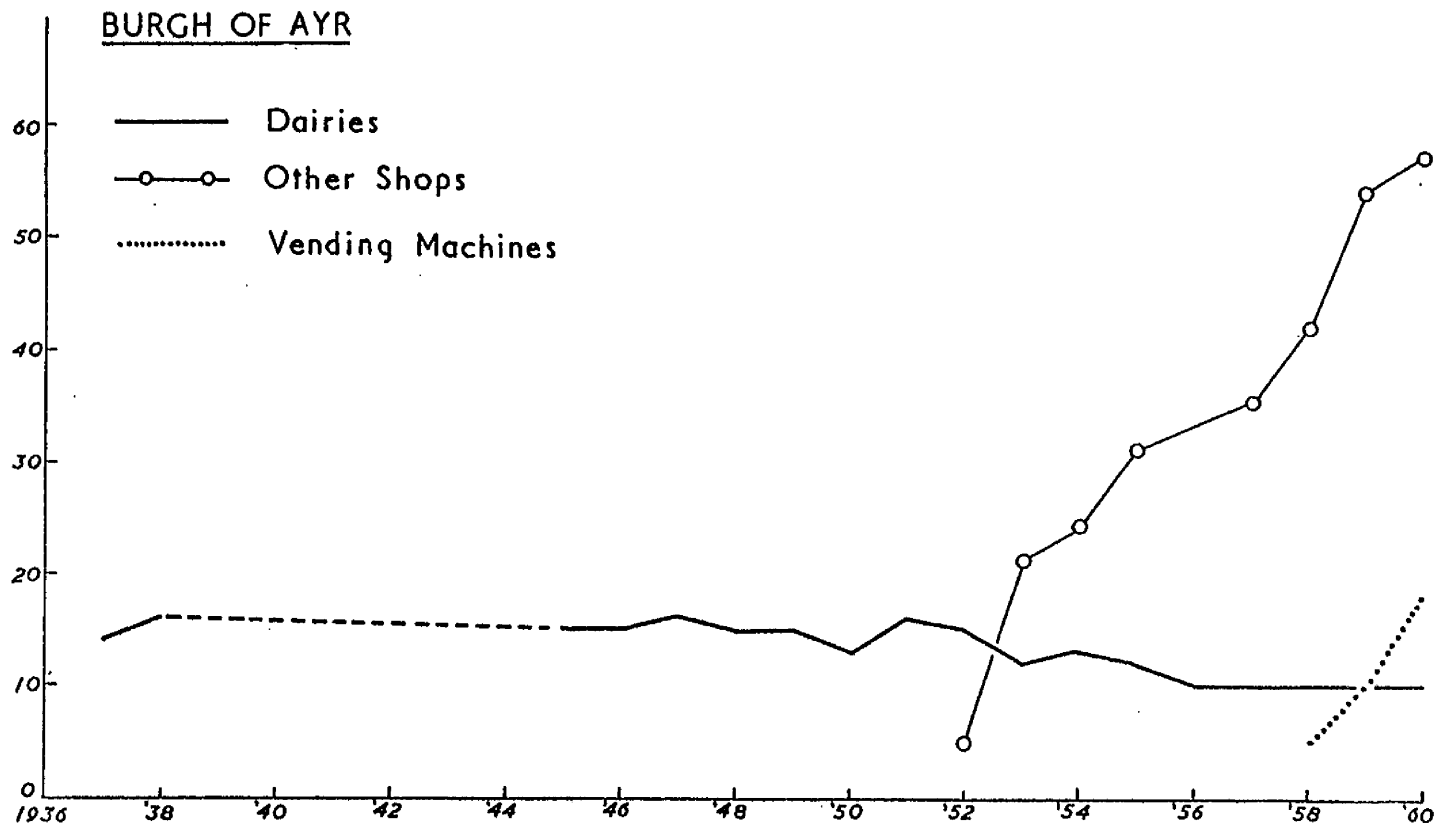
It is important to note that the information on figure 47 refers only to 1958. Changes in the number of retail points have been considerable in recent years and the trends require to be examined. Figures of premises licenced to retail milk were obtained for the four Scottish cities for the years 1937-1959 and graphed as on figure 48. The year 1937 was chosen for no other reasons than that it allowed comparisons to be made with the pre-war period and that figures for earlier years were not strictly comparable. All four show the same general trends though with varying emphasis. The almost perfect parabola in the case of Glasgow is striking. An extension of the survey to most of the large burghs in Scotland further showed that these trends have been in no way peculiar to the largest urban centres/

Figure 49

RETAIL PREMISES IN THE SCOTTISH LARGE BURGHS 1937 - 1960



Types of Retail Premises 1937 - 1960



centres but are fairly general throughout the country. (Figure 49). Lack of available statistics prevented the further extension of the survey to small burghs but there is no reason to doubt the presence of similar trends there too. This falling then rising curve is not found in every case (Greenock and Rutherglen are exceptions) but is sufficiently general to be discussed for the country as a whole.

Part of the explanation is clearly in terms of war-time controls. Edinburgh, Aberdeen, Greenock, Rutherglen, Perth, Dumfries, Airdrie, Dumfries, Ayr and Dumbarton all show increasing trends in the pre-war period only to start the decline during the war. Similarly, the start of the present increase occurs in almost every case in the late 1940's and can be associated with derestriction of licencing. On the other hand, the clear decline in the number of retail premises in many cases (notably Glasgow and Dundee) before the war, and the continuous and often rapid rise in the numbers in most cases since about 1948-1950 suggests a more deep-rooted cause quite apart from the disturbance of war. The explanation lies in the fact that milk retail premises are not all of the same type and each type has its own particular trend. In short, the graphs on figures 48 and 49 are composite graphs combining two different trends. Only two burghs in Scotland (Ayr and Inverness) keep records for each type of milk retailing premises and these are shown in figure 50. The term "dairy" presents certain difficulties of interpretation but is defined here as "proper dairy premises registered as such under the 1914 Act in which milk was handled in bulk prior to the specification of the area in terms of the 1949 Act". These show an almost continuous decline throughout the period examined. The reasons are several and obvious. In general terms the specialised dairy was not able to move with the times. Many failed to satisfy the demands of the sanitary authorities and with the decline in the handling of milk in bulk (accelerated by the specification order when it became obligatory for pasteurised milk to be bottled on the pasteuriser's premises) their specialised function was largely lost. Milk is rapidly becoming just another grocery product and increasingly tends to be sold as such. This explains the continuous rise in the numbers of/

of "other shops" registered to retail milk. It is not true, however, that milk can now be sold anywhere as freely as packets of salt or detergent. A bottle of milk, though largely protected from contamination, is not airtight and there are strict regulations on where it can be sold. Just how strict these regulations are depends on the local sanitary inspector. In Glasgow no shop which sells newspapers can also sell milk, and although it is not legally enforceable, shops with no refrigerator are strongly discouraged from retailing milk. But even these conditions leave many shops free to deal in milk, chiefly grocers. The following is a list of the types of shops which have started milk retailing in Clydebank in the period, October, 1958 to April, 1961.

Grocers 10, Bakers 1, Mobile shop (bread, rolls, etc.) 1,
Delicatessen 1, General Store 1.

Recent increases in the number of shops selling milk does not necessarily mean they consider milk retailing, as such, profitable. Many stock milk as a "catch-penny" and in any case canvassing of likely retailers by the wholesalers is becoming more general. The trend for vending machines, a recent innovation, explains itself.

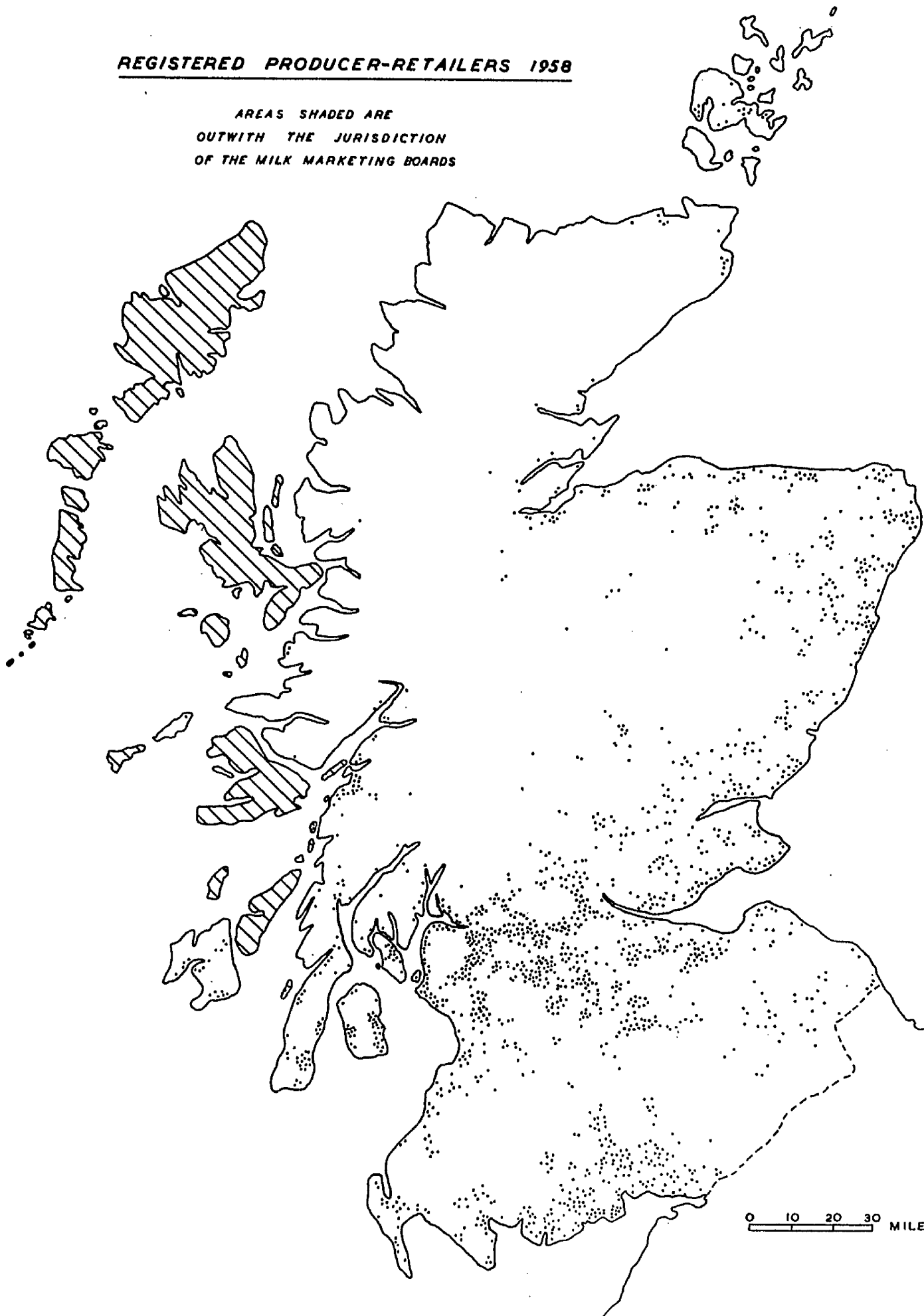
These particular trends for Ayr and Inverness clearly explain the general trends in the other burghs and cities. In the light of these facts some of the anomalies on figures 48 and 49 can now be examined. The most outstanding of these is Rutherglen which is unique in showing an almost continuous decline in the number of milk retailers throughout the post war period. Investigations revealed that, as elsewhere, new licences are being issued to "other shops" and it can only be assumed that the decline in "dairies" is more marked here than elsewhere, sufficiently so to outweigh the increases in new licences. There is some sense in this for Rutherglen appears to have been over-served with dairies in the pre-war period with one retailer for about every seventy households. This can perhaps be related to the location of the town near a great concentration of milk producers with a specialism towards producing for the urban market. Speir's reference to the buttermilk trade from East Kilbride, quoted/

quoted above, will be recalled. In 1937 almost a quarter of the retailers in Rutherglen (20 out of 86) were producer-retailers. In 1960 only one producer-retailer operated in the burgh. In some ways Rutherglen may be compared with Dundee where, although retail premises have risen considerably since 1948, the previous fall (since 1937) has been very much greater. The high density of milk retailers in Dundee in 1937 was quite absurd (about one for every fifty households) and the reasons for this have already been discussed. The 50% decline in the subsequent decade can probably be explained largely in terms of the redundancy of many of these. The anomalous history of Greenock where the present rise was not preceded by a fall admits of no clear explanation.

Figure 51

REGISTERED PRODUCER-RETAILERS 1958

AREAS SHADED ARE
OUTWITH THE JURISDICTION
OF THE MILK MARKETING BOARDS



CHAPTER 21.

THE PRODUCER RETAILERS.

The producer-retailers occupy a special position in the industry with special problems which are distinct from those of ordinary distributors. They have their own trade association in the Scottish Association of Producer-Retailers. Many of their problems arise from the fact that the producer-retailer, almost by definition, usually operates in a rural or semi-rural area. This is not by any means an invariable rule but the association between producer-retailers and rural areas is close.

Since the producer-retailer actually collects the cash from the retail sale of his milk his financial relations with the Board are different from those of ordinary producers. As a producer he is entitled to the pool price and as a distributor he is entitled to the distributors' margin but these two together amount to less than the retail price which is what he actually collects. The difference, apart from a small margin which is left with the producer-retailer as a "financial advantage", is payable to the Board. This payment is usually known as the producer-retailers' levy but because of the emotive content of the word "levy" some (the North Board for example) prefer to refer to the producer-retailers' "contribution".

The existence of the financial advantage, which usually ranges from 1d. to 4d. a gallon, implies a recognition of the producer-retailer's special position. How realistic this is will be examined later. It is sufficient to note here that with the creation of the Boards the producer-retailers moved from what was a relatively advantageous position (an assured market) to one which many now regard (rightly or wrongly) as having peculiar disadvantages. Consequently their relations with the Board are apt to be less convivial than those of ordinary producers. The very fact that, unlike an ordinary producer, the producer-retailer pays the Board/

PRODUCER-RETAILER SALES as a PERCENTAGE of

(A) Retail Sales and (B) Production by Counties, 1957.

	(A)	(B)
<u>Scottish Board</u>		
Angus	20	21
Argyll	31	6
Ayr	18	4
Berwick	17	18
Bute	54	8
Clackmannan	22	19
Dumbarton	19	18
Dumfries	24	2
Dumfries	22	18
Kinross	92	9
Kirkcudbright	41	1
Lanark	4	8
E. Lothian	27	23
Midlothian	7	21
W. Lothian	6	4
Peebles	38	8
Perth	34	16
Renfrew	12	12
Roxburgh	60	52
Selkirk	2	2
Stirling	19	13
Wigtown	23	1

North of Scotland Board.

Gaithness	17	12
Sutherland	19	11
Foss	9	9
Inverness	16	16
Nairn	71	23
Moray	46	26
Orkney	48	6

Aberdeen & District Board

33 17

Board and not vice-versa provides an obvious point of friction.

The geographical distribution of registered producer-retailers is shown on figure 51. A comparison with fig. 1 will show how little their geographical distribution is related to the geographical distribution of producers in general. As a very approximate rule their distribution is the same as that of population. In other words, the pattern on fig. 51 is more the result of their function as distributors than of their function as producers. But it is important that the pattern on figure 51, and indeed any use of simple numbers of producer-retailers, be treated with caution. This is so because many of the producer-retailers are registered as such though they retail only a minute quantity of milk. Only a minority of those shown on figure 51 actually retail the major part of their production. The following table shows the producer-retailers in the Scottish Board's area arranged according to sales. The table relates to December, 1960 (Total 1140).

Gallons (month totals)	0-100	101-200	201-300	301-400	401-500	501-600	over 600
Number of producers	472	116	43	39	35	34	401

A farmer producing two hundred gallons a day and selling a few pints to nearby cottages may be a registered producer-retailer. Usually there is a limit below which retail sales are ignored (sales to farm workers do not count for example) but these exemptions vary between the Boards. Similarly the conditions of exemption are changed from time to time so that a comparison of numbers of producer-retailers over a period of years is difficult. In dealing with variations over time or space it is, therefore, safer to deal in terms of gallons than in terms of numbers of producers. The only difficulty with this is that the finer geographical variations tend to be lost since gallonage figures are only available on a county basis.

Producer-retailer sales as a percentage of total production are distinctly more important in the east and north east than in the south west (Column B opposite). This is a simple reflection of historical circumstances. The/

The former areas have little tradition of farm manufacture and historically milk production has been geared almost entirely to the liquid market. It was indeed very largely because of the relative importance of the producer-retailers in the north and east that the Aberdeen and North Boards were created independent of the Main Scottish Board in the south.

The calculation of producer-retailer sales as a percentage of total retail sales in each county offers more difficulties. The total retail sales in each county is an unknown figure and there is no record of the extent to which a producer-retailer retails outside the county in which he is registered. However, an estimate of the county retail sales can be made by multiplying the total non-farm population by an average per capita consumption figure for the Board's area. The assumption is similarly made that the producer-retailers operate only in the counties in which they are registered. The result of this calculation is shown in column A of the Table. Here a more haphazard pattern emerges. The only reasonable generalisation from this is the obvious one that the producer-retailer's share in the liquid market is lowest in the areas with the greatest concentration of population, notably Lanarkshire and Midlothian.

In all these calculations of producer-retailers sales it must be noted that the figures refer only to the milk sold by producer-retailers which is of their own production. In fact, many producer-retailers handle extra supplies from time to time when their own production is insufficient to meet the requirements of the customers. Some handle this additional milk all the year round having developed a much bigger retail business than their farms can accommodate.

Most of the arguments and debates which surround the producer-retailers arise from the fact that they form a declining section of the industry. In 1938 producer-retailer sales accounted for over a fifth of all the liquid sales in the Scottish Board's area. In 1960 the proportion was about a tenth. The decline in the numbers of producer-retailers has been almost continuous for at least twenty years.

These/

SCOTTISH MILK MARKETING BOARD.

Year ¹	1956	1957	1958	1959	1960	1961
P.R. Sales ²	11400	13800	12600	12000	12100	12099
as % of liquid sales	12.1	11.8	10.9	10.3	10.3	10.3
as % of total sales	7.8	7.1	6.3	6.3	6.1	5.8

ABERDEEN & DISTRICT MILK MARKETING BOARD.

Year	1956	1957	1958	1959	1960	1961
P.R. Sales	4098	3940	3596	3400	3441	3445
as % of liquid sales	36.4	36.1	34.3	32.6	32.6	32.5
as % of total sales	20.3	19.2	16.9	16.2	15.5	15.5

NORTH OF SCOTLAND MILK MARKETING BOARD.

Year	1956	1957	1958	1959	1960	1961
P.R. Sales	1456	1374	1324	1323	1336	1336
as % of liquid sales	25.4	24.6	24.2	23.9	23.3	22.9
as % of total sales	16.2	15.3	14.7	14.8	14.2	14.0

1. Year ending 31st March.

2. In thousand gallons.

These figures refer to the Scottish Board's area:-

<u>Year</u>	<u>P.R.s.</u>	<u>Year</u>	<u>P.R.s.</u>
1939	2885	1955	1615
1945	2731	1956	1510
1947	2560	1957	1433
1949	2301	1958	1304
1951	2105	1959	1264
1953	1870	1960	1218
1954	1723	1961	1227

More precisely the gallonage figures are analysed for the years 1956-1961 and for the three Boards separately in the table opposite. The slight increases in recent years could be significant and possible reasons will be discussed later.

Numerous reasons have been given for the decline of the producer-retailers and these will be examined in turn.

(1) Existence of guaranteed market. This is certainly the most obvious and most general, if not the most important reason behind the decline in producer-retailing. Prior to the Board producers had to seek their own markets and a retail outlet had obvious advantages. Since 1933 any producer can have his milk collected from his premises so that the same incentive to open a retail outlet is not there. In addition the operation of a milk round is a seven day a week job with obvious disadvantages. The result is that very few farmers to-day start retailing and the new entrants generally fail to compensate for what might be described as the natural wastage. It will be noted that this is a trend which will operate quite apart from any disadvantage which the producer-retailer may have compared with other distributors. Very frequently when the son takes over the farm from his father he sells the retail side of the business to another distributor and concentrates on farming.

(2) The rising levy. It is true that the producer-retailers' levy has shown a general rise but it remains true that the producer-retailer receives/

PRODUCER-RETAILERS SELLING IN THE BURGH.

<u>Year</u>	<u>Inverness</u>	<u>Fort Glasgow</u>	<u>Dunfermline</u>
1937	18	10	15
1938	16	12	12
1939	17	-	12
1940	12	-	12
1941	7	-	12
1942	7	-	11
1943	7	-	10
1944	7	-	10
1945	7	-	10
1946	7	-	10
1947	7	-	9
1948	4	6	8
1949	2	6	8
1950	1	6	8
1951	1	6	9
1952	1	5	8
1953	1	4 (s)	8 (s)
1954	1 (s)	3	7
1955	1	3	6
1956	1	3	6
1957	1	3	6
1958	1	2	6
1959	1	2	6
1960	1	2	5

(S) indicates when Burgh was specified.

Source: Burgh Sanitary Inspectors.

receives the full distributor's margin plus a financial advantage. The rising levy is only an excuse for complaint and in any case has no geographical significance.

(3) Labour costs. This is probably the most important of all the particular disincentives to producer-retailers. Only a few producer-retailers can operate a milk round without employing extra labour for the purpose and mounting labour costs are an increasing burden in all branches of farming. It is a neat reflection of this that a number of farmers have built up a considerable retail trade using vending machines, but only a small minority of farmers are suitably located (near a holiday centre for example) to operate in this way.

(4) Specified Areas. Since very few producer-retailers have pasteurising plant and at the time of the 1949 Act a large proportion of producer-retailer sales were neither T.T. nor Certified (94% in the Aberdeen Board area) it is clear that many producer-retailers operating in an area about to be specified were liable to be put out of business. For reasons such as this specification was only carried out after close consultation between the Government and the Boards so that most of the more serious repercussions were generally avoided. Detailed information is difficult to obtain but it is clear that producer-retailers were more affected in some parts than in others. The areas most obviously affected in this way were the Oban area and parts of Aberdeenshire. The former district has a particularly high proportion of non-T.T. farms, but even producer-retailers with T.T. licences often gave up their retail business when the area was specified because of the requirement that to sell as T.T. the milk had to be bottled or cartoned as such. It was often the need to install bottling equipment and not the lack of T.T. licences that induced producer-retailers to become ordinary producers. Other parts of Scotland were noticeably less affected, especially the area of the North Board where specification appears to have had a negligible effect on the producer-retailer situation.

Information relating to producer-retailers supplying individual towns over a period of years is not everywhere available but has been obtained for Inverness, Fort Glasgow and Dunfermline and is shown opposite. It/

It is quite clear in each of these three cases that specification has been of very minor, if any importance, in the decline of producer-retailing. It is reasonable to infer that the same has been true in most other burghs. In most towns the creation of new housing schemes on former agricultural land has undoubtedly been more important in reducing the number of producer-retailers than has the specification order.

(5) Operation in Rural Areas. Most producer-retailers operate in rural or semi-rural areas and milk distribution under these circumstances has special problems. The most important of these are (1) operations are liable to be on a small scale and (2) transport costs are liable to be high. It has been calculated that where a man and a vehicle are employed in milk distribution it is necessary to retail at least 30 gallons a day to break even financially, and in a rural area it is not always easy to find sufficient customers to absorb 240 pints daily. The clerical work necessary for the returns to the Board is a further disincentive to retailing on a small scale. But it is the abnormally high transport costs under these conditions that weigh most heavily in the accounts. A city distributor may deliver over a hundred gallons per mile of run; in rural districts it is more likely to be under five gallons. This in itself is not a completely fair comparison for the city distributor has certain delivery costs which the rural distributor does not have (he often has to employ teams of boys for delivery up tenement stairs for example) but the fact remains that heavy transport costs are a major disincentive, not only to the producer-retailer but to all distributors operating under these conditions. As an approximation the cost of transport for milk deliveries is about a shilling a mile so that delivery to a house a third of a mile off the route costs as much as the retail price of the milk. In fact provision is made for these unusual conditions in the Maximum Price Order and "in the remoter parts" a distributor may make a "reasonable" transport charge. It is true that this dreadful vagueness in the regulations is probably deliberate and designed to allow the maximum flexibility. In fact there is reason to believe that many distributors are/

are afraid that what they charge may be deemed "unreasonable" and are not willing to take the risk, to the consequent detriment of an important public service. Many rural areas lack an adequate retail milk service and in the highly commercialised farming regions of the lowlands it is no longer a simple matter to obtain milk casually from a farm. A casual retail sale of that type involves the farmer (legally at least) in a disproportionate amount of clerical work. The Reports of the Consumers' Committees published in 1958 drew attention to this problem of distribution in rural areas and suggested that deliveries might be subsidised. (101) There are grounds for believing that poor milk services in rural areas are reflected in the average consumption per head and if that is so the matter assumes a new importance. This is discussed later.

It is not easy to disentangle all these various reasons for the decline of the producer-retailers as a group, different factors clearly vary in effect from area to area. A large number of producer-retailers are poor business managers. Their book-keeping is often primitive and money can easily be lost through inadvertent undercharging. These conditions do not help to overcome the more powerful disadvantages outlined above.

It is important, however, that the general decline of producer-retailing should not obscure some important contrary facts. Many producer-retailers have conspicuously profitable businesses and there are producers who are taking up retailing. For example, in the Aberdeen Board's area between January, 1952 and November, 1960 although 26 producers ceased retailing, 15 started retailing. In Berwickshire in the ten years 1950 to 1960, 12 producers ceased retailing and 14 started. While the Berwickshire trend is clearly exceptional it is equally clear that retailing is not regarded by every producer as an unnecessary drudge. There are several reasons for this. One is a product of the present fall in the profitability of milk. In recent years, mainly because of increasing surplus for manufacture, the pool price has failed to keep pace with rising costs. As a result more and more farmers have been induced to start subsidiary enterprises. Beef from the dairy herd is probably the most popular and broilers are attracting attention as well. Milk retailing comes into this same category.

More/

More particularly there are certain circumstances which favour the producer-retailer. The most important of these is in areas where there is an inflated summer demand. This is because the producer-retailer levy is calculated on an annual basis and does not rise in summer to take up the slack caused by the fall in pool price. This means that in summer the producer-retailer makes inflated profits and is correspondingly poorer off in winter. This can best be illustrated by the following comparison. In May, 1959, the retail price was 5/- and the producer-retailers' levy was 6d, so the net receipt of the producer-retailer was 4/6d. As a producer he was entitled to the pool price (2/1³/₄d.) plus the distributor's margin (1/6³/₄d.) which equals 3/8¹/₂d. or 9¹/₂d. less than what he actually received. Conversely, in the following January the arithmetic was as follows: Retail price 5/4d. minus levy 6d. = 4/10d.

Pool price 3/5³/₄d. plus distributor's margin 1/7¹/₈d. = 5/-⁷/₈d. which is 2³/₈d. more than he actually received.

It is clear from these figures that producer-retailing can be a very profitable business in areas where there is a big summer influx of population, notably around holiday centres. Something of this can be seen in the Clyde Coast area in figure 51, particularly in the case of Bute. A similar effect is found in the north-east.

There are a number of other special circumstances which favour producer-retailing for similar reasons, notably where there is a demand for a special grade of milk such as Certified or Channel Island, but these are of little geographical significance and are only mentioned in passing.

In conclusion it seems that the producer-retailers' position is not nearly so black as is often claimed. Disadvantages they certainly have, but the most important of these (transport and labour costs) are by no means peculiar to producer-retailers. In addition, under certain clearly defined circumstances they have a definite and calculable advantage over ordinary producers and recent figures suggest that their long decline may at last be checked, perhaps even reversed.

CHAPTER 22.

MILK SUPPLIES IN THE HIGHLANDS AND ISLANDS.

The Highlands and Islands are doubly unfortunate as regards milk supplies for not only do they have all the problems of rural distribution discussed in the last chapter but they are also generally deficient in production* so that a large part of the demand has to be satisfied from distant sources. In fact, the potential demand is not satisfied with the result that the region is the worst off in Britain for milk supplies and the per capita consumption of condensed and dried milk is abnormally high. There is nothing new about this deficiency of fresh milk in the north west as this extract from a Harris crofter's evidence to the Crofters Commission in 1883 reveals:

- Q. Are you scarce of milk ?
A. Milk is not to be had at all.
Q. What food do you give the children ?
A. Forridge.
Q. What do you give them instead of milk ?
A. Sugar and treacle, and mussels from the shore when we have no other food. (102).

In such a conspicuously agrarian community this is surprising and not wholly understandable. Part of the explanation in former times lay in the practice of transhumance. During the summer months the cattle were herded on the hills well away from the cultivated land near the crofts and surplus milk was made into butter and cheese (or "crowdie") by those who tended the cattle and stayed with them on the hill. Since the cattle were separated from the main settlement during much of the season, when they were in milk, fresh milk was inconvenient, if not impossible, to obtain. Coupled to these organisational difficulties the cattle were poor yielders and in any case the calves, which represented the chief source/

* In the sense of sales off farms, not necessarily in the sense of actual total production as will be explained later.

source of cash income, had prior claim to the milk. But few of these facts have any relevance to-day. Transhumance is no longer practised and a very large number of the cattle in the Highlands and Islands are part-Ayrshires, capable of supplying much more milk than is needed for their calves.

The paradox is further complicated by the fact that there are wide variations in the degree of self-sufficiency between areas. The central Highlands are, as a rule, not badly off for the haugh lands and broad river terraces of the straths provide the basis for a number of dairy farms which come well up to lowland standards. It is in the west coast and islands that the variations are most striking. On the mainland, Kintyre and the extreme north east have surpluses for manufacture, at Campbeltown and Wick respectively, throughout the year. Milk produced in Kintyre never leaves the area as liquid milk but the supplies of the north east are tapped in winter to meet demands in the Moray Firth area. The Oban area is almost self-sufficient in milk but since April, 1960 non-F.T. milk has been diverted to Hogganfield for manufacture and F.T. supplies are taken from Glasgow to compensate the deficiency so caused. Almost the entire north west coast is deficient in supplies throughout the year and milk is brought from the producing areas of the north east, usually in bottled form and by public transport which adds considerably to the cost.

It is in the islands that the most obvious contrasts are found in the degree of self sufficiency. Bute, Cumbrae, Arran, Gigha, Islay, Coll and Orkney all have surplus milk but only Bute, Cumbrae and Orkney export some of this in liquid form. Bute to Dunoon, Cumbrae to Glasgow and Orkney to the mainland (occasionally) and to Shetland (very occasionally). The rest of the surpluses are manufactured in local creameries with the exception of the Coll milk which is separated on the farm and the salted cream is sent to Hogganfield where it is manufactured into butter. All the other major islands are either clearly deficient in milk supplies in the sense that they import milk, or they have a concealed deficiency which/

which shows itself in a high per capita consumption of condensed milk.

Physical conditions partly explain these variations between islands. Islay, Gigha, south Arran, Bute and Cumbrae, for example, are in many ways lowland areas comparable to parts of Ayrshire. But other factors are equally, and in places more, important. This is well demonstrated in the case of the neighbouring islands of Coll and Tiree. The former has a long tradition of milk production and Coll cheeses, which commanded a special price in the market were known in many countries. Tiree, on the other hand, has a chronic deficiency of milk and all the schools on the island are supplied with dried milk. It is true that there is some very good land on Coll which helps to maintain the contrast but the main explanation of the disparity in the level of milk production between the islands lies in the differing patterns of land tenure. Tiree is almost entirely in crofts and by their small size and semi-communal organisation these are ill-adapted for commercial milk production. Coll, in contrast, has a number of fairly big farms which can provide a sound basis for dairying. In addition, several of the farming families came initially from the dairying districts of the south west and brought their own ideas and techniques with them.

The most glaring cases of local deficiency of milk supplies are undoubtedly to be found in the Outer Hebrides and in Lewis in particular. The crofting areas in general have great difficulty in providing sufficient milk for their needs and consequently a town like Stornoway (pop. 5200) has little hope of obtaining its supplies locally. Between 850 and 1,000 gallons are imported into Lewis from Dingwall every day. The milk is bought at Dingwall and the rail and steamer rates paid by the distributor in Stornoway. These are added directly on to the price of the milk. The milk is pasteurised before it leaves Dingwall but because it is transported in ten gallon cans and is not bottled until it reaches Stornoway it cannot be sold as pasteurised milk. This point is of little real importance, however, for the Islands, not being in the area of any of the Milk Marketing Boards, are not subject to any form of price control.

Milk/

Milk arriving at Stornoway is distributed to most parts of Lewis and as far south as Leverburgh in Harris. Dingwall milk also goes to the Uists via Mallaig but this is on a very much smaller scale than to Lewis, only about 50 gallons a day being involved. The Isle of Barra draws a little milk from the S.C.W.S. in Oban as well as from a farm on Mull, an average of about 30 gallons being sent with each boat (every second day). On occasion this milk may come initially from Glasgow but this sort of thing is usually avoided as much as possible. Even so, by the time the milk is sold in Barra it is often in very inferior condition, despite the fact that it is pasteurised in Oban. There is no doubt that consumption would be higher if the milk were in better condition.

Most of these sea movements are in ten gallon cans but cartoned milk is sent from Oban to Tiree. Bottles proved uneconomic because of the very low return rate. In all cases of island supplies the freight is charged directly to the buyer and passed on to the consumer.

Milk prices vary widely in the Highlands and Islands and reflect these wide variations in extent of local production. Those parts which are within the areas of the Milk Marketing Boards are subject to the Maximum Prices Order but elsewhere (most of the islands) there is no form of price control and market forces are allowed full play. In fact, this does not result in conspicuous price differences between the two areas for the existence of recognised prices on the mainland undoubtedly affects the price asked on the islands. In addition extra transport charges (permissible under the Act) are commonly made on the mainland so that the prices there are as a rule higher than those charged in the Lowlands. A good deal of the milk is transported in bottled form which is particularly expensive in freight. The following retail prices show the effect of freight charges. All are for winter 1960-61 and apply to ordinary pasteurised milk sent from Dingwall.

Place/

<u>Place of retail</u>	<u>How transported</u>	<u>How retailed</u>	<u>Per Pint.</u>
Inverlochy	Bottles	Bottles	8d.
Spean Bridge	Bottles	Bottles	8d.
Kyle of Lochalsh	10-gall. cans	Loose	8½d.
Broadford	Bottles	Bottles	11d. "
Stornoway	10-gall. cans	Bottles	10½d.
Scalpay	10-gall. cans	Loose	10d.
Tarbert (Harris)	10-gall. cans	Loose	1/-

*

From S.C.W.S., Inverness.

The above table was specially compiled to illustrate the effect of freight charges and is perhaps a little misleading for interspersed with these prices are others which are not always easy to understand. There is little evidence of overcharging in the sense that the retail price exceeds the maximum price plus transport but there appear to be many cases of artificially low prices. The following instances illustrate the sort of thing.

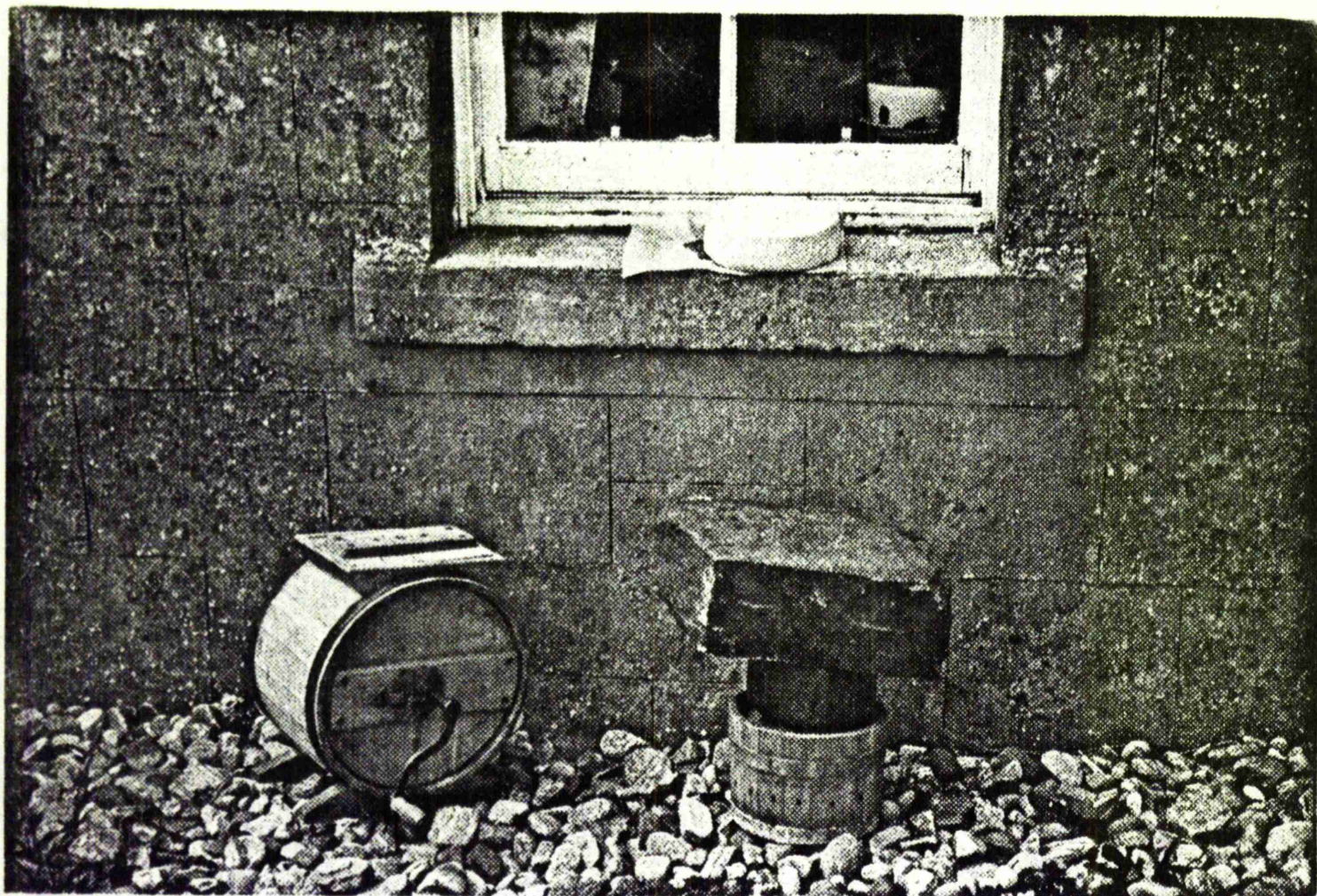
Case 1. A producer-retailer at Ophir, Orkney selling bottled T.T. milk at 6½d. (5½d. to farm staff). Milk is collected by customers at the farm.

Case 2. A hotel at Shieldaig selling bottled T.T. milk (from Dingwall) for 9½d. This is less than is justifiable for the freight charges are high. The milk comes from Dingwall to Strathcarron by rail, thence to Shieldaig by bus. The bus alone costs 1.2d. per pint and more if there is less than a full crate.

Case 3. A farm on the Isle of Raasay selling milk at 8d. a pint. "Primarily it is a social service for it does not pay to sell milk at 8d. a pint". This letter from the producer goes on to explain that even at 8d. a pint a seventh of his supply is left on his hands each week for he has no sales on a Sunday. "It would make an interesting chapter to describe and comment on the impact of Free Presbyterianism on milk supply".

The general deficiency of fresh milk within the Highlands and Islands/

Figure 52



Butter churn and cheese press on a North Uist croft, June 1959.

Islands remains the most conspicuous of all the anomalies and it is not clear that the situation cannot be improved. Lord Leverhulme, during his period of interest in Lewis and Harris, gave milk supplies the first priority in his plans for agriculture, so glaring is the absurdity of the situation. There is nothing in the physical build of these islands that prevents an adequate milk supply for their inhabitants. The problem lies entirely in the existence of the crofting system which with its very small holdings and peculiar semi-communal organisation offers little inducement to the type of individual ^{ti}initiative that would be required for the development of commercial milk production along the normal lines. In addition, most of the byres would not pass even the most lenient sanitary inspector. Thus it is that commercial milk production is at present possible only on the farms of which there are less than two dozen in the whole of the Outer Hebrides and only seven of these actually produce milk commercially (Figure 1.)

Lord Leverhulme, primarily concerned with milk supplies, fought in vain to prevent farms being subdivided into crofts.

The fact that the shortage of milk in the crofting areas is due to unsuitable organisation of production and not to any genuine impossibility of production offers some scope for reform. It is, in fact, most probable that the crofting areas are already producing more than enough milk for their requirements even after the needs of the calves have been taken into account. Many crofts have a conspicuous surfeit of milk in the summer months and this is usually fed to the animals just to get rid of it. Some of the crofters' wives make butter and cheese but not many (Figure 52). The available statistics are interesting, if not wholly reliable. The agricultural returns show that in June, 1960 in Lewis alone there were 1795 dairy cows and heifers in milk and another 202 dairy cows in calf. Only a minority of these would be of a quality acceptable on a lowland farm but even so they should each yield at least 400 galls. per annum, or a total of 798,800 gallons. Taking the average annual consumption per head to be 25 gallons the total consumption of Lewis/

Lewis (population 17,300) is about 432,500 gallons, or about 54 per cent of the estimated production. Using the same calculation the figures for the rest of the Outer Hebrides are as follows:-

<u>Island</u>	<u>Production</u>	<u>Consumption</u>	<u>%</u>
Barra	76,800	45,000	59
South Uist	299,600	102,500	34
North Uist	162,800	50,000	31
Harris	178,000	98,750	55

The percentages are probably actually lower than these for 25 gallons per head per annum is a generous allowance and the calculations do not take into account the production of those cows recorded under the head of beef cattle.

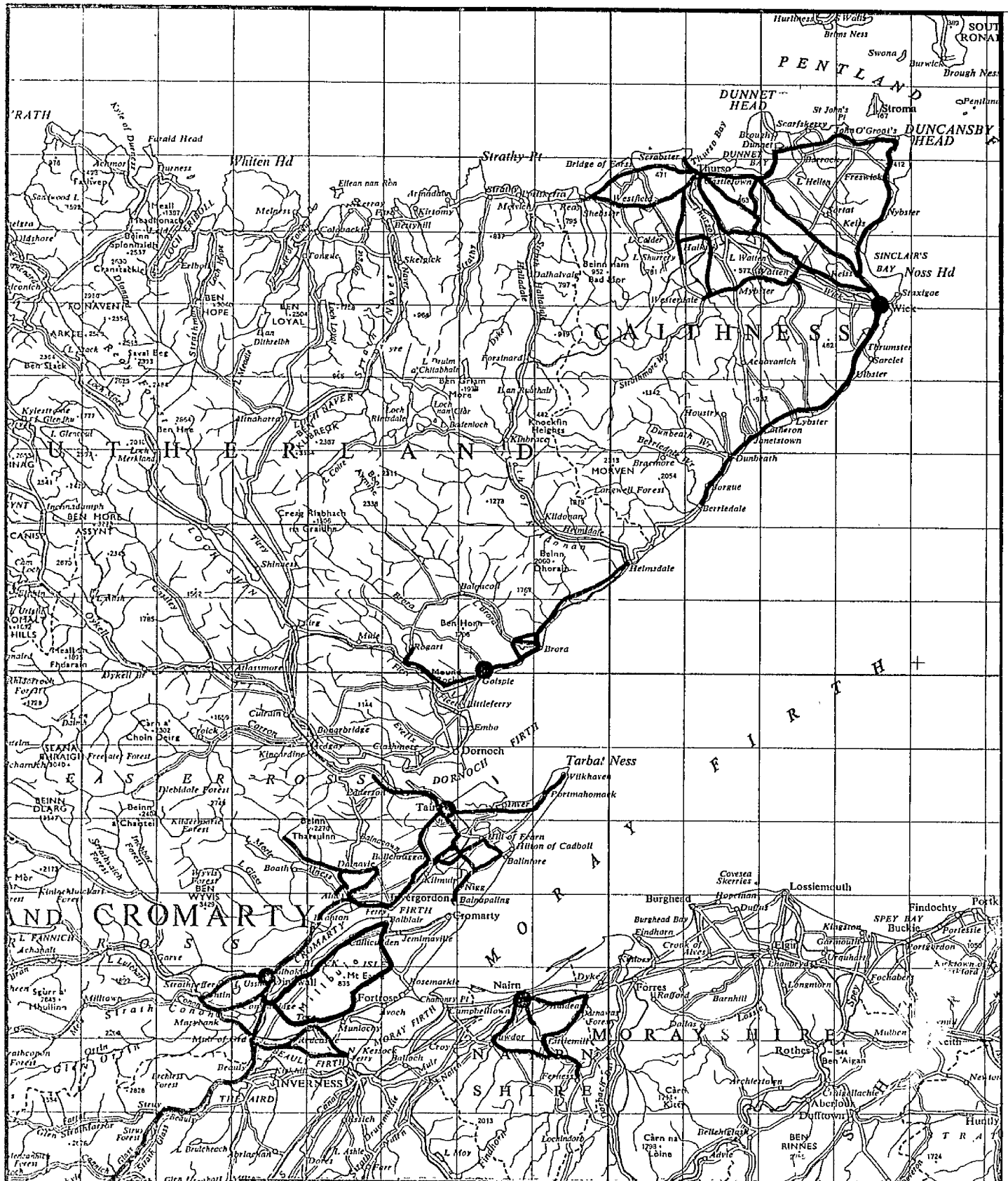
The two most obvious obstacles to the placing of this milk on the market are, firstly, the sanitary requirements and, secondly, the small scale of production which makes the milk seem hardly worth collecting. Coupled with these facts are the deeper problems of the crofting communities the most stubborn of which is the virtual absence of any sense of commercialism among the crofters. It is not proposed to go into the vexed question of the "Crofting Problem" here but it is clear that with some degree of planning the Hebrides could be self-sufficient in milk, at least in the summer months. The following favourable points can be noted. Firstly, the stock is 100 per cent attested, and in any case the local milk is already drunk by most of the islanders without any apparent ill-effects. A very little co-operation among crofters could establish a milking shed which would satisfy the sanitary authorities and could be used communally. Secondly, the crofts themselves are usually situated on or near a main road and collection by lorry would be a simple matter. A pasteurising plant as an additional safeguard could easily be set up by the government at some central depot. Provisions of this kind were made in the 1949 Act for Specified Areas. Since nearly all the islands are outwith the areas of the Milk Marketing Boards the maximum price regulations/

regulations do not apply and neither is there any producer-retailers levy. With the present price of milk in Stornoway at 10d. a pint the returns would be not insignificant. At that rate two cows yielding two gallons each per day would realise just under £10 a week. This is a gross figure but it does show the possibilities.

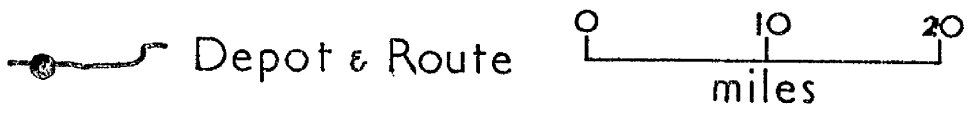
The Outer Hebrides compare unfavourably as regards milk supplies with other islands. For example, twelve years ago Skye imported nearly all its milk and the island is now about 80 per cent self sufficient. More remarkable has been the progress in Shetland over the last ten years. The island is now virtually self-sufficient in milk supplies and all of it is T.T. or Certified, yet in 1950 there was not one gallon of T.T. milk produced in the county and the total production was only 58 per cent of what it was in 1960. This progress has been the result of an intensive milk campaign by the sanitary authorities and has been accompanied by a concentration of production into the hands of the relatively few producers who were prepared to incur the expense involved in improving their premises. In 1942 there were 67 registered producers in the county and the average herd size was 7 cows. In 1960 there were 31 registered producers with an average herd size of 15 cows. In the same period Ayrshire and Friesian cows have been brought in to replace the traditional low-yielding Shetland cattle and as a result the average annual sales per cow have risen from 491 gallons to 659 gallons. 85 per cent of all the retail sales are in bottles and the milk sells for 9d. a pint.

When set beside these achievements in Shetland the Outer Hebrides appear in a very poor light indeed. Though almost entirely in crofts Shetland appears to be less in the stranglehold of the crofting system with all its complications of shares, soundings, grazing committees and the rest. Though characteristically hampered by poor land and a small acreage the Shetlands producer seems to have more scope (or ambition) for expansion than his Hebridean counterpart.

On top of the organisational difficulties of the Hebrides there is one recent innovation which will, in time, effectively destroy much of the/



RETAIL DELIVERY ROUTES OPERATED BY THE NORTH OF SCOTLAND BOARD



the potential of the islands to provide their own milk supplies. This is the Government's subsidy scheme for beef cattle and the provision by the Department of Agriculture of beef bulls for use in the crofting areas. In many ways this is a commendable scheme and it would be foolish to condemn it out of hand but it must inevitably destroy the Ayrshire element in the cattle of these parts with consequent effect on milk production.

Because of the general lack of the normal milk distributive channels in the Highland area the North of Scotland Board has developed an extensive retail trade of its own and this represents about a quarter of all the retail sales in the Board's area. The fact that this is basically uneconomic means that there is no conflict with the distributors such as might be expected in other parts of the country. It does not mean, however, that it is conducted for purely philanthropic reasons for the alternative is manufacturing which is for the most part still less economic. It, therefore, represents the best return for the milk under these circumstances. The various milk delivery routes, together with the depots where the milk is bottled, are shown on figure 53. None of the other Scottish Boards operate schemes of this kind and as a result these must be among the best served of all rural areas in Britain. The delivery rates are far below those normally acceptable. For example, the lorry which runs from Dingwall to Tomich travels 70 miles and delivers 109 gallons, or 1.6 gallons per mile. The lorry serving the Black Isle delivers 1.9 gallons per mile.

CHAPTER 23

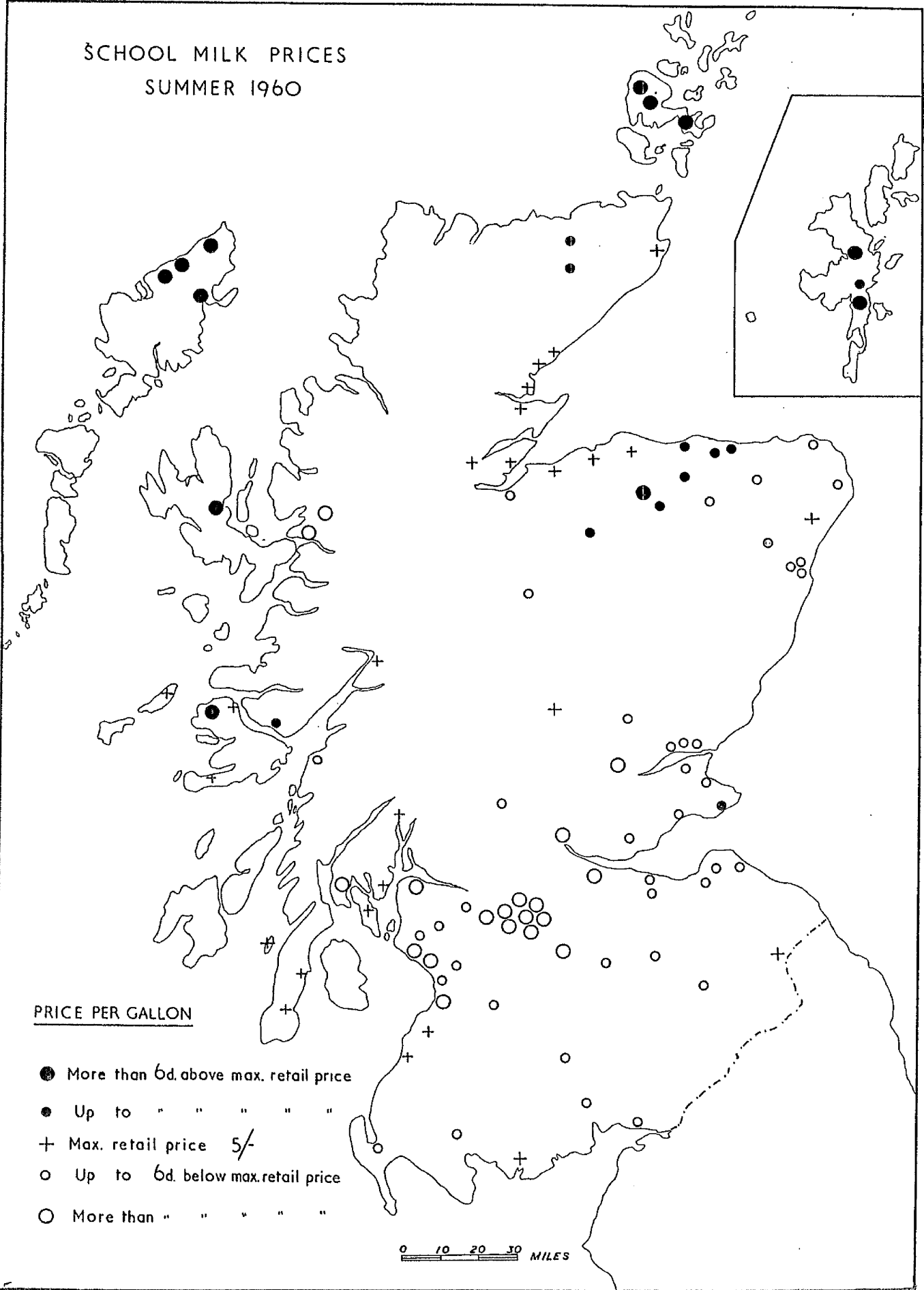
SCHOOL MILK

In Scotland at present about six and a half million gallons a year or roughly a twentieth of the total liquid sales is represented by school milk. Sales to Schools, along with sales to hospitals, canteens, and similar institutions are known in the trade as semi-retail sales and it is in this market that price competition is least restrained. Price competition is legally possible with all milk sales but is rarely practised in the case of ordinary retail sales. The maximum retail price is nearly always adopted and any competition is through service and quality. This latter is surprisingly important even to-day. Carelessness with milk after it has been pasteurised can easily lead to the presence of harmful bacteria and, therefore, poor keeping quality. A number of cases were noted where a shift of custom from one distributor to another was attributed to this cause.

School milk contracts are made by the local education authorities after the submission of tenders by prospective suppliers. These tenders are usually formulated in terms of the maximum retail price less a percentage discount. Any collusion among the distributors amounts to "restrictive practices" which is an indictable offence and consequently price competition is given free play. This is intensified by the fact that school milk has certain attractions for the distributors. It is usually delivered in fairly big loads with consequent saving and it need not be delivered in the early hours of the morning, which is an increasing problem with most milk sales. Clearly the greater competition the lower will be the price. Thus it is that the price of school milk to the Education Authorities shows wide geographical variations. For this reason the price of school milk is considered a good indicator of the degree of availability of milk in each district. This is something which is concealed in the ordinary retail trade but is clearly of considerable importance.

Figure 54

SCHOOL MILK PRICES SUMMER 1960



A survey of education authorities (relating 1st June, 1960 when the maximum retail price was 5/- a gallon) revealed that school milk prices ranged from 4/2¹/₂d. a gallon to 7/- a gallon inclusive of any special transport charges. The general pattern is shown on figure 54. Because of the confidential nature of much of the information received it is not possible to reveal precise figures. The lowest prices were found in the Glasgow conurbation generally and in the more populous parts of Ayrshire. In Glasgow itself contracts are made separately for each postal district and discounts ranged from 5% to 15%. This wide range in discounts within the city is a reflection of the extent to which each distributor operates within a limited area only, though clearly there is a good deal of overlapping. Competition for school milk contracts was described by city distributors as "cut-throat" and "quite ridiculous" and at least one wholesaler has ceased to submit tenders because "discounts greater than 12% involves a loss". A degree of ill feeling has been engendered by this competition and a rumour has been about that the co-operative societies are trying to capture the schools market for "political" reasons. There is little sense in this and no supporting evidence.

In Edinburgh the situation is very different and a uniform discount rate seems to apply to the whole city. The sense of wild competition present in Glasgow is absent. This is in accordance with the more orderly development of the trade in Edinburgh as discussed earlier. Since the decline of the town cow-keepers the milk supplies of the capital have been in the hands of only a few distributors.

But Edinburgh appears to be the exception. In the other cities and big centres of population the state of competition approaches much nearer to that in Glasgow. ^{Competition in} Dundee is becoming increasingly intense though prices have not yet fallen as low as in Glasgow, and the position in Aberdeen is similar.

As would be expected, the price of school milk rises steeply in rural areas and additional transport charges frequently bring the price above the maximum retail price. In the Highlands and Islands most of the problems/

problems in providing a retail milk service also apply to school milk with the additional problem that many producers will not undertake to supply schools because of the absence of an outlet for the milk during the school holidays.

In the area of the North of Scotland Board school milk prices are kept moderately low by the operations of the Board itself in this market. In Caithness all the schools are supplied by the Board. The price charged is the ordinary retail price plus haulage rates according to the following scale:

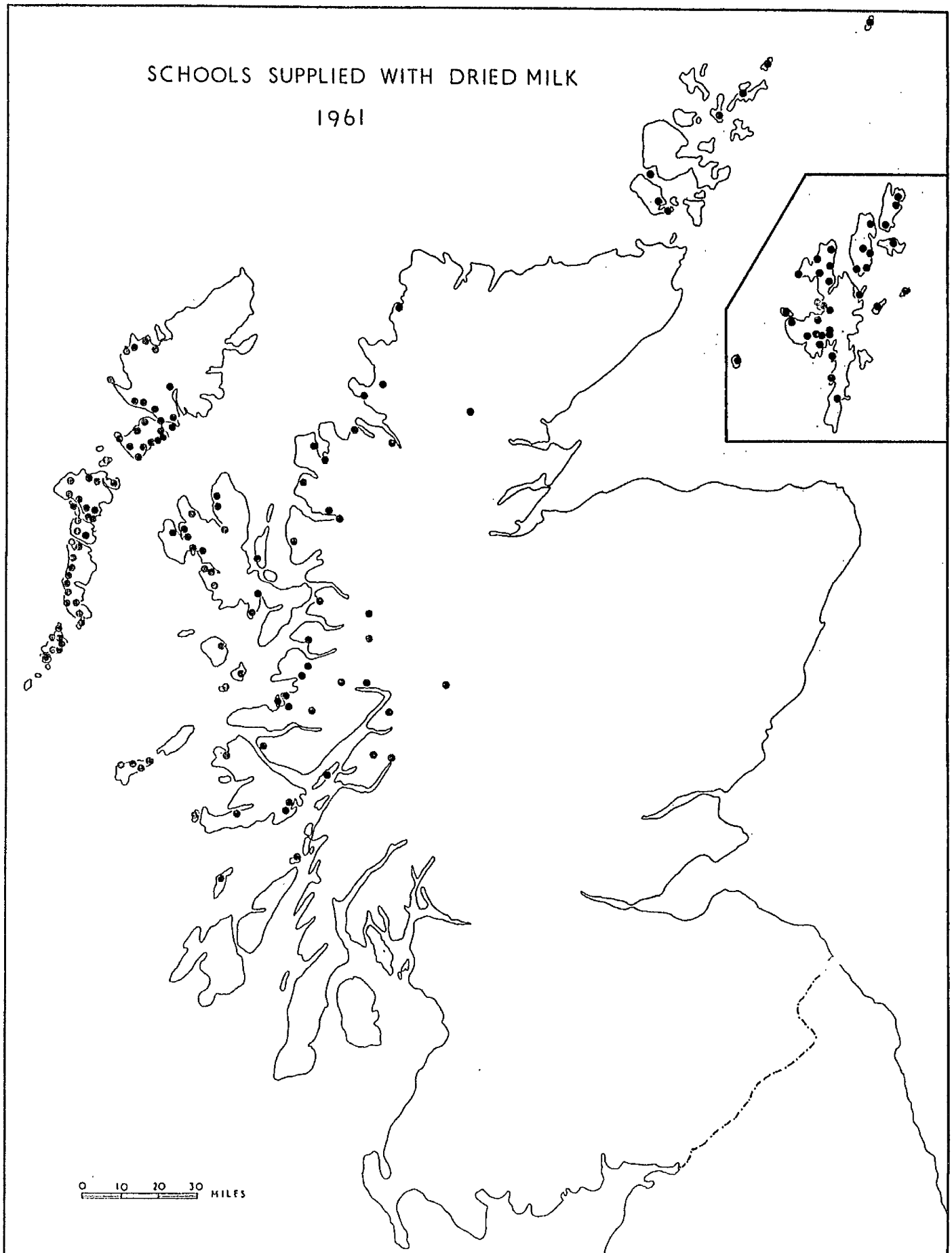
<u>Miles</u>	<u>Pence/gallon</u>	<u>Minimum Charge (pence)</u>
less than 5	0	-
5 - 10	2	4
10 - 15	2 $\frac{1}{2}$	5 $\frac{1}{2}$
15 - 20	3 $\frac{1}{2}$	7
20 - 30	4 $\frac{1}{2}$	8 $\frac{1}{2}$
over 30	5	10

The very low prices in the south western parts of Ross and Cromarty refer to schools supplied by Balmacara Farm which is run by the County Education Authorities.

Although there are many cases of school milk prices above the "maximum retail price" there are no cases of school milk prices higher than the local retail price. All the school milk in Lewis, for example, is supplied by Manor Farm (to which, incidentally, Lord Leverhulme introduced cows of an improved quality as part of his plans for milk production) at 6/3 $\frac{1}{2}$ d. per gallon (1960). The retail price of milk in Stornoway is 10 $\frac{1}{2}$ d. a pint or 7/- a gallon.

Every pupil has a legal right to school milk no matter where the school is located. In areas of deficiency it may be impossible to obtain school milk and in such cases dried milk is supplied as an alternative. There are at present 153 Scottish schools supplied with dried milk and these are shown on figure 55. In a number of small schools the pupils do not take the dried milk and these schools are not included here so that the actual number of schools unable to obtain liquid milk is actually more/

Figure 55



more than 153. Nevertheless, figure 55 clearly reveals those areas where milk supplies are most difficult. The contrast between Coll and Tiree is again apparent as is the contrast between the northern part of the Outer Isles (supplied by Manor Fara mainly with milk from Dingwall) and the southern parts. In Orkney, an important milk producing county, only a handful of schools have no liquid supplies, all of them on the smaller islands. The large number of schools in the Shetland Islands receiving dried milk should not be allowed to mask the progress that has been made there. The county only started its school milk scheme in 1955 and by the end of 1960, 68% of all pupils were in schools where liquid milk was available.

CHAPTER 24

REGIONAL VARIATIONS IN THE LEVEL OF MILK CONSUMPTION.

The factors determining the per capita consumption of liquid milk are exceedingly complex and for the most part fall outside the scope of this study. At the same time it is relevant to note that the per capita consumption varies considerably from place to place. In fact, the geographical variations in consumption are distinctly greater than the seasonal variations and for this reason should perhaps be given more attention. Unfortunately accurate figures are almost impossible to obtain and such figures as are available must be accepted with caution. The subject is examined annually in some detail by the National Food Survey but only for a few constituencies each year and in any case the information collected is not in a suitable form for the present purpose.

Since information is only available for liquid milk which is actually sold attention is here confined to the average consumption of the non-farm population, the assumption being made that the farm population does not buy milk. This is not strictly true for in the beef producing areas of the north east in particular it is not uncommon for milk to be delivered to farms, but the assumption is reasonably safe. A further problem exists in the fact the total farm population is unknown. The estimate used here was obtained by multiplying the number of agricultural holdings by 3 (to represent the farmer and his family) and adding the total number of agricultural workers. The calculations refer to 1958 unless otherwise stated.

The average consumption per head for Scotland as a whole was 27.5 gallons per annum at just over 0.6 pints per day. The figures for the three boards separately were as follows:

Scottish Board	26.6 gallons/year
Aberdeen and District Board	29.9 " "
North of Scotland Board	27.3 " "

These/

AVERAGE MILK CONSUMPTION PER HEAD 1958

<u>City/Town.</u>	<u>Gallons per Annum.</u>
Perth	39.7
Azbroath	36.2
Inverness	35.3
Elgin	34.7
Dundee	34.1
Kirkcaldy	33.8
Aberdeen	32.6
<hr/>	
Stirling	31.7
Glasgow	30.9
Clydebank	30.2
Port Glasgow	29.1
Falkirk	28.5
Rutherglen	26.8
Irvine	26.1

These figures suggest that the per capita consumption is higher in the north eastern parts than elsewhere. The difference between the Aberdeen Board and the North of Scotland Board is easily accounted for in terms of the communities in the remoter parts of the north west which find difficulty in obtaining supplies, and also by the fact that milk produced and sold in the islands outside the Board's area does not enter into the total consumption figures. Accurate calculations under these conditions are difficult, but it is sufficient to note here that the figure of 27.3 gallons per head is a minimum. The Scottish Board, on the other hand, is not appreciably affected in this way and the per capita consumption appears to be genuinely lower than in the area of the other two Boards.

Information for individual towns is available in only a few cases and is not wholly reliable for there is rarely any record of the amount of milk sold by distributors in areas outside the towns in which they are registered. However, for comparative purposes they should be tolerably reliable. The consumption figures here include school milk.

In the case of Glasgow the total amount of milk sold in the city during 1958 divided by the total population of the city gives a figure of 30.9 gallons. This figure is probably slightly higher than the actual per capita consumption but if it is taken at its face value then the average figure for the rest of the Scottish Board's area is 25.2 gallons. This would seem to confirm the impression that in rural areas milk consumption among the non-farm population is distinctly lower than average, a fact that can be related to the frequent difficulties in obtaining supplies. Even where there is an adequate delivery service the crucial "extra pint" may be almost impossible to obtain. The actual proximity of a retail point can be a vital factor in maintaining a high level of consumption.

Average consumption figures were obtained for 11 towns and cities and are set out opposite in descending order of magnitude. The range is very considerable, but more significant is the fact that those towns above the line on the table are in the eastern or north eastern parts of the country while all those below the line can be fairly described as in the central/

central or west central lowlands. The traditional industrial areas seem from these facts to have a relatively low average consumption. Precisely why this should be is not certain. Simpson has shown that whereas before the war variations in income levels between towns could account for most of the differences in the average consumptions per head this is no longer true. (103) It could well be the case, however, that the conditions of the depressed thirties established consumption habits which still remain. Milk consumption habits, once established, are particularly tenacious. But it is not unlikely that a number of other non-financial factors have contributed to the variations. For example, the broad regional differences in per capita consumption are conspicuously similar to the regional variations in the percentage of milk deliveries discussed earlier. It may be that there is some direct relationship here. A highly developed system of milk deliveries seems to be associated with a relatively high consumption per head. It is more likely, however, that the two stem independently from the same basic social and housing conditions.

CHAPTER 25

SOME GENERAL OBSERVATIONS.

An overall survey of this type emphasises the contrast which now exists between the systematic organisation of milk producers in the form of the Milk Marketing Boards and the general lack of organisation among the distributors and manufacturers considered as a group. It further emphasises the wide variations which are found particularly in the field of milk distribution, between different parts of the country, and the present system of distributors' remuneration clearly makes insufficient allowance for these. The industrial centres of the Clyde Valley in particular appear to possess a number of distinctive features, notably a high proportion of counter sales, a relatively low per capita consumption, and very intense price competition in the semi-retail market. This last contrasts conspicuously with the stubborn absence of price competition in the retail market and many relatively inefficient firms must be protected in this way. It is not suggested that widespread price competition in the retail market is desirable for this could result in stringent demands for a lower standard price and a consequent deterioration of the already uncertain position of the producers, but there would seem to be room for it in the special case of counter sales. This would create a long overdue price differential between counter sales and delivery sales, the persistent absence of which is one of the oddest facts of the British dairy trade. This is particularly so in view of the increasing labour problems of milk deliveries. The present trend away from counter sales would certainly be checked in this way and perhaps even reversed, with consequent saving. The effect on the general level of consumption is, however, more doubtful. People induced in this way to cancel delivery orders might buy less simply as a result of casual purchasing or bad planning.

In view of the paramount importance of the level of retail sales
the/

the wide geographical variations which exist in per capita consumption require very careful attention. If it is true, as Eapson suggests, that such variations between towns are not due principally to real economic factors then it is likely that in areas of relatively low consumption, such as the industrial Clyde Valley towns, there is a potential extra demand. Further research is needed to discover which means - advertising, more retail points, better delivery services or other changes - could be adopted to bring consumption in these areas into line with other parts of the country. The apparently low per capita consumption in rural areas is a more obvious problem and clearly calls for improvements in the milk distributive system in these areas. A subsidised milk retail service would have much to commend it but it should not be forgotten that relatively poor services of all kinds are usual in rural areas and the problem is by no means peculiar to milk supplies. The most obvious solution would be for the Boards themselves to operate retail services in these areas such as is already done by the North of Scotland Board. Even though it failed to ^{be} commercially viable on its own such a service would frequently be financially preferable to the manufacturing market and with careful planning and gradual implementation need not trespass to any serious extent on the markets of private distributors.

APPENDIX A

Sources of material and methods of construction
used in the maps and diagrams

Figure 1. Dairy farms with crops sales unimportant. Map first published in "Types of Farming in Scotland" D.O.A.S. 1952, p.52.

Figures 2 and 3. Dairying 1795, 1835. Owing to the imprecise nature of the reference to dairying in both Statistical Accounts (actual figures are given only in a minority of cases) the maps are inevitably to some extent subjective. Personal judgement was used in some cases in deciding whether a parish is properly described as "dairying predominant" or "dairying mentioned" but in most cases the distinction is quite clear. The "dairying mentioned" category, however, covers a very wide range of circumstances from cases where dairying forms a major part of the farming economy to others where its presence is assumed from references to a small export of dairy produce.

Figure 4. Cheese Trade 1795. Strictly the title of this map should be Dairy Produce Trade 1795. Cheese, however, was clearly far and away the principal dairy product. It is clear from the texts that the trade was at that time somewhat haphazard. Much of the cheese was sent by weekly carrier, presumably after direct negotiation between the farmer and the retailer. Such a procedure would explain the clear awareness at the time of the ultimate destination of the cheese. References to markets for the cheese are relatively rare in the New Statistical Accounts presumably on account of the emergence of the middlemen, the cheese "cadger", whose operations lengthened and obscured the link between producer and consumer. It is because of the relative absence of such references in the New Statistical Accounts that a comparable map has not been compiled for that period.

Figure 5. Facsimile of part of Bowing Agreement. Original from Mr. W.B. Grant, Borlenad, Lockerbie.

Figure 6. Illustrations of Ayrshire Cows. The top illustration is

from "Agriculture of the County of Ayr" by William Aiton 1811, and is probably the earliest illustration of the breed. The illustration was officially passed by the Kilmarnock Agricultural Society as a true and accurate representation at that time. The lower illustration appears on page 15 of "The Judging and Preparation of Ayrshire Cattle" published by the Ayrshire Cattle Herd Book Society of Great Britain and Ireland. The relative sizes of the two cows shown here can only be guessed.

Figure 7. Farm Sizes. The map is compiled on a parish basis from Department of Agriculture statistics which are available for nine different size groups, - 1-5 acres, 5-15, 15-30, 30-50, 50-75, 75-100, 100-150, 150-300, over 300, and for owned and rented farms separately. It is clearly neither practicable nor desirable to represent cartographically all of these nine size groups and consequently they have been grouped into three main classes. This three-fold classification is not entirely arbitrary and is intended to represent, in an approximate fashion, "family" farms, good sized to big farms requiring some hired labour, and very big farms requiring large amounts of capital. Holdings with less than 50 acres of improved land are excluded as the great profusion of these would confuse the map to no useful end. It is to be remembered, however, that many substantial hill sheep farms will come under this head and that the upland area is not just so devoid of farms as the map might suggest. It is not possible to locate accurately each individual farm, but in compiling the map due regard has been given to the local physiography and distribution of farm settlement.

Figure 8. E. & D. Dairy Co. Ltd. Collection Points. The information was supplied by Mr. R.A. Wyllie, formerly a dairy farmer in Annandale, and currently a director of the Company.

Figure 9. Dumfriesshire Dairy Farms 1906-1934. The figures were obtained from the Health Department of the Dumfries County Council. The drop in the graph after 1926 is due to the Dairy Bye-laws passed at that time and which obliged many small producers to give up dairying. Figures for the other south-west counties are less complete so a

County	Average size of milking herd [#]	% infection in 1938 sample
Ayr	36	29.7
Dumfries	34	19.3
Kirkcudbright	41	23.3
Wigtown	49	31.0
Berwick	32)
Selkirk	31	) 16.6
Roxburgh	32)
West Lothian	25)
East Lothian	31	) 19.9
Midlothian	33)
Peebles	30)
Lanark	32	27.1
Renfrew	32)
Bute	20	) 19.1
Argyll	24	20.1
Stirling	29)
Dunbarton	33	) 34.7
Fife	37)
Clackmannan	40	) 33.6
Angus	36)
Kincardine	?	) 28.7
Perth	32)
Kinross	38	) 22.8

[#] The figures are for 1952-53, but the relatively unchanging nature of average herd size makes the disparity in dates of little consequence.

comparison is not possible.

Figure 10. Incidence of Bovine T.B. in Scotland 1938. The map is based on figures obtained from a sample survey conducted by the Ministry of Agriculture and subsequently published in "Scottish Agriculture" 30, 1950-51, pp.52-53. The percentage sample varied widely between areas and at best the results are tentative.

Figure 11. Graph of average herd size and % infection by counties or groups of counties. The figures used are shown opposite.

Figures 12 and 13. Progress in T.T. Licencing and Attestation. Information in the case of attested herds from the Animal Health Division of the Department of Agriculture, and in the case of T.T. licences from the Scottish Milk Marketing Board. The discontinuity in Figure 12 is due to a change from D.O.A.S. to S.M.M.B. figures.

Figure 14. Cheese Farms 1959. Information from Company of Scottish Cheesemakers. Each farm is located in its correct position. No lists of cheese farms are available for the years prior to 1954.

Figure 15. Cheese farms 1934-1959. Statistics from the Scottish Milk Marketing Board.

Figure 16. Graph of total producers. Statistics from the Scottish Milk Marketing Board.

Figure 17. Acreage of Crops and Grass per Dairy Cow. The map is compiled on a parish basis from the Agricultural Returns for 4th June, 1958. Crops and grass = Improved land.

Figure 18. Dairy Cows as Per Cent of Total Dairy Stock. "Cows" here include heifers in milk. The map is compiled from the Agricultural Returns for June 1958. Total dairy animals include bulls but the number is so small that the figures can be safely taken to represent cows and followers alone. Young male animals reared from dairy herds but intended for beef stores and not for dairy breeding are excluded from the figures.

Figure 19. Buyers at Four Dairy Cattle Sales. Information extracted from the sales books of the auctioneers.

Figure 20. Per cent Improved land under grass. Statistics from Agricultural Returns June 1958.

Figure 56

SEASONALITY OF MILK SALES BY HAULAGE AREAS 1958

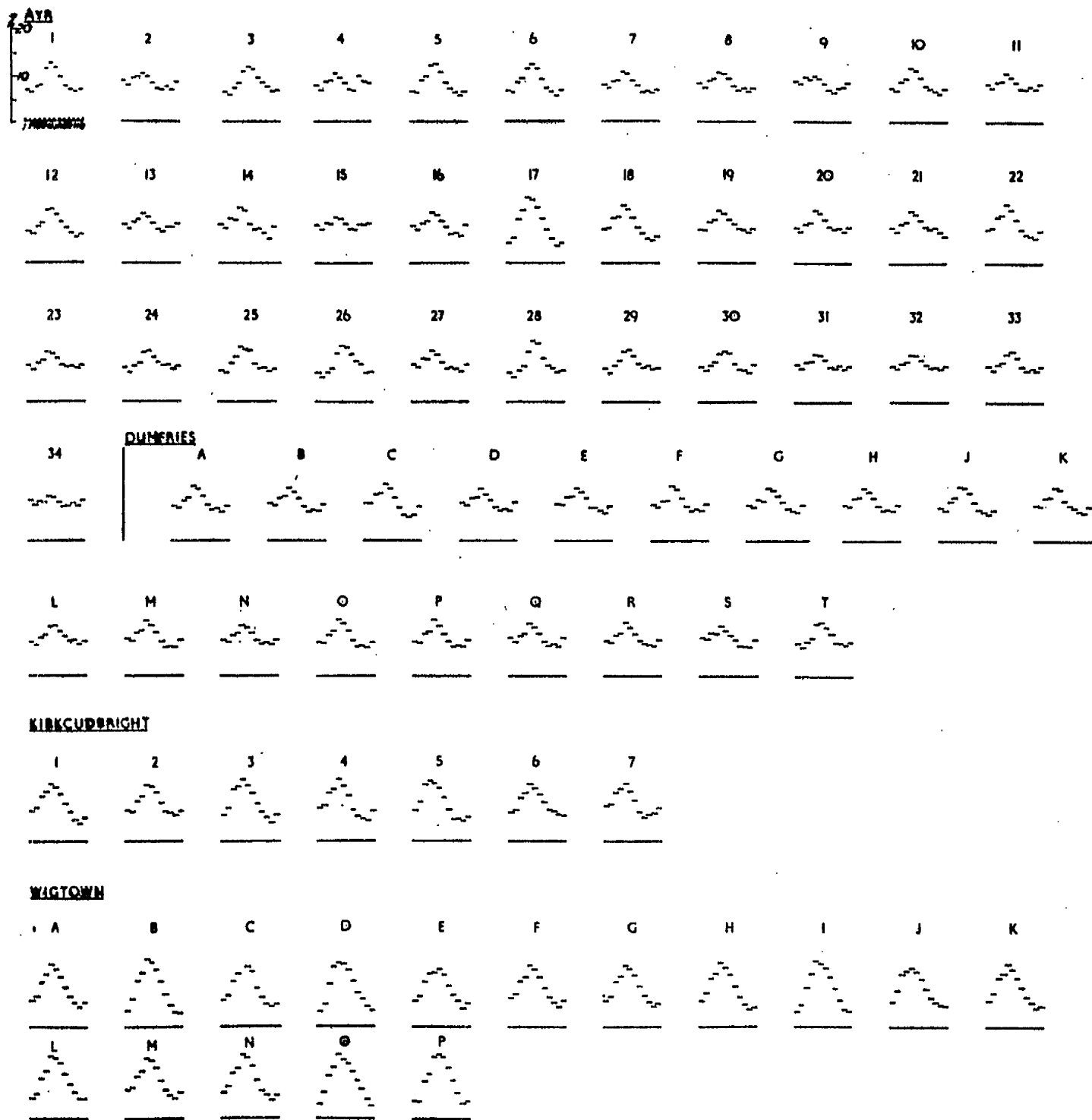
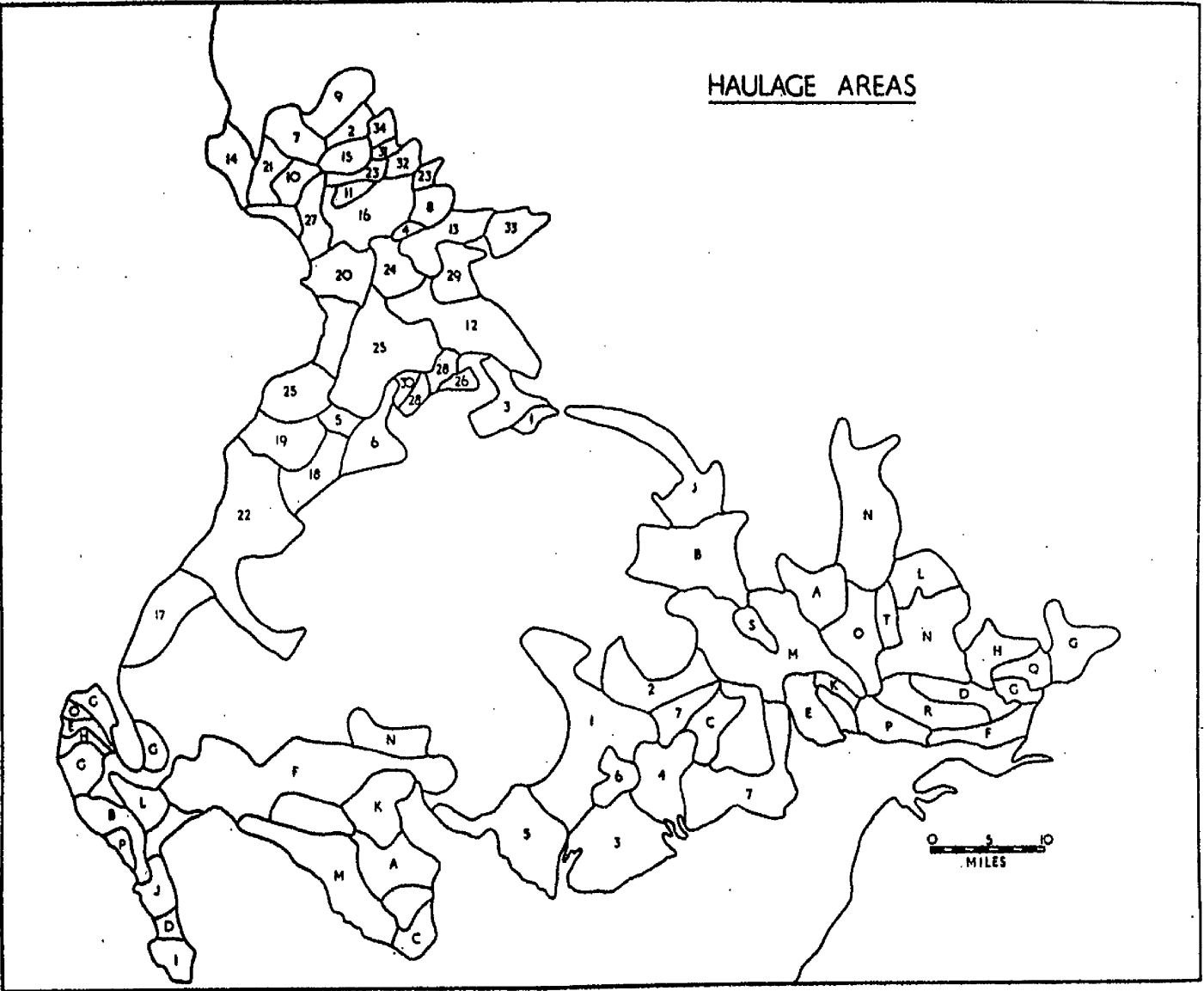


Figure 57



REGIONAL SALES OF SEED MIXTURES BY MESSRS. MCGILL AND SMITH

% demand by regions

<u>Mixture</u>	<u>N.Ayr</u>	<u>S.Ayr</u>	<u>Dumfries</u>	<u>K'bright</u>	<u>Wigtown</u>	<u>Symbol on Map</u>
Castlehill 4	6	9	10	12	8	
Castlehill 2	38	34	39	22	14	
C [⌘]	19	38	15	33	25	
D [⌘]	3	6	5	6	17	⊕
JDZ/JDW [⌘]	23	3	-	-	-	●
JW [⌘]	-	-	20	18	25	○
Others	14	9	10	10	10	
Total	100	100	100	100	100	

Mixtures mapped indicated by an asterisk

Figure 21. Types of Sown Pasture. The map is compiled from the records of Messrs. McGill & Smith, Seed Merchants, Ayr. A random sample of farm orders was taken and three of the firm's range of mixtures mapped. These three were chosen because they were considered to illustrate best the principal regional variations in pasture types, but it must be emphasised that as a result of this selection the pattern is exaggerated here.

One of the most popular mixtures is the high quality (and expensive) "Castlehill No.2", a general mixture for medium soils. The demand for this sows no clear regional pattern, though it appears to be less in demand in Wigtownshire where many of the farmers prefer to mix their seeds themselves.

If the seed mixture used by every farm could be shown regional variations would probably appear slight. Some sort of quantitative measure can be obtained from the table opposite which should be consulted in conjunction with the map.

Figure 22. Timothy as Per cent of Total Mown Grass. Statistics from Agricultural Returns, June 1958.

Figures 23 and 24. Seasonality Maps. Statistics from the Milk Marketing Boards. A detailed percentage statement of the monthly sales (excluding farm cheese) of each haulage area in Figure 24 is shown in Figure 56. Since calendar months are used it is important to remember that these are not of uniform length; the February figure in particular is depressed in this way. The figures are for year ending November 1958.

The Scottish Milk Marketing Board and the agricultural colleges in dealing with seasonality use the April-September total as a percentage of the annual total. The choice of these six months appears to be determined with reference to the period when the cows are usually on grass. That is, it is determined with reference to the economics of production. Where, as here, a simple measure of seasonality is required the April-September figure can give misleading results by understating the variations. This is because these six months only occasionally represent the six months of greatest sales. In all but seven of the haulage areas (Ayrshire 1,2,3,4,24,26 and 37)

March sales exceeded September sales in 1958. Consequently, even allowing for the difference in the lengths of these two months, it is clear that the March-August percentage is a better measure of seasonal fluctuations in milk sales than the April-September percentage.

The six shading groups used on Figure 24 were chosen to bring out the salient patterns of seasonality and in consequence the interval is not constant.

Comparable maps for earlier periods cannot be compiled because of repeated adjustments to the areas collected by each haulier.

Figure 25. Average Hours Sunshine per Day September-March. Figures from the Monthly Reports of the Meteorological Office.

Figure 26. Monthly Calvings - Ayrshires. The figures were extracted from the Livestock Records Bureau, Edinburgh. The total percentages for the spring (February-April) and autumn (September-November) months are shown to facilitate comparison.

Figure 27. Seasonality 1934-1959. Statistics from the Scottish Milk Marketing Board.

Figure 28. Length of Grazing Season 1959. The information was obtained by questionnaire. Among other things each farmer was asked:

1. On what date were the cows first out at night?
2. On what date were the cows first in at night?

The numbers on the map represent the number of days between these two dates.

Figure 29. Available Home Grown Winter Feed 1958. The map is compiled on a parish basis from the Agricultural Returns for June 1958.

Figure 30. Graph of Mown Grass and Seasonality. Milk production and cropping figures are not available for the same areas in units less than counties. The graph was compiled by super-imposing the map of haulage areas (with its seasonality indices) on the map of parishes (for each of which the mown grass % was calculated) and relating each haulage area to the parish or parishes with which it most nearly coincided.

Figure 31. Winter Feed Crops 1939-1958. Statistics from Department of Agriculture for Scotland.

Figure 32. Milk Production and Retail Sales by Counties 1958.

Production figures supplied by the three Milk Marketing Boards except in the case of Zetland figures for which were obtained from the county sanitary authorities. Figures of retail sales can only be estimated. For the purpose of estimation it was assumed that the farm population did not buy milk. County estimates were made by multiplying the county non-farm population by the average consumption of liquid milk per head of non-farm population in the area of the relevant Board. Farm population was estimated as the number of agricultural holdings x 3 together with the total number of employed agricultural workers.

Figure 33. Farmers' Co-operative Dairy Association 1930. Compiled from information contained in the Reports of the Chief Registrar of Friendly Societies. Since the addresses of individual members are not recorded it has not been possible to map the actual area covered by each co-operative. The scale of the circles, however, has been chosen to approximate to the actual geographical coverage.

Figure 34. Milk Marketing Board Areas. Sources: Milk Marketing Boards.

Figure 35. Manufacturing Creameries: Products. Sources: Milk Marketing Boards.

Figure 36. Manufacturing Creameries 1915. Information chiefly from the managers of the present creameries in the area.

Figures 37 and 38. Manufacturing Creameries. Summer and Winter Intakes. Information received mainly from representatives of the creameries concerned. The figures refer to the peak and minimum intake in each case and not to average daily figures for each season.

Figure 39. Inter-creamery movements and non-local supplies of manufacturing milks. Information mainly from the Milk Marketing Board. The map is necessarily generalised and the links shown must not be taken to be unchanging. The pattern undergoes considerable change from time to time though the general movements remain the same. The map ignores the quantities involved. In the case of milk from Coll for example, only a few gallons are involved each day. Other

movements can be measured in terms of thousands of gallons.

Figure 40 and 41. Milk Movements to Liquid Market Summer and Winter. These maps are generalised from information received from the Milk Marketing Boards and from certain distributors. The arrows are diagrammatic and do not always indicate the actual routes followed by the milk.

Figure 42. Specified Areas. Compiled from the lists of areas to be specified at each date.

Figure 43. "Town Dairies" in Glasgow and Edinburgh 1925-1958. Compiled from information in the Reports of the Medical Officers of Health for the two cities.

Figure 44. Vehicles from outside Glasgow retailing in the City. Source: Reports of the Medical Officer of Health for Glasgow.

Figure 45. Pasteurising and Heat Treatment Plants 1960. List from the Department of Health for Scotland.

Figure 46. Counter Sales as a Proportion of Total Sales in Branches of the Glasgow South Co-operative. Information obtained by circular kindly arranged by Mr. J.M. Wilson, dairy manager.

Figure 47. Population per Retail Point 1958. Calculated from information received from the Sanitary Inspectors of the cities and large burghs, and in the cases of the small burghs, from the County Sanitary Inspectors. "Retail Point" includes all shops and vending machines (where not part of a shop already counted) and retailers outside the burgh who retail within the burgh.

Figure 48. Cities. Retail Premises 1937-1959. Information from the Public Health or Sanitary Departments of the cities. "Retail Premises" is synonymous with "Retail Point".

Figure 49. Retail Premises in the Scottish Large Burghs 1937-1960. Information from the Burgh Sanitary Inspectors. Eighteen of the nineteen Scottish Large Burghs are represented. No figures were obtained for Arbroath.

Figure 50. Types of Retail Premises 1937-1960. Information from the Burgh Sanitary Inspectors.

Figure 51. Registered Producer-Retailers 1958. Source - Milk Marketing Boards, (via the Scottish Association of Producer-Retailers). Each Producer-Retailer is indicated separately.

Figure 52. (Photograph). Butter Churn and Cheese Press on a North Uist Croft. June 1959. The photograph was taken by the author. This systematic manufacture of milk is not general practice in North Uist though there is a general and conspicuous surfeit of milk in summer and it was noted that the local S.C.W.S. grocery van carried little jars of rennet for cheese-making presumably in response to demand.

Figure 53. Retail Delivery Routes Operated by the North of Scotland Board. Information from the North of Scotland Milk Marketing Board.

Figure 54. School Milk Prices, Summer 1960. Information was obtained from the County Directors of Education. Most of the schools shown are senior secondary schools. Since these are usually located in or near one of the more important centres of population the sample has a bias towards those instances with relatively low prices. Many instances could be found in the lowland counties of small rural schools where milk is supplied at or above the maximum retail price. However, it is unlikely that the general pattern of regional variations would be much affected were all such cases taken into account.

Figure 55. Schools supplied with Dried Milk 1961. Lists of schools from the Education Authorities of the counties concerned, and in the case of Zetland from the County Sanitary Inspector. Each school is indicated separately and is located precisely.

Figure 56. Seasonality of Milk Sales by Haulage Areas 1958. Statistics from the Scottish Milk Marketing Board.

Figure 57. Haulage Areas. Source: Scottish Milk Marketing Board.

Figure 58. Parishes in South West Scotland. Source: Ordnance Survey map of administrative areas.

APPENDIX B

Example of a Bowing Agreement

"Auchenfad Dairy Agreement 4th July, 1938"

Minute of agreement of let between Walter G. Crawford, tenant of Auchenfad farm in Rerrick parish on the one part, and John A. Hannah now at Corwar Outon, Whithorn.

The said Walter G. Crawford hereby sets or lets to said John A. Hannah hereafter called the Dairyman a bowing of cows and heifers at Auchenfad numbering 63, for one year from Martinmas 1938.

The said W.G.C. binds himself to supply the said dairyman for the use of said cows the following articles of feeding.

Grass. About 90 acres as pointed out.

Fodder. For fodder straw is to be used in Winter with care, bedding allowed for pigs for 4 months in Winter. 3 round stacks of hay for spring for spring use. The fodder of the farm is held to be sufficient.

Turnips. 3 acres for Autumn use, and 7 acres for Winter and Spring.

Feeding. 40 stoness meals for each cow and quey of an approved balanced ration.

One sixth of any meals or cake purchased by dairyman for cows will be allowed.

Rent. Dairy man agrees to pay W.G.C. for each cow and quey 20 stoness of 24 lbs. to the stone of cheese, and it is understood cheese is to be made up to the average of the best dairies in the County, and any difference that may arise in value to be made good by dairyman.

Picking Calf. Any cow or quey that may pick calf before 1st December W.G.C. will be bound to take out or accept 14 sts. cheese, in his option, but any cow or quey that shall pick calf after that date shall be a full cow or quey's rent.

Late calvers and any cow or quey that does not calve before 26th May W.G.C. binds himself to pay said dairyman 1/- per day till she calves.

Cows with 3 teats to be considered full cows.

Reasonable discount for disease and death.

Sick Cows. The said dairyman shall be bound to give all his time and attention to the cows in the dairy, and in the event of any cow ailing said dairyman shall be bound to at once acquaint the foreman of such illness, and any loss that may come to W.C.C. through neglect of dairyman shall be a charge against him.

Not to sell produce. The said dairyman binds himself not to sell any part of produce of cows without liberty of W.C.C. except Winter milk, but dairyman shall be required to supply cot people 3 in number on the farm 1d each daily of skim milk, at the rate of 1d for $\frac{1}{2}$ gallon, or new milk at 8d per gallon.

Security. The said dairyman shall pay on entering the dairy £63 as security: W.C.C. will hold this sum and only repay it to said dairyman when he has implemented his bargain. W.C.C. will pay dairyman 4% interest for same.

Rearing calves. Said dairyman will be required to rear 28 heifer calves for the sum of 70/- each including price of calf, till fit for grass. Meals supplied free of cost also cake.

Wintering Cows. Said dairyman shall be required to attend any odd cows out of dairy in Winter, W.C.C. paying him 6/- per week for 10 cattle.

Potatoes. Dairyman is allowed to plant 2 cwts. of potatoes in whichever field W.C.C. may direct.

Horse. Dairyman is not bound to keep a horse, but it is understood that he only gets the loan of a horse at times suitable to the foreman.

Carting turnips. Dairyman will cart his own backend turnips, but Winter turnips will be carted to a convenient place near offices by W.C.C.

Carting feeding, etc. Feeding stuffs for cows will be delivered, and cheese carted away, but dairyman must arrange to have his coals delivered.

Arbiters. In case any difference may arise between W.C.C. and dairyman in relation to this agreement, in any manner or way, the parties agree and bind themselves to submit same to the amicable decision and final settlement of Wm. Gilmour or failing him, J.B. Douglas, Barstibly, whose decision shall be final, and the said parties bind themselves respectively to implement and perform all the foregoing agreement, and the party failing or unwilling to do so shall pay £20 to the party willing to perform it.

Wintering. W.C.C. reserves liberty to winter sheep and young cattle on dairyman's grass, but same to be removed by 1st March.

Poultry. Dairyman shall be allowed to keep a few hens in a house in field, place to be pointed out by W.C.C.

Pigs. Pigs will only be allowed out in paddock fenced off for them.

Tester. Dairyman will be required to keep free the Tester on his visits.

Milking Machine. If milking machine use, is to be kept up by dairyman.

This agreement has been continued from year to year with the following alterations:-

- 1933 30 calves to be reared.
- 1934 Under any milking marketing scheme W.C.C. will sell all produce of cows, 1 lb. cheese equals 1 gallon of milk. Average of all cheese and milk sold will be basis of calculation when deciding rent.
- 1935 Feeding: 1/6th of 12 tons only will be allowed. Agree to pay £8 for use of milking machine. Keep it in first class order, and if leaving dairy to hand engine over in as good order as he received it, excepting fair wear and tear.
- 1937 Water bowls will be put in. Dairyman to pay £3 per annum for same.

Signed W.C.C.
J.A.H.

Chapmanton,
Castle-Douglas,
4th July, 1938.

Original from Mrs. J.A. Hannah, Myroch, Portlogan.

APPENDIX C

Example of the Sixth System

"Minute of Agreement between the Farmer and the Dairyman,
for the working of about 76 cows, from November 28th, 1948.

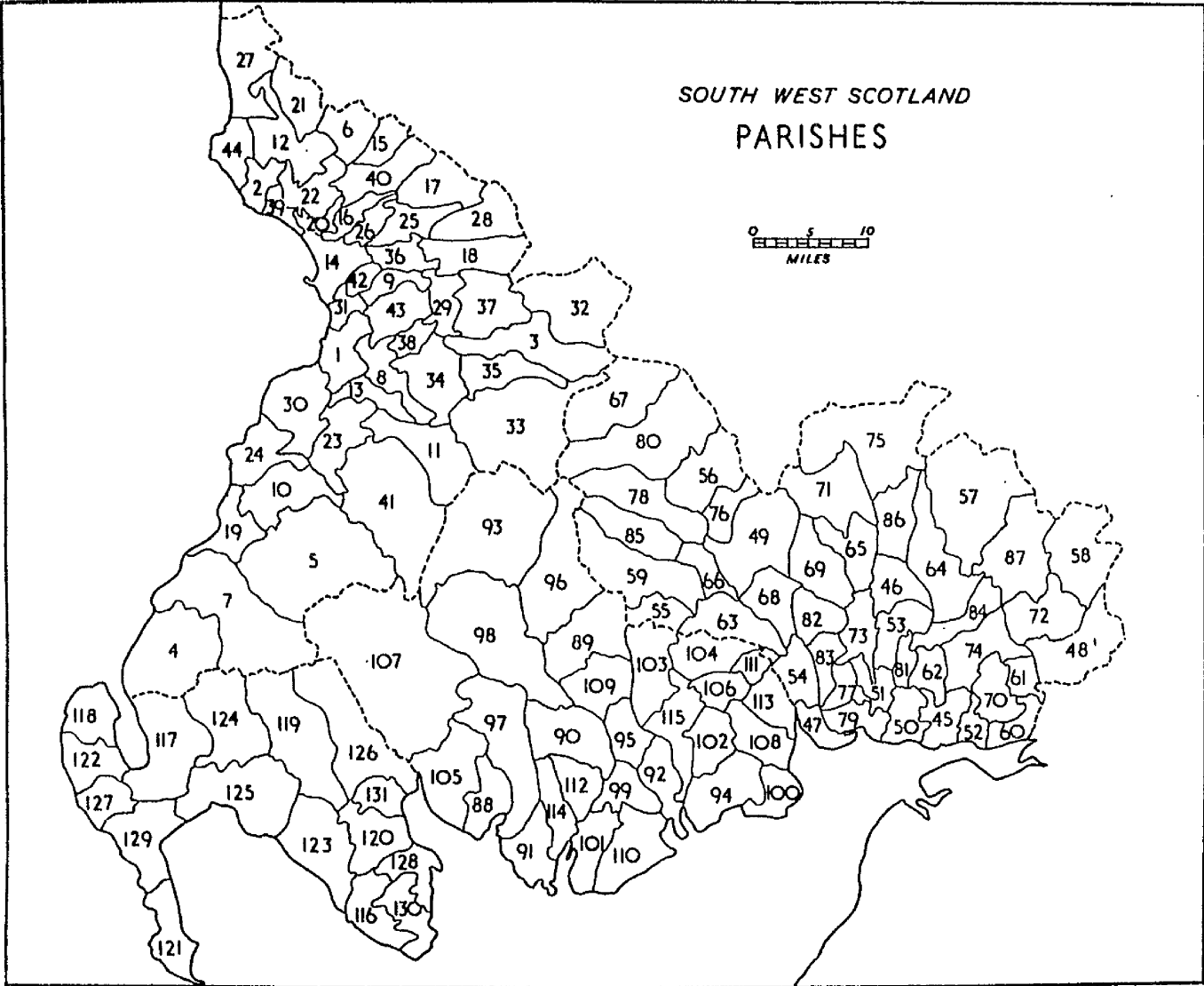
- (a) All labour required for working the dairy efficiently.
- (b) Keeping house, garden, courts and dairy buildings clean and tidy at all times.
- (c) Keeping all utensils in good serviceable order.
- (d) Assistance at threshing, if required, between 1 and 3 p.m.
- (e) Milk Tester to be boarded for which payment at appropriate rate will be paid.
- (f) Dairyman to show and cart backend turnips or kale.

The farmer agrees to pay dairyman $\frac{1}{6}$ th of milk cheques received from the Board. Dairyman to pay own coal and light, but an allowance of £40 per annum will be paid by farmer at 28th November. Dairyman to receive £2 for all calves weaned and $\frac{1}{6}$ th of cheques for bull calves graded. Payment for these will be made at November 28th. 2 carts of Potatoes will be allowed yearly. The dairyman binds himself or his servants not to sell or dispose of any part of the produce of the dairy, without consent of the farmer. This agreement to be terminated by not less than three months notice on either side.

It is agreed by the dairyman that the dairy house is occupied only so long as he remains in the farmer's employment."

Copy from Mr. I.W. Mitchell, County Agricultural
Adviser, Castle-Douglas.

Figure 58



APPENDIX D

Parishes in South-West Scotland as on Figure 58

AYSHIRE:

1. Ayr
2. Ardrossan
3. Auchinleck
4. Ballantrae
5. Barr
6. Beith
7. Colmonell
8. Coylton
9. Craigie
10. Dailly
11. Dalmeilington
12. Dalry
13. Dalrymple
14. Dundonald
15. Dunlop
16. Dreghorn
17. Fenwick
18. Galston
19. Girvan
20. Irvine
21. Kilbirnie
22. Kilwinning
23. Kirkmichael
24. Kirkoswald
25. Kilmarnock
26. Kilmeurs
27. Largs
28. Loudoun
29. Mauchline
30. Maybole
31. Monkton & Prestwick
32. Muirkirk
33. New Cumnock
34. Ochiltree
35. Old Cumnock
36. Riccarton
37. Sorn
38. Stair

39. Stevenston
40. Stewarton
41. Straiton
42. Symington
43. Tarbolton
44. West Kilbride

DUMFRIESSHIRE:

45. Annan
46. Applegarth
47. Caerlaverock
48. Canonbie
49. Closeburn
50. Cummertrees
51. Dalton
52. Dornock
53. Dryfesdale
54. Dumfries
55. Dunscore
56. Durisdeer
57. Eskdalemuir
58. Ewes
59. Glencaltn
60. Gretna
61. Half Morton
62. Hoddam
63. Hollywood
64. Hutton and Corrie
65. Johnstone
66. Keir
67. Kirkconnel
68. Kirkmahoe
69. Kirkmichael
70. Kirkpatrick Fleming
71. Kirkpatrick Juxta
72. Langholm

DUMFRIESSHIRE (Cont'd.):

- 73. Lochmaben
- 74. Middlebie
- 75. Moffat
- 76. Morton
- 77. Mouswald
- 78. Penpont
- 79. Ruthwell
- 80. Sanguhar
- 81. St. Mungo
- 82. Tinwald
- 83. Torthorwald
- 84. Tundergarth
- 85. Tynron
- 86. Wamphray

KIRKCUDBRIGHT:

- 88. Anwoth
- 89. Balmaclellan
- 90. Balmaghie
- 91. Borgue
- 92. Broughton
- 93. Carsphairn
- 94. Colvend & Southwick
- 95. Crossmichael
- 96. Dalry
- 97. Girthorn
- 98. Kells
- 99. Kelton
- 100. Kirkbean
- 101. Kirkcudbright
- 102. Kirkgunzeon
- 103. Kirkpatrick Durham
- 104. Kirkpatrick Irongrey

KIRKCUDBRIGHT (Cont'd.):

- 105. Kirkmabrock
- 106. Lochrutton
- 107. Minnigaff
- 108. New Abbey
- 109. Parton
- 110. Rerrick
- 111. Terregles
- 112. Tongland
- 113. Troqueer
- 114. Tynholm
- 115. Urr

WIGTOWNSHIRE:

- 116. Glasserton
- 117. Inch
- 118. Kirkcolm
- 119. Kirkcowan
- 120. Kirkcinner
- 121. Kirkmaiden
- 122. Leswalt
- 123. Mochrum
- 124. New Luce
- 125. Old Luce
- 126. Penninghame
- 127. Portpatrick
- 128. Sorbie
- 129. Stoneykirk
- 130. Whithorn
- 131. Wigtown.

APPENDIX B

Development in Bulk Tanker Collection of Milk

This is undoubtedly the most important technological development in the dairy industry for many years. It affects almost every branch of the industry - farmers, distributors and manufacturers - and is spreading so rapidly that any statement of the current position is soon out of date. Already the S.M.B. is thinking in terms of that period in the clear future when the ordinary ten gallon milk can will be a museum piece.

Bulk transport of milk by road has been commonplace for many years. The innovation is in the installation on farms of refrigerated bulk storage tanks from which the milk can be pumped directly into the road tanker. Sample costings suggest that the cost per gallon on the farm is slightly higher than with the conventional can method but the amenity value of the tank, which dispenses with the job of washing and handling cans, is widely appreciated. Transport costs per gallon are substantially lower as are handling costs at the receiving depot.

One of the more interesting consequences of refrigerated bulk storage on farms is that during the season of low production the farm tank capacity may be sufficient for two days' production. Consequently collection need only take place on every other day. This will only be possible, of course, in the more seasonal areas, and it is not improbable that the geography of seasonality may soon acquire a new and practical significance in this way. The effect of bulk collection of the role of the creameries as primary collection centres has already been mentioned.

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N.S.A.	New Statistical Account.
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