

THE IRISH RURAL ECONOMY 1844-54:

A GENERAL EQUILIBRIUM APPROACH TO

FAMINE, RELIEF AND CHANGE.

Pat McGregor.

Ph.D

University of Edinburgh

1980



I, Pat McGregor, hereby declare that this thesis
was composed solely by myself.

date 22/8/80

ABSTRACT OF THESIS.

The crisis in the Irish rural economy wrought by the potato blight presents a challenging area for economic analysis. Despite terrible mortality and large scale emigration, there was a significant increase in livestock numbers. Any investigation of the mechanism by which these developments occurred immediately faces two distinct problems. Firstly there is the question of peasant economic behaviour - is it distinct from the neoclassical paradigm of the economy made up of individuals and firms? Secondly, there is the lack of comprehensive statistics.

In response to these difficulties a rigorous model of the peasant economy is developed in the thesis. The theoretical structure provides a framework on which the historical evidence, which tends to be highly uneven in quantity and quality, may be hung and wrought into a pattern. Moreover, by being concrete, the historical evidence allows us to restrict the model's generality, making it a much more practical instrument.

The defining characteristic of a peasant economy is taken to be the absence of a capital market. The peasant is simultaneously a producer and a consumer with his central economic decision being between present and future consumption. Since output is generated after a lag, the problem is one of intertemporal allocation of resources, which is solved by using non-linear programming.

Optimal behaviour for the peasant differs from that of the firm due in the main to the existence of a budget constraint. This, together

with the peasant's position as a consumer and the production lag, leads to comparative static results which are distinct from traditional demand theory. With consumption often being near the physical minimum, we find the peasant's supply of hours schedule to be distinctive, which has important consequences for wages during the Famine.

Counterpoised to the theoretical model of peasant behaviour is the historical evidence of the pre-Famine rural economy. From the latter we basically require an appreciation of the agricultural production function and the potential for substitution between factors. To gain this it was necessary to undertake an extensive investigation of cropping systems and the techniques of tillage and livestock production. This was supplemented by analysing the evidence on land utilisation, where the role of land quality was captured by using the valuation evidence. The land and labour markets were intertwined in the rural economy and are examined carefully since, together with the product markets (inputs and outputs are interchangeable) they constitute the general equilibrium system.

The course of agricultural production in the years 1845-47, for which we have only limited statistical material, is analysed using the same approach as employed previously. A simplified model is developed and its behaviour is noted under assumptions which are relevant to the period under consideration. Within this framework a detailed study of the historical evidence is developed. The blight had two direct economic consequences. There was a loss of income from the potato crop, though in some cases this could be

compensated by price changes of other products. Secondly, there was an increase in the real wage rate.

Because physiology sets a floor to the real wage rate, the labour market could not be cleared during the Famine. As a consequence excess labour supply rapidly developed. Since the existing welfare provisions were inadequate the British government introduced special relief measures. These have been analysed principally from the viewpoint of the constraints on expenditure which they included.

The blackest year of the Famine was 1847. It also marks the beginning of recovery and the beginning of reliable and comprehensive statistics of agricultural production. This permits a model of the recovery to be estimated. The production decisions of the peasant are constrained by a budget and thus we concentrate upon the factors which would directly affect this. We consider the role of rents, rates and crop yields upon the growth of real wealth in the rural economy.

The period of the recovery is taken to be 1847-54, during which time we assume the supply of labour to be infinitely elastic. The short time period requires that cross-sections of time series be pooled. Estimation is carried out under differing assumptions and the results are compared.

ACKNOWLEDGEMENTS.

I would like to express my gratitude to my supervisors, PROFESSOR S.B. SAUL and DAVID WRIGHT for their guidance and encouragement.

I have benefited from discussions with the members of the ECONOMIC HISTORY DEPARTMENT AT QUEEN'S and with colleagues at the ULSTER POLYTECHNIC. With respect to the latter I am especially grateful to ALLISTER McCULLOUGH and MIKE SMYTH. The staff of the ACADEMIC PROJECTS DEPARTMENT OF COMPUTER SERVICES and particularly NOEL WILSON were of great assistance with computer operations.

Many of the issues addressed by this thesis were first raised in tutorials with MIRIAM DALY. Her tragic murder precluded any detailed discussions of the results and robbed Irish economic history of a committed worker.

My greatest debt over the past five years is to my wife who willingly shared the sacrifices the thesis entailed.

C O N T E N T S

	Page
Abstract of Thesis	
Acknowledgements	
Table of Contents	1
List of Figures and Tables	2
Abbreviations	4
 CHAPTER I. Introduction	 6
 CHAPTER II. A model of the peasant economy	 11
 CHAPTER III. The pre-Famine rural economy	 59
 CHAPTER IV. Agricultural production, 1845-47	 153
 CHAPTER V. The British relief scheme. 1. Prelude.	 208
 CHAPTER VI. The British relief scheme. 2. Chaos	 239
 CHAPTER VII. The British relief scheme. 3. The new order	 266
 CHAPTER VIII. Recovery	 282
 CHAPTER IX. Conclusion	 300
 Mathematical Appendices	 305
Appendix I - The Irish valuations	334
Bibliography	370

LIST OF FIGURES AND TABLES.

	Page	
Table 3.1	Approximate utilization of nutrients by oats and potatoes.	64
Table 3.2	Depletion of fertilizer by disposal of animal products	66
Table 3.3	Yield of dry matter, nitrogen and phosphorus obtained from herbage over a complete year	67
Table 3.4	Manures and the cropping system in pre-Famine Ireland	70
Table 3.5	The costs of principal tillage operations	92
Table 3.6	Labour and horse requirements per Irish acre for oats and potatoes	92
Table 3.7	Cost of cultivation per statute acre of some crops	93
Table 3.8	Land division and utilization in pre-Famine Ireland	105
Table 4.1	Estimates of agricultural production on pre-Famine farms	157
Fig. 4.1	Prices of several agricultural products, 1831-54.	171
Table 4.2	Agricultural production 1845-47: some statistical relationships.	176
Fig. 4.2	Price of milch cattle	198
Fig. 4.3	Emigration overseas 1841-55	202
Table 4.3	Crop acreages in Bailieborough PLU, 1845-47	203

LIST OF FIGURES AND TABLES (Contd.)

	Page
Table 5.1 % utilization of workhouses, 1844-1846	225
Table 5.2 Aggregate workhouse statistics 1844-46	226
Table 5.3 Public works under 1 Vict.c.21	228
Fig. 5.1 Foodstuff prices 1844-54	233
Fig. 5.2 Aggregate relief statistics	Inset back cover

ABBREVIATIONS.

- AGRICULTURAL RETURNS Returns of agricultural produce in Ireland (annual from 1847).
- C.E. Cork Examiner.
- CONSOLODATED ANNUITY Report from the select committee of the House of Lords on the Treasury Minute, providing for the debts due from counties and unions in Ireland by the imposition of a consolodated annuity; PP1852, Vol 6.
- CORRESPONDENCE These references relate to the relief papers that were published by the government. The reference gives the dates they relate to, the series, Commissariat or BoW (Board of Works), and their volume number in the Parliamentary Papers. Thus, Correspondence, from July 1846 to January 1847, relating to the measures adopted for the relief of the distress in Ireland (Commissariat Series), is given as Correspondence, July 1846 to January 1847, (Commissariat), PP1847, Vol 51.
- DEVON Report from Her Majesty's commissioners of inquiry into the state of the law and practice in respect to the occupation of land in Ireland; also Minutes of Evidence, PP1845, Vols XIX-XXII.
- GENERAL VALUATION Report from the select committee on general valuation, &c. (Ireland); PP1868/69, Vol 9.
- JSSISI Journal of the Statistical and Social Inquiry Society of Ireland.

ABBREVIATIONS (Contd.)

n.a.	No author.
N.W.	Northern Whig.
POOR INQUIRY	First Report (and Appendices) from His Majesty's Commissioners for inquiring into the condition of the poorer classes in Ireland; PP1835, Vol 32; PP1836, Vol 30-34.
POOR LAW COMMISSIONERS ()	Annual reports of the commissioners for administering the laws for relief of the poor in Ireland. Figure in brackets refers to the specific annual report.
POOR LAWS	Reports from the select committee on poor Laws (Ireland) PP1849, Vol 15.
PP	Parliamentary Papers.
PROI	Public Record Office of Ireland.
RELIEF COMMISSIONERS ()	Reports of the Relief Commissioners. Figure in brackets refers to specific report.
THE GREAT FAMINE	The Great Famine: Studies in Irish History 1845-52, edited by R.D. Edwards and T.D. Williams, Dublin, 1956.
TV	Tipperary Vindicator.
1841 CENSUS	Report of the commissioners appointed to take the census of Ireland, for the year 1841; PP1843, Vol 24.

CHAPTER I.

INTRODUCTION

The records we have of the pre-Famine rural economy present a tapestry rich in social, economic and cultural diversity. However, this variety makes it extremely difficult to analyse the development of the economy as an integrated whole. Induction tends to flounder in a mass of information; the criteria of relevance seem indistinct.

Certainly some developments are clear enough. In the decades before the Famine Ireland experienced a remarkable growth in population, increasing for instance from under seven millions in 1821 to about eight and a quarter twenty years later.

The effects of this were pitifully evident on the western seaboard, from Donegal to Cork. The land was poor and the climate unkind driving men, after they had planted their crops to tramp to England or to the more fertile areas in Ireland in search of seasonal employment. Virtually anything was used that would increase the fertility of the soil, be it sea weed, sea sand, the dredgings of bog or simply the burning of the land.

The west serves as an extreme illustration of the dominant characteristics of the pre-Famine rural economy - the pressure of population, the dangerous ascendancy of the potato, the poverty of large sections of society, the fragmentation of holdings. But small as holdings were in the west they were often smaller again in the north-east. Yet here the dire poverty of the west was not reproduced. Instead it struck many travellers as the most progressive part of Ireland. Domestic industry flourished. Belfast and the Lagan valley were in the process of industrialization.

Fragmentation of holdings was not evident in large areas of the central plain. The district was renowned for the rearing and fattening of livestock, with large grass farms where the potato was not permitted. Squalor there was but it tended to be found much more in the villages.

The "pressure of population" was again pronounced in the south-west. Although it contained areas famous for dairying, tillage was also extensive. In fact it is doubtful whether dairying could be considered as distinct in general from tillage. Holdings tended to be larger here than in the west though they could be subtenanted.

In the above thumbnail sketch of pre-Famine Ireland we have divided the country into four rough regions. Naturally the concept of a region is vague and gives rise to problems in the border areas, such as the north central counties or the Wexford area. However, such problems arise because the defining features of a region, let us say population, the structure of agricultural production, soil fertility and the distribution of wealth, are not identical in every area within the region. Thus when we try to take account of change within the economy taken as a whole we find that diversity tends to defy generalisation.

Opposite induction we have the approach utilising the abstract model. We can generally derive a large number of results from relatively few premises. The drawback, which is often seen in general equilibrium theory, is the extreme generality of the results. While capable of great refinement, their relationship to the economic system they seek to explain is often tenuous.

The two basic approaches are married together in what we may term the "historical model".⁽¹⁾ The abstract model is developed under fairly strict assumptions, themselves generated by the induction process. However, the consequences of the assumptions in the behaviour of the abstract model often leads to particular emphasis being placed on certain areas of our evidence, which to begin with is not self evident. Thus by means of successive approximation we can reduce the model's generality and make it function as a framework on which the historical evidence may be presented.

In the following analysis of the rural economy during the Famine period, the above process is taken to some extreme. This is due to two factors. The evidence we have of the period is extremely uneven, which requires the framework it is presented on to be relatively refined. Secondly, we lack comprehensive statistics of agricultural production until 1847, forcing the mechanism of change to be elaborated abstractly before the detailed evidence can be assembled.

REFERENCES TO CHAPTER I.

- (1) This is the term used in Davidson, P., Money and the real world, London, 1978, P26.

CHAPTER II

A MODEL OF THE PEASANT ECONOMY

The very considerable geographic and historical diversity in types of peasant economy makes it essential to choose a particular aspect, a defining characteristic, on which to build a model. In the analysis developed below, we take this to be the absence of a capital market. Individual peasant households begin each production cycle with a specific allocation of resources. The value of this allocation acts as a budget constraint upon both the consumption and investment of the household in any period.

The presence of usurers in most peasant societies would seem to make the assumption of no capital market unrealistic. However, the solvent peasant rarely goes to a usurer to finance the expansion of his activities. The major reason for this is the generally very high rates of interest charged which means in turn that the anticipated return of the expansion has to be similarly high. Such opportunities are rare for the most part in a peasant economy.

The usurer, on the whole, deals with the peasant who is already facing great difficulty and who is desperate enough to attempt to meet the repayments. It is tempting to consider that capital scarcity is the reason for such high rates being demanded (though risk is a factor which has to be included - why is the applicant desperate in the first place?). Capital scarcity could also explain the absence, or highly imperfect functioning of a capital market. Whatever the reason, we consider the usurer's function to be peripheral and essentially parasitic.

Given an initial allocation of resources, the problem for the peasant household is to determine the relationship between present and future

consumption. For the decision to be rational, there must be some way by which the result of varying the amount invested can be evaluated. We assume that the production possibilities are evaluated at expected prices, taken to be a lagged function of the present price and past prices.

Present prices are in many ways the focal point of our enquiry. Their magnitude is a result of the aggregate of the decisions taken by every individual household. If a particular household decided to allocate more of its resources to immediate consumption then we would expect that this would slightly change relative prices as the demand for commodities used more intensively in production than in consumption would fall with a corresponding rise in demand for other commodities used predominantly in present consumption.

We assume that factors of production are allocated competitively. The method by which this is achieved is not of primary analytic interest, despite the supposition that landownership is the overpowering desire of every peasant. In the model, we assume that allocation occurs through a landlord system though a competitive land market is consistent with peasant proprietorship. In this case, the peasant would rent out any land if the return from so doing was greater than that which he could achieve if he cultivated it himself. Thus he merely acts as a landlord. The difference between the two systems is thus distributional.

With labour, competitive allocation can be assumed with little difficulty or violation of reality. No peasant will work on his own farm if he can get a consistently higher income by being a labourer.

This, of course, ignores the role of uncertainty and seasonal fluctuation in labour demand and assumes they can be readily evaluated.

Those factors which are used in production and whose life spans more than one cycle cannot be dealt with as easily as land and labour. We consider only one durable good, the cow. This simplifies the analysis without loss of generality as any number of such goods may be considered.

The analysis is further simplified if we assume that the peasant disposes of all his goods at the end of every cycle. This is clearly unrealistic as few peasants are eccentric enough to take a cow to market to buy it back again. However, it does mean that total potential supply is realized at the end of every cycle. The price of livestock will thus be determined by demand, which in turn is based on the peasant's decision between present and future consumption.

It is worth emphasizing that at any time t (where t is integer - the production cycle is assumed to be of unit time) there will be ambiguity concerning the number of livestock or any other goods on the farm. If we approach from the left along the time axis, the resources at t will be those on the farm at the end of the last cycle of production - they will be the outputs of the farm. Approaching from the right, the resources at t will be the inputs for the cycle immediately following t . There is thus a discontinuity at t . (In order to remove the possibility of any alteration in the plan during production we assume all inputs and consumption are utilised at the beginning of the cycle and output is produced at the end of the cycle.)

The problem for present prices is that they bridge the discontinuity at t . Only when present prices are determined will the value of the budget constraint be given. Previously the resource endowment was a collection of physical articles - cows, corn, potatoes, etc. The position of the peasant at time t is as follows: he has a group of commodities and an appreciation of the production function. If he is given a series of prices for commodities and factors two things will follow directly. Firstly, the budget constraint is given and secondly his price expectations for the coming period are formed. The optimum plan for production can be determined for future cycles (we assume that future prices are expected to be constant.)

The variation in future income as more of present income is invested, called here the profit function, is the basis on which the allocation between present and future income is made. The crucial decision for our analysis is the one between present consumption and investment in the cycle immediately following.

Once this decision is made we have a further budget constraint given, this time for investment. The optimum production plan can easily be formulated from this, the production function and expected prices. It must be remembered that the output from production and the price it realizes are both stochastic variables. In the first instance we assume that the peasant does not take account of this but takes the expected value of the variable and ignores variance and higher moments.

The allocation between present and future expected income, highlights an essential characteristic of the peasant household - it is simultaneously a producer and a consumer. The consumer role is

recognized by it discounting future income and thus ruling out the possibility of the household consistently investing a large proportion of each year's income so as to accumulate a large amount many years hence.

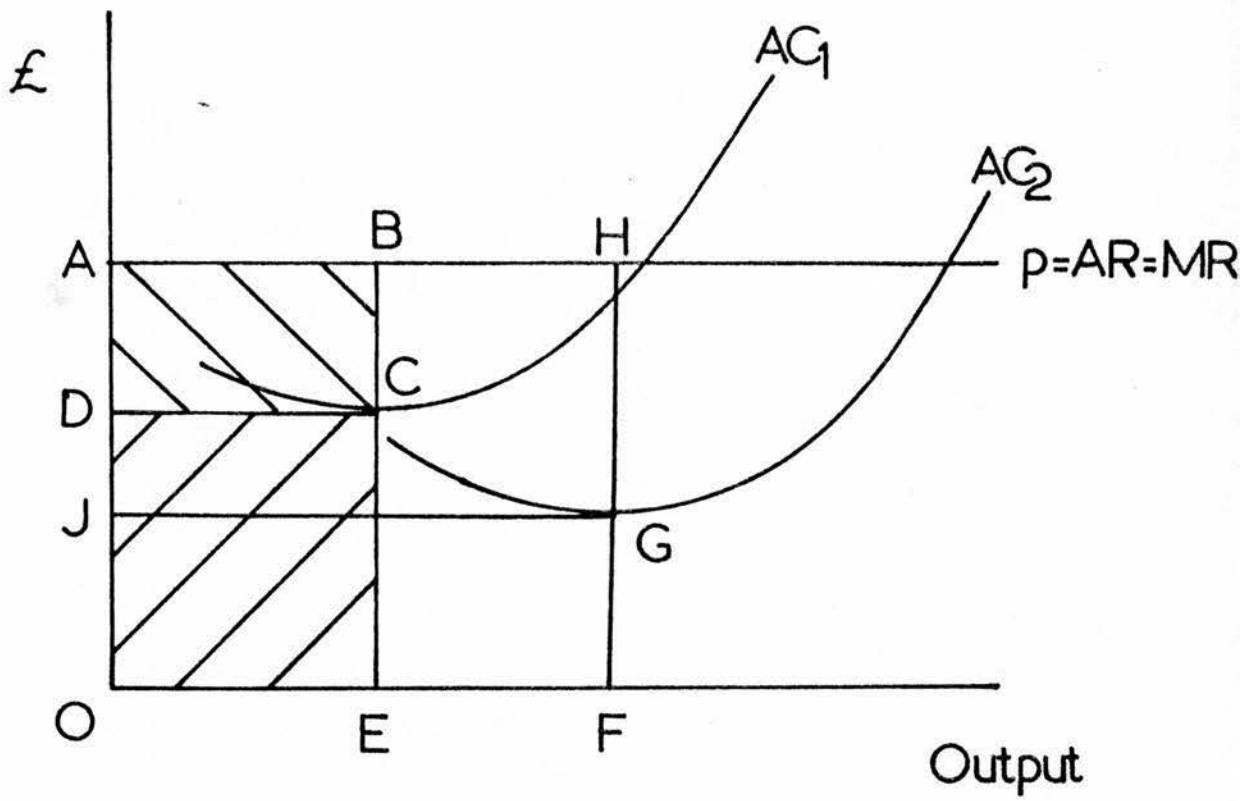
The process by which present prices are determined can be divided into three major steps. The first of these is the dynamic problem of choosing the optimum income stream over the planning period, for the individual peasant household. From this we have the budget constraint on investment in the coming year. Given this constraint, optimum production must be determined. In both of these steps, plans are formed on the basis of expected prices, which are taken as parameters. The final stage is to aggregate the peasant households to determine a set of prices which will leave the economic system in equilibrium. We deal with these stages in turn.

(1) The dynamic problem.

In this section we treat prices as parameters and thus the initial physical resources of the household can be converted into value terms. We assume that there is a continuous function, the profit function, which converts any quantity of present value into value at one year's hence. This function can be easily depicted using the standard model of the competitive firm along with some modifications.

The peasant's budget constraint is given by the total cost - the shaded rectangle DCEO when q_1 units of output is produced. However, the peasant does not choose to produce q_1 units. His choice relates to the quantity of income invested. Once he makes this decision he will seek to maximise profit. Since it is his total cost that is

Diagram 2.1

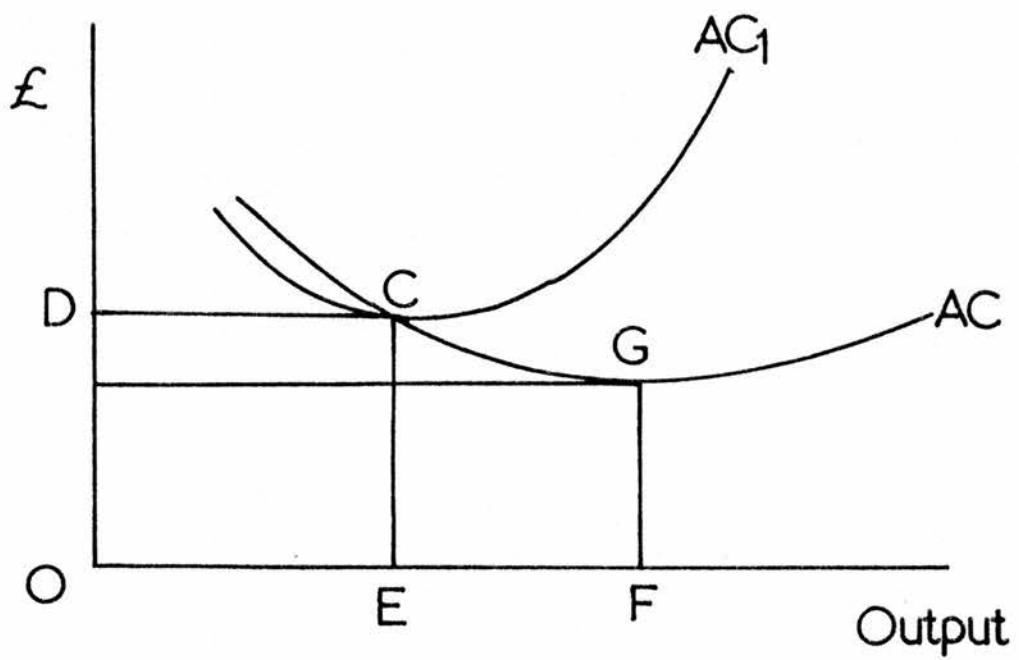


given, the peasant will vary DCEO until the north-east corner touches the lowest average cost curve possible, which in the diagram is AC_1 . If the peasant is at this position, the profit function will map total profit ABCD onto total cost DCEO. It should be noted that this operation involves a time lag of one year.

If the peasant's budget was increased to JGFO, this would allow him to reach AC_2 . At this point total profits will be larger, as would the rate of profit per unit output (as HG/GF is greater than BC/CE).

The locus of the minima of the AC curves is drawn in Diagram 2.2. As the peasant's budget constraint is eased he will move down the curve from C. The diagram illustrates the similarity of the peasant farm to the neoclassical model of the firm, where AC would be the long-run average cost curve. It also illustrates the contrasts. Peasants will not tend to move towards G as they would with the neoclassical firm. Peasants might move, over time, down from C and then back towards it, never reaching G. Their investment budgets are set over time by their long-term consumption plans. Let us assume the peasant at C to begin with can reach G after ten years by investing all his income. Thereafter let him consume at a rate which allows him to stay at G. This does not maximise his consumption since this will be zero for ten years. By this time the discount factor will be substantial and will almost certainly dominate any benefits of being technically more efficient. Thus the underlying rationale for the peasant farm and the neoclassical firm differ fundamentally.

Diagram 2.2



The discounting of future consumption may be considered as a subjective allowance by the peasant for uncertainty and risk. The further into the future the plan of production stretches, the more uncertain the actual outcome would be. We have taken the production plan to be based on constant expected prices. It is unlikely that any peasant would consider this to be the case. Even if some notion of a "normal" price existed, the large fluctuations experienced by the peasant in former years would mitigate against him expecting a long, smooth production plan.

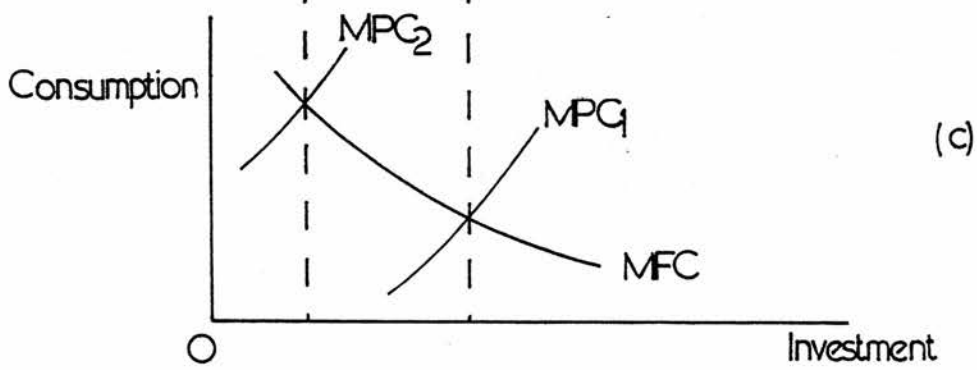
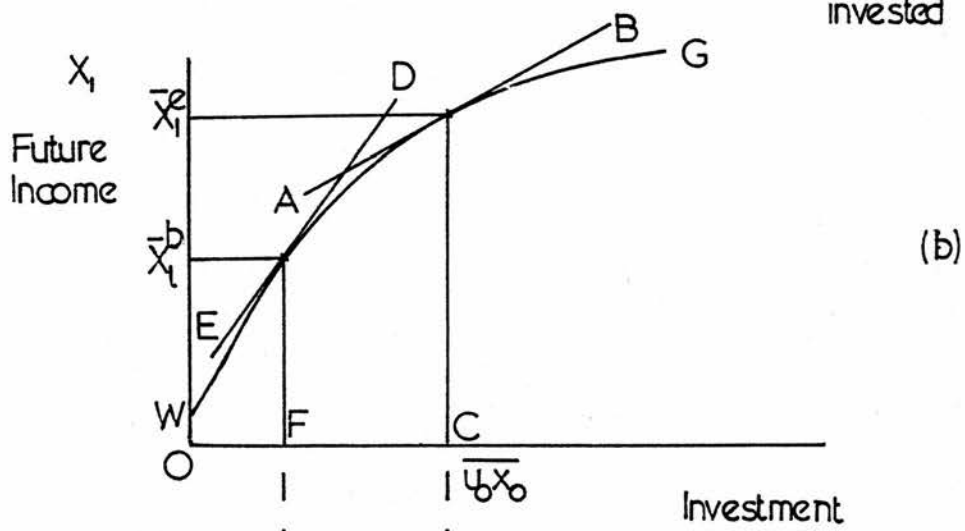
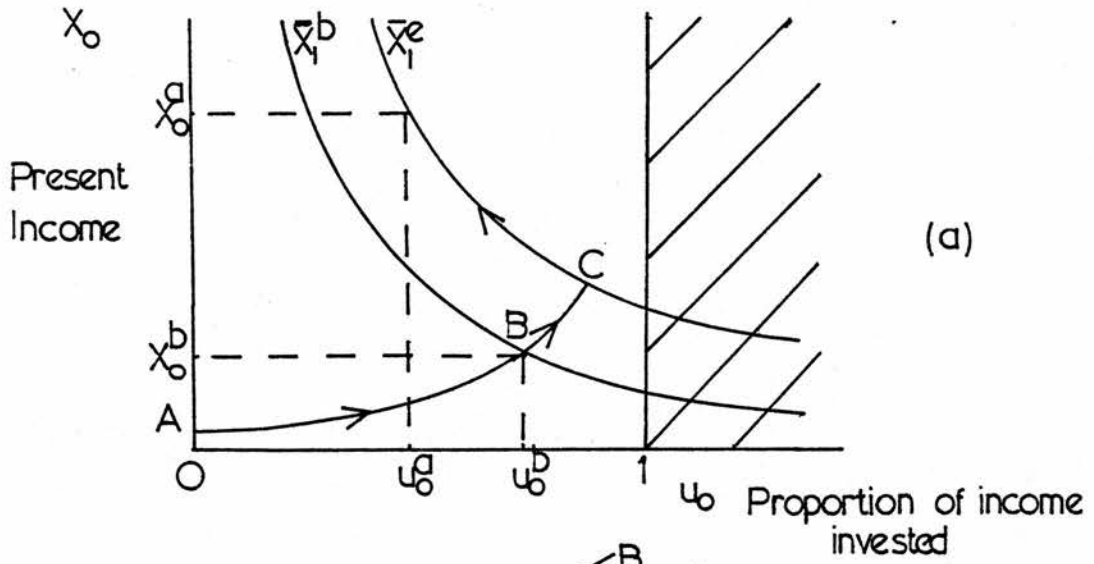
This, together with all the vicissitudes of weather and disease would tend to make the period of the production plan, T , quite small for a peasant economy, maybe only five or six years. What we require from the process is a rough measure of how the peasant divides between consumption and investment at the beginning of every cycle. This vagueness is caught by the discount factor. Thus we can successfully rationalise the removal of potential divergence in the model.

In order to maximise discounted consumption the peasant should set what we might call the marginal product of investment, the increase in income one year's hence due to a small increase in the amount of investment, equal to the discount factor.* This is demonstrated diagrammatically below. The optimum investment decision is shown in diagram (b) by the slope of the line AB which is equal to the discount factor. This line is tangential to the profit function, WG .

We may note two points: the profit function does not go through the origin. If the peasant invests nothing of his current income, x_0 , his income one year hence will equal the wage accruing to one

* For a proof of this see Mathematical Appendix 1.

Diagram 23



household, as we assume the household's labour supply is totally inelastic to changes in the wage rate. Income from wages is depicted by OW. Next, the profit function as drawn exhibits continuously diminishing marginal productivity as this will give us a unique maximum, with investment equal to OC.

Under these assumptions, the condition for the maximisation of discounted consumption over time gives us a unique level of investment, $\overline{u_0 x_0}$ which in turn will give us a unique value for income one year hence, $\overline{x_1^e}$. Now let us consider diagram (a). The level of investment $\overline{u_0 x_0}$ can be achieved by the combination of u_0 and x_0 depicted by the locus of points labelled $\overline{x_1^e}$ which will be a rectangular hyperbola. Since we constrain u_0 to be not greater than unity, any combination of u_0 and x_0 in the shaded area of the diagram is inadmissible.

The particular values of u_0 and x_0 for any peasant will be given by the level of initial income, $\overline{x_0}$ which is given exogenously. This will give us the corresponding value of u_0 immediately. The case of x_0^a and u_0^a is given as an example. If the peasant's initial income is insufficient to reach $\overline{x_1^e}$ then the maximising condition changes. On our diagram, (b), this is depicted by a larger marginal product of investment. Since we have diminishing productivity, this is associated with a lower amount of investment. This level of investment gives us the locus $\overline{x_1^b}$ in (a) and the procedure can then be repeated.

We interpret the process in diagram (c). The curve labelled MFC represents the increase in future consumption, evaluated from the

present, associated with a small increase in investment (i.e. the marginal contribution of investment to total consumption.) This is downward sloping due to the assumption of diminishing productivity. But as investment increases, present consumption falls. The curves measure the marginal cost of any investment to present consumption. They are drawn for different levels of initial income. As the investment budget approaches initial income, the marginal cost to present consumption tends to infinity. Thus at equilibrium the marginal cost of sacrificing present income for investment equals its future return.

The conclusion to our analysis of the operation of the peasant farm brings us close to the contemporary theoretical approach to intertemporal production.⁽¹⁾ However, the rationale underlying it is fundamentally different, being based on different objectives and from this a different conception of technical efficiency. The peasant economy is, as we would expect, distinct from the neoclassical one.

The optimum production plan we have thus worked out would be carried through by the peasant if price expectations proved correct, though with the model of expectations we employ, this could never be the general case. At the end of each cycle, as the previous price expectations are proved incorrect, new ones are formed. A new plan for the future is constructed and the old one is discarded. Thus the process, though dynamic, is not continuous - plans are continually being remade.

We have thus determined the amount of income the peasant will invest in each period. Next we consider how this outlay is distributed

among the various inputs to the productive process.

(II) The static problem.

This is a familiar problem of economic theory, although we will cast it in a modified form. We have a multiproduct production function, $F(q,x,r) \leq 0$. q is a vector of physical outputs, which are produced at time $t+1$. The vector r of inputs covers exactly the same commodities as q , but relates to time t . Thus we could have used q_{t+1} and q_t as an alternative notation, but this becomes extremely cumbersome when the production function is differentiated twice.

The vector x consists of the factors of production, taken to be land and labour. There is no capital - instead we consider physical inputs. To demonstrate this let us consider an input, say a cow, whose potential life is greater than one production cycle. We would then have within q and r a pair of vectors, s_t and s_{t+1} , where each s_i , $i = 1, 2..A$ (where A is the maximum age of a cow) represents a cow aged i years. The production function in this case also represents the ageing process, except for s_1 which would depend on the aggregate number of mature cows on the farm and s_A , which animals would have died (though it is likely that the animals would have been disposed of before this). It is useful in any case to have cows specified by age as the relationship between calves and mature cattle in the dynamics of structural change is of economic interest.

The second modification we make to the model of the profit-maximising firm is the addition of a budget constraint. This is usually considered only in the case of the consumer because the production

function includes capital as an argument. The supply of capital is considered to be infinitely elastic at the market rate of interest and thus the firm can adopt the optimal production position as given by the production function and the prices of products and factors.

When the investment of the peasant is constrained, the optimal output vector will still be on the production surface. An increase in the budget will move it towards the optimal unconstrained position.

Ceteris parabus, a general increase in agricultural income should lead to some peasants achieving an unconstrained optimal position (the budget constraint is removed from the programming problem by a zero Lagrangian multiplier). However, this tendency will be countered by other peasants moving from optimal points towards higher ones. Thus the notion of economic efficiency in equilibrium is weakened.

Before we can consider the optimal production position in more detail we must note that output is evaluated at expected prices. The full consequences of this are evident when we come to comparative statics, because a change in any present price will also affect future expected prices. Because of this and the fact we are using a multiproduct production function with a budget constraint, we cannot comfortably employ a diagrammatic exposition except for the situation between two products or two factors. Since this is a familiar case, we have omitted them.

The static results can be summarised as follows:*

(i) Between any two outputs, q_j and q_i , we have, for $q_i \neq 0$

$$F_{q_j} / F_{q_i} = p_j^* / p_i^* \quad \text{where } F_{q_j} = \frac{\partial F}{\partial q_j} (q, x, r)$$

$i, j = 1, 2, \dots, n$ and p_j^* is the expected price of q_j .

* See Mathematical Appendix 2.

In equilibrium, the marginal rate of substitution between two outputs is equal to the ratio of their expected prices.

(ii) Between any two inputs and factors, r_k and x_h we have, for $x_h \neq 0$,

$$F_{r_k} / F_{x_h} = p_k / w_h \quad \text{where } w_h \text{ is wage of } x_h$$

$$h = 1, 2 ; \quad j = 1, 2, \dots, n$$

That is, the marginal rate of substitution between inputs is equal to the ratio of their prices.

(iii) Between an output, q_j , and an input r_i , for $r_i \neq 0$, we have

$$F_{q_j} / F_{r_i} = - P_j^* / P_i (1 + y_2^*)$$

where y_2^* is the Lagrangian multiplier on the budget constraint.

(y_2^* can be shown to be equal to the discount factor)*

The marginal rate of physical transformation between an input and an output is equal to minus the ratio between their prices, with the input price being weighted by the discount factor. This final result is clearly the most interesting. The effect of the budget constraint, when it operates, is to effectively increase the price of inputs relative to outputs and in this manner to reduce the output level. This would be analogous to an increase in the wage of a factor in the usual case of the profit-maximising firm.

Depending on what assumptions we make about the production function, the solution to the optimising problem will be unique or multiple. We would expect the latter to be the case in reality. Thus peasants with the same command over resources, could choose different production plans to achieve the same income. However, we would not

* See Mathematical Appendix 4.

expect that initial income would be distributed equally throughout peasants households. This, combined with multiple production optima for any particular income level, would lead us to anticipate a smooth, continuous distribution of any measure of household production, say holding size. This flows from a different conception of efficiency in the case of the peasant economy compared to the neoclassical theory of the firm. In the neoclassical case we would expect that firms would be bunched around certain technical optima as given by the production function.

We have presented in the above an abstract model of the behaviour of the peasant household. In order to get a more comprehensive grasp of the peasant economy we will have to move closer to reality. A good method of doing this is by the examination of our assumptions. The most obvious abstraction from reality we have made is the ignoring of the question of land quality. Although this can, in actual fact, be treated quite simply, the analysis of it does provide a major insight into the type of consideration we have neglected.

Land quality can be simply introduced to the model by, instead of having a single unit of land in the production function, dividing land into M different qualities. The vector of factors now includes x_{k_i} , the amount of land of quality i , where $i = 1, 2..M$. To each quality of land there will correspond a rent, w_{k_i} . Optimum production will occur when the marginal rate of substitution of two different types of land equals the ratio of their rents.

The theoretical optimum now will include up to M different qualities of land. This is very unrealistic for it is highly unlikely that

nature will obligingly provide these qualities in the right proportions in a compact locality. In fact, they will be distributed randomly in any area. To achieve the theoretical optimum would entail taking pieces of land from different parts of an area. This will incur a number of economic penalties.

First of all, and probably most important, there will be the transport costs involved in the production process. Livestock, men and materials would have to be moved between strips of land at various distances apart. Most peasant economies are characterised by high transport costs, especially for short distances. If the peasant undertook this himself he would tie up a sizeable proportion of his budget holding draught animals which would not, on the whole, be productively utilised.

In addition to the costs of transport, managerial tasks would be considerably increased with dispersed land due to the increased supervisory duties. With work being done on several sites, it would probably be necessary to delegate supervision which would entail increased costs, as would neglecting it, which would lead to lower productivity.

To establish the quality of land will entail information costs - even if this is only a peasant walking around an area having conversations with other farmers who were cultivating nearby land. Even when this information was secured, it is likely that the costs of actually renting a piece of land, whether a field or a complete farm, would tend to have quite a substantial fixed element in them (e.g. legal fees, the landlord's or his agent's time, surveying.)

Thus renting land in small parcels would result in a higher rent payment, there being economies of scale in letting.

For the reasons outlined above, the peasant is likely to compromise on the optimal mix of land qualities and settle instead for a reasonably compact land holding. But once we entertain the possibility of compromise like this, there is considerable room for indifference between bundles of land of varying qualities whose aggregate rental is constant. Also, peasants who face the same budget constraint may choose between many different ways of making up holdings, while aiming for the same income.

When aggregating the choices of all peasants, we must acknowledge that the discount factor for future income is subjective and will thus vary between peasants. It is likely that age and family wealth will be major determinants in the way that peasants discount future income. Such differences among peasants will give different values for the budget constraint, even if the initial physical resource position of the peasants is identical.

Perhaps we may develop this point. We have taken the position of the peasant at the beginning of a production cycle to be one where he has a particular allocation of physical commodities, the sale of which gives him his income which he divides between consumption and investment. Varying the discount factor will alter the balance between consumption and investment. Thus different discount factors between peasants who possess the same initial resource position will lead to different production plans.

However, differences in production plans between peasants with the same resource position could arise for reasons apart from the discount factor. It is highly unlikely that any two peasants would have exactly the same price expectations. In fact, it is likely that there would be considerable variation. With several areas of variation possible in the production plans of peasants with the same resource position, combined with considerable distribution of resources, we would expect considerable variation in the production decisions of peasants in the economy taken as a whole.

The initial resource allocation of the peasant has been a recurring theme in the analysis. This will be a consequence of production decisions taken in the previous cycle. In our treatment so far this has been presented in a determinist fashion as a matter of combining a set of inputs with a set of factors. At the end of the process a set of outputs emerges. This is, of course, a gross violation of reality.

Weather, pests and diseases all combine to make the output vector a random one, with the outcome for any one output having a fair degree of independence of the outcome for others (e.g. potatoes may benefit from a rainy growing season which could flatten the corn; cattle diseases will not affect crops). How does the peasant take account of this in his production plan?

The notion of the "average" or "normal" is probably crucial here, although it is extremely difficult to define the term. We assumed earlier that the peasant had an appreciation of the production function. Given that the peasant has no control whatever over

aspects of the environment such as weather, he could have the expectation of a certain yield from a particular level of input. This would be conditional upon the outcome of those random factors, such as weather, over which the peasant is powerless. With each particular outcome there would be a separate yield expectation. But superimposed on this, the peasant knows that if he varies inputs, especially the labour intensity of the operation, then his expected yield, within the restrictions of the above qualifications, will also vary.

These considerations mitigate against using a weighted average of past yields as a measure of future expected yields. If the peasant experiences a very poor yield of a particular crop, let us say due to disease, there are several ways this could affect him. First of all, the onset of the disease, in a virulent form, would most likely affect the peasant's subjective appreciation of the probability distribution of the random disease factor. Thus for the following year it would be considered more likely for the disease to break out again. The outcome in this interpretation would be the same as in the case where we considered a weighted average of past yields as a measure of expected yield. The poor crop, being in the most immediate past would be weighted most heavily and this would pull down the expected yield. The result would be a reduction in acreage.

However, it is also likely that the peasant would change his appreciation of the production function. His reaction to this would be to reduce the level of input to the crop. This will in itself tend to reduce the level of yield. This type of reaction is not caught by weighting past yields which can only operate on the basis

of constant input levels. If the peasant's reaction to a poor yield was to reduce input levels then the reduced expectations would most likely not even be reached. This could set off further reductions in inputs until none of the crop was planted.

Once yields vary with respect to the input level as well as random factors we are unable to use a weighted average of past experience as a proxy for expected yields. This closes a possible way out of the dilemma. If we could have a satisfactory measure of expected yields then we could have a production function with the output vector random but with known mean and variance. The peasant's reaction to risk could be taken as a function of the variance of the output concerned and covariance with other outputs. The peasant could be considered as taking an efficient portfolio with various combinations of risk and expected return.

Even if this was resolved there would be a further difficulty concerning price expectations for expectations of yield and price could not be taken as independent, unless the commodity concerned had an international market for which the peasant economy we are dealing with was an insignificant producer. While this would be acceptable for some commodities, most peasant economies have a domestically produced crop, like rice, maize or potatoes, which constitutes the principal foodstuff consumed.

A poor yield for one year in the food crop would lower the expected yield in the following year. The price increase, consequent on the crop failure, we would expect to be substantial. Thus we would have contrary movements in expectations. Yields would be moving downwards

and prices upward. Depending on their relative magnitudes, a rational result of a crop failure would be increased planting.

Undoubtedly the problem could be resolved mathematically. The question would be whether the result would be worth the effort. As the analysis stands the results are a simply body of rules within which even the comparative statics can be handled easily. To bring in the dimension of probability, while making the system more realistic in one respect, makes it considerably more abstract in another. Instead we shall use the simpler device of catching only price expectatidns and letting the production function shift between years in the situation where a particularly severe drop in yield occurs.

The above discussion is relevant to the question of the initial allocation of resources within the peasant economy. This allocation was the consequence of the previous production cycle. However, with the output vector random, there will be differences in the resources between peasants who had identical production plans as yields are never identical. Thus the distribution of resources within the peasant economy would be constantly changing. Peasants would change the scale of their operations every year depending on how chance favoured them. The picture of the peasant economy this gives is of a high dynamic order.

This contradicts the picture of the peasant economy (at least in the popular imagination) generally held which is characterised as static with highly imperfect markets. To begin with peasant economies tend to be much more dynamic than the caricature. Markets, though, are

generally imperfect. This does not render our analysis invalid or superfluous. Instead the analysis can explain the existence of market imperfections.

Let us consider the position of an individual peasant in a perfectly competitive situation. Prices have been determined and so has the production plan. Let us assume the peasant has been fortunate in the year's harvest and seeks to increase production and thus wants more land of better quality.

He would have, at least, to go around his locality and select the various holdings or potential amalgamation of fields that would be suitable. Even if the general level of rents had been determined in some manner each potential holding would require negotiations with its landlord or landlords. The peasant would be bidding against other peasants, not just for the holding he hopes for, but also for other potential holdings of which it forms some part.

Now let us look at the situation from the landlord's (or his agent's) position. He has received a number of bids for the estate overall, though these would constitute many different forms of land division. Let us assume that a compromise can be arranged at by which the agent maximises rent. We ignore for the moment the time and effort expended in this prolonged process.

This in itself would not be an end of the agent's problem. Potential tenants would be, to some degree investigated to find out their background and character to determine the likelihood of them being able to meet their rent obligations. On this basis, peasants would

be ranked with regard to the rent they offered on the one hand, and the agent's assessment of their ability to pay on the other. As we see, each consideration appears to add a new dimension to the problem.

Let us assume a solution is arrived at. Next the estate agent would have to draw up an agreement with the successful bidder. This would involve legal and surveying charges. In addition to this, the annual restructuring of holdings would probably entail some modifications - to fences, gates etc. The amount of time and effort (and thus cost) incurred in the perfectly competitive situation is thus considerable. Moreover it does not end even here. The letting is for a year in general, as resources will change due to random factors. The soil, however, contains nutrients which have to be continually replaced. No tenant would be motivated to put into the soil any more nutrients that he could anticipate removing. In fact, any depletion in soil nutrient level would constitute a gain for the tenant. Without checks, the soil could rapidly become exhausted.

One possible check would be for the letting agreement to include some manuring provision. The problem then becomes one of supervision - making sure that the manure is not composed half of soil, that it is applied evenly. The landlord's agent could himself undertake the manuring process. Either way, further costs are involved and it is likely that the optimum according to the perfect market may not be the profit maximising solution due to the neglect of other costs.

There are many alternatives open to the parties concerned. A lease will give both parties some security. The tenant realises that a

shortfall one year will not lead him into searching for a new holding for the next year, since such arrears are usually tolerated. The tenant can make improvements and get some benefit from them. The landlord can rely on the tenant's self interest to maintain the holding in reasonable condition.

The tenant would still appear to have some advantage in depleting the soil in the last few years of the lease. In this situation the landlord would not renew the lease and would instead put the new lease up for bidding. It would be necessary for each bidder to be vetted. This would be avoided if the existing tenant was continued, provided he had proved satisfactory. (This would be seen in the manner he kept the holding and paid his rent).

If the tenant was not satisfactory in this sense, he could be legally ejected. This would incur costs, both legal and also the loss in rent while the case was being decided. To avoid these costs and the uncertainty among other tenants that ejections can cause, it would be easier to let the lease run out and not to renew it. Such a tenant would seek another holding, but any inquiry into his background would reveal him to be a bad risk. Any agent dealing with him would demand a premium on the rent to take account of this. Thus there are strong grounds for self-interest to urge reasonable behaviour upon both landlord and tenant. Such a regime would operate provided there was no major change in the economic environment which would give either party cause to break an agreement.

Similar considerations operate with an annual tenancy. The landlord could change tenant every year but this would involve the same type

of costs as discussed with respect to a lease. It would be in the landlord's interest to let the holding to a reliable tenant at a rent below the immediate market one, in order to ensure a stable rent payment and also the holding being maintained at a reasonable standard and not depleted.

Thus there are economic forces which work against the land market being perfect and it is these forces, rather than any intrinsic psychological quality of peasants which lead to markets being imperfect. The same will apply to the labour market. The more tried the labourer, the more his qualities and abilities are known and the less likely will his employer dispense with him for an unknown alternative, even if he is slightly cheaper.

We have thus examined two major facets of the peasant economy. Profit maximisation over time, combined with the vagaries which time brings, will give a strong dynamic element to the economy. Imperfect markets will provide a brake to this. Within a stable environment the economy would appear fairly static. However, a crisis would provide the type of impulse which could allow rapid adjustment to a new situation.

We now turn to the comparative static aspects of our results. We wish to analyse the change in the peasants production plan due to a small change in one of the parameters. Since we consider the peasant to begin the cycle with an allocation of commodities, his nominal income will rise with the increase in price of the commodity concerned, let us say r_j . The investment budget is a function of his real income and will also be affected. The direction of the change will depend on the extent the peasant produces and consumes r_j . If he consumes

more than he produces then his real income will fall. If he is close to subsistence this will probably lead to a decrease in the investment budget. This effect we will term the Budget Effect.*

Because the production function has a time lag within itself there are two substitution effects - the Output and Input Substitution Effects. Since r_j is an input, its increase in price will encourage substitution against it, except in the case where an input is complementary with r_j .

According to our simple expectations model, a rise in the price of r_j will affect the anticipated price of q_j . This will involve a change in the output mix, almost certainly favouring q_j . The new output mix will change the pattern of inputs used might increase or decrease the demand for r_j , depending on how intensely r_j was used in the production of itself. The sign of the Output Substitution Effect is indeterminate.

The role of expectations is an important one. If the peasant considered that the price of q_j would rise by a greater proportion than r_j then he might conceivably further reduce present consumption in order to enjoy increased income in the next period. The level of real income of the peasant will be the deciding factor. If he was well above subsistence he might be encouraged to increase the output of q_j even if this entailed the increased use of r_j .

We earlier assumed, to ease the technical complexity, that this did not occur. This assumption does, however, have a perfectly acceptable economic interpretation. As real income increases, maintaining present consumption is regarded as more important than possible

* For a rigorous development see Mathematical Appendix 2.

increases in future income. The latter would contain an element of risk in any case. We may regard this as a wealth effect which is primarily concerned with present consumption and is averse to risk.

We would expect in general then that the investment budget to be reduced in the face of an increase in the price of an input. What effect will this have on the demand for r_j ? This will depend on the production function. If the result was an increase we could call r_j an inferior input, one used more intensively at the lower end of the production scale.

Thus the overall result of an increase in the price of r_j is a balance of three effects. Since we cannot make any definite judgement about the signs of each of these effects we are not able to make any general comment about the change in demand for r_j . The answer will be determined by the production process and the income level of the peasant. The division, though, into three separate effects does provide a useful framework for analysis of the situation.

There are several aspects of the static case which are worthwhile examining in some more detail. The first is when the optimal labour input is less than one unit. The precise unit in this case is deliberately vague. It will usually be the labour input of one household. This naturally begs a whole series of questions concerning age and sex composition. Presumably children would find employment on the domestic holding since their chances of becoming wage-earners would be small.

Bearing in mind these reservations, a labour input of less than one unit to the farm merely means that the labour left over will seek utilisation in the market. In the programming problem this becomes a negative input. If this is larger than domestically employed labour then the net result is added to the budget constraint.

It is worth emphasising that the profits earned by the farm are in addition to the earnings of the labour done by the household on the holding or elsewhere, which is accredited with the going wage. The going wage we assume to be sufficient to maintain the life of the household.* (The period of employment is taken to be a complete cycle). This means there is a floor to the wage level which cannot be broken though this does not mean that the rural economy ensures life to all its members. It is quite possible that competition could lead to the labour market being cleared by a wage rate which would not allow the reproduction of the household over the cycle. If the economy is in such a situation then what we are saying is that the wage rate is fixed above this.

The result of this is that the labour market is not cleared and there would be excess supply. If there were no welfare provisions in the economy, those unemployed would use up whatever resources they possessed and then would face starvation. Thus the fixing of the wage rate at the physical subsistence minimum gives life to those who manage to obtain a job but death to those who are unemployed. The alternative would be the gradual starvation of all those who were wage-earners.

* See section below on hours.

This would provide a great incentive to all those who could undertake production to do so, as it would ensure, at the very least, an outlet for their labour in the situation of there being unemployment. So even if there were no profits being earned from production there would still be a strong motivation to engage in it up to the level of the household concerned being fully employed. This we would imagine to be at a fairly small scale of production.

The reason for going into this is that in the standard general equilibrium case, profits are extinguished. If this was so in the peasant economy then there would only be small farmers. Such a conclusion is far too extreme. Analogous to the inclusion of entrepreneurial profit in the fixed cost for the neoclassical theory of the firm we would expect that profit would be proportional to, say, the rent payment.

However, the proportion may not be constant. If landlords considered small peasant holdings to be more likely to default on their rent than larger ones then the proportion of profits allocated to them would be smaller than for the richer peasants. As we have seen above, it is precisely the smaller peasants who would have the greatest incentive still to produce, as it would ensure an outlet for their labour in the event of there being unemployment in the rural economy.

We have previously mentioned the existence of fixed costs in the letting of land. It is possible that this would lead to a minimum amount of land being required for the peasant to let for it being worth the landlord's while. This would be easily taken care of in the model. All that it would mean will be that the nonnegativity

restraints on the land factor would be replaced by a positive constant.

In the rural economy this would lead to those peasants who possessed some income from the previous cycle, but not sufficient to take on the minimum holding, would be frustrated from engaging in production. By providing an outlet for their labour, production is still attractive. One method of circumventing the minimum holding rule would be to acquire land on an annual basis from an existing tenant, provided there were no restrictions placed on this by the landlord.

While there exists an incentive for the subtenant in this situation, what would be the gain for the tenant? There are a number of possibilities here. Firstly, the tenant could insist on a premium above the landlord's rent and thus receive pure rent himself. However, it could be that the land would benefit technically from the planting of a crop which was difficult to sell, either due to its bulk and high transport costs or to its price and yield fluctuation. If the subtenant agreed to plant this crop the rent premium might be reduced.

In the programming problem, we have left the budget constraint as an inequality. It might be considered that this was superfluous as it would be obvious that the constraint would be fulfilled, as indeed the optimal conditions suggest. However, although we have not considered money at all in our model, the presence of the inequality does in fact give us a reason for liquidity preference.

Profits are evaluated at anticipated prices and thus the possibility of making a loss on the undertaking cannot be ruled out. Holding money as an asset at least guarantees fixed nominal values. The absence of a capital market means there is no fixed nominal value financial asset which gives a return. The only alternative to production would be to hold cash. Instead of selecting between assets of varying return and risk as in the Markowitz-Tobin model, the peasant would choose between different production patterns of varying return and risk. Holding cash would be a method of making the production portfolio more efficient.

If this was the case, a major crisis in the rural economy could be cushioned to some extent. The poorer peasants would probably require all their resources in production - for some, to get by at all would require a good year. Peasants above this, however, might have some reserve to continue production even though they might be badly affected by the failure.

So far in our discussion about the peasant economy we have assumed that the household offers one unit of labour, split between the domestic holding or plot of land and the labour market. This is a simplification which considerably eases analysis but one which can also ignore some important features of life when the individual is receiving close to the nutritional physical minimum. To modify a saying of Napoleon - a peasant works on his stomach.

In seeking to define more closely what we mean by the physical minimum we have first to appreciate in a general sense the metabolism of the body. This can be divided into two categories - basal and super

metabolism. Basal metabolism is involuntary. It is the energy required to keep the body in a steady state when the individual is inactive. Even when sitting quietly, the bodily functions have to be maintained and this requires energy. Thus when we wish to look at the calorific requirements of an individual, basal metabolism enters as a constant.

In as much as we can control our actions, the calorific requirements of super metabolism are subject to individual control. Obviously the calories we require for work will depend on how strenuous it is. It has been calculated that for farm work, a 70-kilo man will need 450 calories per hour while for carpentry he will require at least 290.⁽²⁾ The total calorific requirement for an individual is thus dependent on the kind of work he does, for how long he does it and his weight. In addition, we must add his basal metabolism, which will vary with age and sex.

When he is an agent in the labour market, the individual is usually considered to maximise a utility function of consumption of commodities and leisure. To acquire commodities he must earn the requisite money. While the consumption of these commodities increases his utility, the time spent earning them reduces it. In equilibrium the utility of further consumption is balanced by the disutility of the effort in the additional work required to pay for the additional consumption. For any commodity, this will be achieved when the marginal rate of substitution of leisure, for the commodity concerned is equal to the ratio of the wage rate to the price of that commodity.*

* See Mathematical Appendix 3.

When a calorific requirement is added to the budget one, there are two constraints to be considered when the utility function is maximised. For developed countries, we would expect that the calorific constraint would not be fulfilled. However, this would not necessarily be the case in a peasant economy where often semi-starvation is the normal condition for at least part of the year.

We can simplify the analysis by considering one article of consumption, say q_i . This is reasonable as usually in a peasant economy there is a basic foodstuff which is distinguished by being cheap. Because the wage level is low, the foodstuff is in general use. We are now investigating the situation in which we approach the limit of how "low" can wages get.

There is no question of a man working for virtually nothing for any prolonged period. Again the reason is to be found in the body's metabolism. If the energy expended on work by the body is not met by the energy intake, the deficit is made up by the realisation of the potential energy stored in the body's cells as fat, protein and carbohydrate. There is an obvious limit to how long this could continue for.

The effects of calorific deficiency on the capacity to work were investigated in the U.S.A. during the Second World War, to prepare the liberation forces in Western Europe to deal with the famines which had occurred in some areas, notably the Western Netherlands, under Nazi occupation. The experiment consisted of giving a group of volunteers (they were conscientious objectors) an average daily intake of 1570 calories (roughly a pound of bread and a pint of milk⁽³⁾)

which included 50 gms. protein and 30 gms. fat.⁽⁴⁾

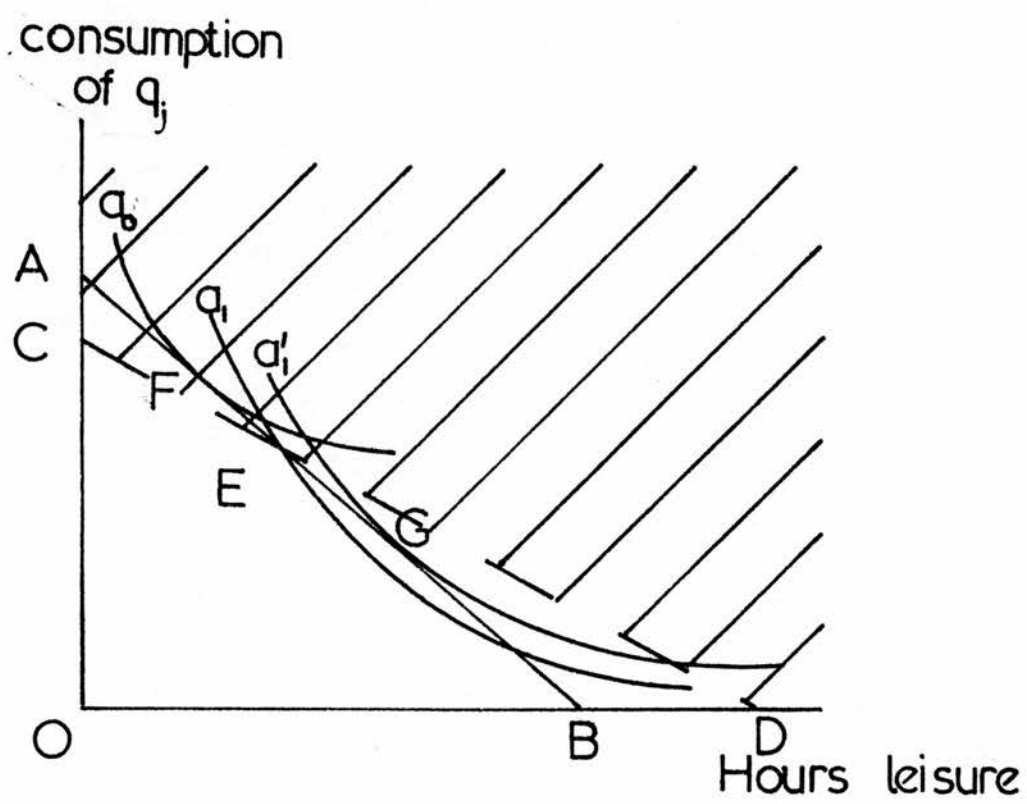
Work performance was studied in two situations, (i) aerobic (steady state) work which was maintained for a relatively long time, 30 minutes, and (ii) anerobic (short, exhausting) work of an intensity that could be maintained only for a few minutes. The deterioration in the capacity to perform severe physical work was extreme in the semi-starvation period and by the end of the first twelve weeks on the deficient diet, the average fitness score of the volunteers had decreased to 52% of the control value.⁽⁵⁾

At the end of 24 weeks, the average score was only 28% of the control value for maximal work.⁽⁶⁾ Recovery of strenuous work capacity was surprisingly slow - after 12 weeks of rehabilitation, the volunteers were still 50% below the fitness of the control.⁽⁷⁾

The short periods for which the work capacity experiments were carried out over make the decline in capacity all the more significant. If a labourer was to be hired for a day then he would be expected to work continuously for a period of hours. We would therefore expect that the labourer would rapidly be exhausted and physically incapable of strenuous work if he was on a calorifically deficient diet for any prolonged period. It would probably pay the employer to give the labourer a wage that would cover an adequate diet and thus one which could ensure prolonged strenuous work.

Although the labourer would perhaps be capable of a higher rate of work if he was given a better diet, there would be a trade-off for the employer between the physical capacity of the labourer and the wage that would have to be given.

Diagram 2.4

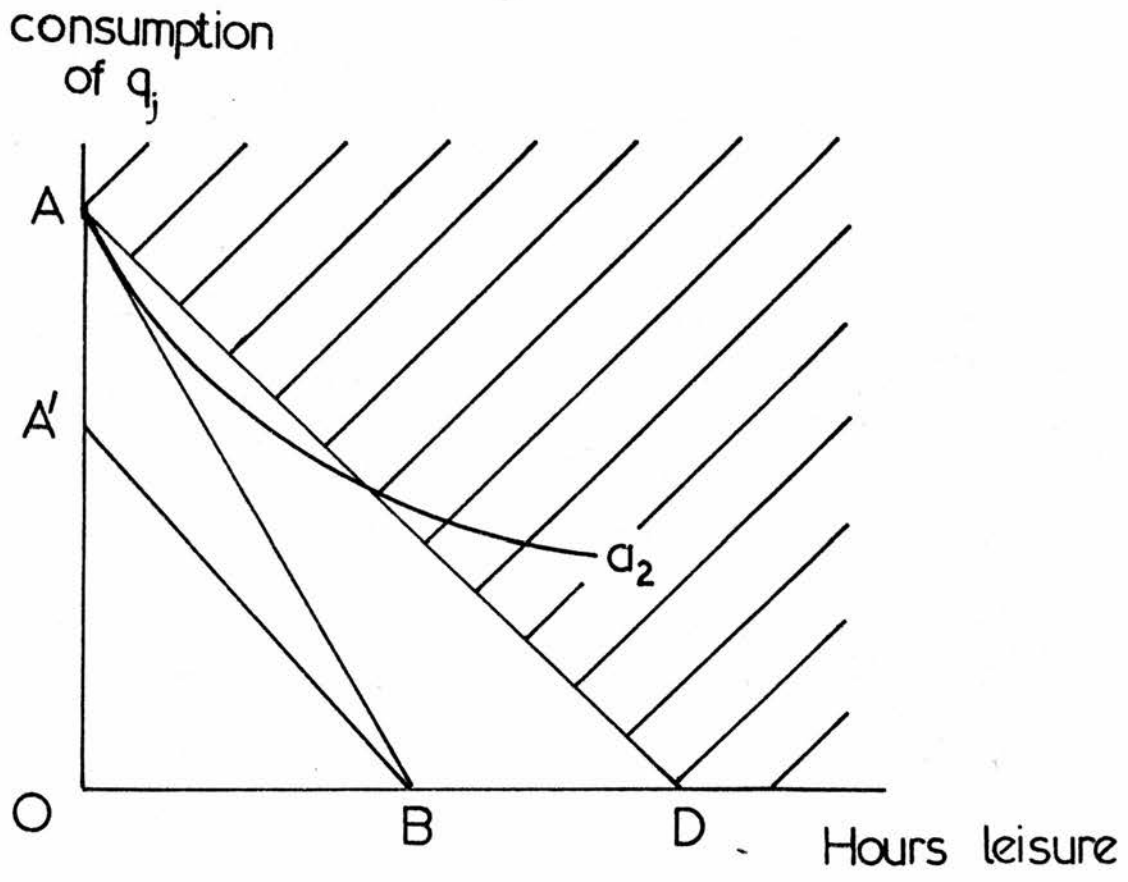


These results are incorporated in Diagrams 2.4 and 2.5, where we look at the labourer's choice between consumption of the basic foodstuff, q_i , and leisure. In Diagram 2.4, AB represents the budget constraint, given by the product of the hours of work of the labourer and the wage rate. The equilibrium point will lie on this for otherwise there would be some earnings unspent. Given a utility function which includes only consumption and leisure, such earnings would be of no value.

The line CD represents the calorific constraint - the equilibrium point must lie in the shaded area of the graph. If the individual's indifference curve was given by a_0 equilibrium would be at F and the calorific constraint would not operate. However, if the indifference curves were given by a_1 and a'_1 , the equilibrium point would be given by E since this is the highest indifference curve the individual can attain, satisfying both constraints since both operate in this region. If the calorific constraint did not operate, the solution would be at G, where the indifference curve is tangential to the budget constraint. The effect of the calorific constraint in this case has been to increase the hours worked.

Since OD is greater than OB, our interest will be centred on the situation as A moves towards C. The limit to this process is clearly when $OC = OA$ since C cannot be above A as then the labourer could not accord the prerequisite consumption of q_i at any combination of work and leisure. ($OC = OA$ when the ratio of the wage to the price of q_i equals $\frac{1}{c_i} (a/k+b)$ where c_i is the calorific coefficient of q_i , a and b are the basal and super metabolic rates respectively, and k is the total of available hours.) When $OC = OA$ there is obviously at corner solution to the problem at A.

Diagram 2.5



As the price of q_j increases, the effect is to swing the line AB towards the origin, turning on B. The equilibrium point E moves towards C, thus increasing the hours worked. The limit to this is the corner solution when E coincides with C. An increase in the price of q_j beyond this leads to a situation depicted in Diagram 2.5.

The budget line is now A'B, the calorific constraint AD. There is no point that can satisfy both. In this situation the employer is faced with the choice of increasing wages or dealing with an exhausted labourer with a falling productive capacity.

In dealing with the problem we have considered that the productive capacity of the individual remains constant. This was done for simplicity for otherwise we get into difficulties with the wage rate (it would have to be a piece rate) and the reaction of the employer to the situation. It is hoped that the basic principle illustrates the type of problem which could be present in a peasant economy and also sheds light on what we mean by a "subsistence" or "physical minimum" wage.

The main point in discussing the supply of labour hours in this detail is to consider possible changes in the wage rate. As we have noted above, an increase in the price of q_j moves the equilibrium point toward C. This places the individual on a lower indifference curve and thus he is worse off. However, if the price increase occurred at a corner solution, the wage rate must be increased if the capacity for work is maintained. This would leave the labourer on the same indifference curve, a_2 in Diagram 2.5, and thus he would consider his position unchanged.

The employer would be in the position of paying more for labour, in money terms. In real terms, the movement of labour costs will depend on the extent to which the price index used by the employing class is influenced by the price of the basic foodstuff. *Ceteris parabus*, and thus the only change to occur is the price of the basic foodstuff, then employers will be faced with paying out more for labour in terms of the prices of their products since the production of the basic foodstuff would only be one of a number of outputs whose prices, by assumption, are unchanged. This assumption is unrealistic as the increase in the price of the basic foodstuff would probably make other foodstuffs more attractive. The shift in demand towards these would increase their price, deflating the increase in labour costs to the extent that these foodstuffs are produced within the rural economy.

Thus if there was a catastrophic fall in the yield of the basic foodstuff which caused a sharp increase in its price, there would first be a movement along the calorific constraint until the corner solution was reached. If the standard of living in the rural economy was low such a movement would be fairly short. Thereafter, in order to maintain the capacity of the labourer for work, the money wage rate would rise. This inevitably leads to an increase in real labour costs. It would be impossible to call this situation an increase in real wages, though it is important to note that agricultural production will respond to the situation in the same way as if it was.

We have previously discussed the influence of land quality on the optimal size of holding. Now we wish to look at land quality from



the point of view of taxation. In our model we deal with the situation by dividing land into distinct qualities. The equilibrium condition is that the marginal rate of substitution between any two qualities equals the ratio of their rents. The approach is clearly not realistic since quality of land will tend to have a continuous distribution instead of the discrete one suggested. This could be included in the model by steadily increasing the number of divisions we make in quality. As the number tended to infinity the distribution would actually become continuous. For the case of a land tax based upon the productive capacity of the soil (taken to be a simple function of quality) such an approach is impractical.

Firstly, the costs involved in the very detailed examination of land quality would clearly be prohibitive. However, it is doubtful if it is even theoretically possible to provide more than a rough measure of land quality. It is likely that there would be much argument on how each component of quality was to be weighted and even on what constituted such a component. In an underdeveloped peasant economy it would be inevitable that any measure of land quality would be rough and ready. It should be noted that we usually include in land quality not only aspects of the soil but also geographic features such as average rainfall of the district and the expected variation in temperature.

These considerations would suggest that it is only realistic to deal with a relatively small number of quality graduations. The importance of this becomes clear when we look at the incidence of a land tax based broadly on land quality. The various qualities of soil will be suited to different cropping systems. Now the valuation

will, unless revised annually, be associated with a particular set of prices. These will change over time and thus some qualities of land will be relatively over charged, where the products they are most suited to have fallen in price, and other lands will be undercharged.

If the land market is competitive then the effect of such a price change would be felt only by the landlords, as the total rental would be distributed differently. (We have taken the supply of land to be infinitely inelastic - the landlord simply wishes to get the highest rent possible, no matter what its absolute level.) In this situation, any tax on land will not affect the tenant at all, as long as the level of tax is below the rent level. The only circumstances where a landlord would not let out his land would be if the tax level was above the rental. If we drop the assumption of perfect competition in the land market, then the effect of a price change on a fair valuation at one point in time would give windfalls, as gains or losses, to tenants. The reaction of landlords to such windfalls is indeterminate.

In every aspect of the peasant economy we have discussed so far, prices have been considered as parameters. With prices given, the physical resources of the peasant at the end of one cycle can be immediately valued and acts as a budget constraint to the sum of consumption plus investment for the next cycle. The allocation of resources between cycles was the dynamic problem which we examined first. The choice of the production plan was then considered under a number of different conditions. We now wish to look at how these decisions in aggregate determine the magnitude of the parameters.

(III) The aggregation problem.

The major difficulty with aggregation is the choice between reality and complexity. We have made the process fairly simple with the result that the assumptions we are using are very restrictive. The result is easily managed and this is the main justification of the approach. Before we deal with the restrictions we have to employ, it is worth emphasising that both the static and dynamic analysis presented above stand by themselves and do not require any of the results of aggregation.

The thrust of our restrictions is generally the imposition of homogeneity onto all agents in the production process.* Every peasant with the same initial resources will make exactly the same production decision. The discount function is now the same for all peasants; all peasants have the same expectations of yields and prices. We remove any differences in land quality so that there is no possibility of the peasant being indifferent between any two distinct holdings. Clearly what we are doing is to reverse the process of the previous section; we retreat from reality. We leave the problem in determinate form in order to have a manageable result.

We can now begin the aggregation process. Aggregation, in time, occurs between two cycles, so we start with the previous cycle. The result of this cycle is the conclusion of the constrained profit maximising function, the Lagrangian is an anticipated profit function and will not in general be accurate. Since prices are unknown, at the end of the cycle the peasant has just a collection of different commodities - cows, cereals, butter etc. The major difficulty is

* See Mathematical Appendix 4.

how do we aggregate a ton of cereals with a firkin of butter?

This is where the anticipated profit function comes in. We require that there is at least one input which increases in a strictly monotone way with anticipated profits. This could be provided by a durable good which is used in all forms of production. The most realistic contender would be livestock, let us say cows. (In this situation we would collapse the vector of cow ages into a single variable.) Then every anticipated profit level would be associated with a unique value of cows. This allows us to express the set of outputs as a function of cow outputs.

We now turn to the profit function. This expressed anticipated profits as a function of the value of investment. This must now be modified to include prices and wages as unknowns and also the initial resource allocation. Once prices and wages are determined then the value of the entire budget is given. With the determination of how much there is to be invested we revert to the old profit function with the exception that anticipated prices will now be different.

We have assumed that all goods are traded at the end of each cycle and thus supply will be the sum of, for each value of cow, the product of the number of peasants with a particular number of cows and the output of the commodity concerned, given as a function of the number of cows. This will give us the supply of all commodities. For labour we assume that every household offers one unit. For land we have a similarly fixed supply. Thus the supply side of aggregation is dealt with.

On the demand side we have two distinct components - demand for inputs and demand for consumption. For any particular commodity we will still use the number of cows as the variable which will determine initial resource allocation. Together with prices, wages and the decision variable u we will be able to determine the demand for any commodity used as an input.

For consumption demand we solve the utility maximising problem implicitly, as a function of consumption expenditure, prices, wages and initial resource allocation. As before, we know the number of peasants in every resource position and thus can determine total demand. For equilibrium we will have aggregate supply equal to aggregate demand, the sum of the input and consumption components. If a particular price is fixed, say by international trade, then the system of equations will give the excess supply or demand situation. This will also operate for labour or any other factor.

We have been discussing the profit function and the modified Lagrangian separately so far. Actually, when evaluated at the optimal solution, the two functions are identical. They are special cases of a more general function where all prices and quantities are allowed to vary. Thus for the profit function we allow prices to be parameters and solve the quantities implicitly from profits. In the case of the Lagrangian we treat prices as parameters but let quantities be determined, giving us anticipated profits. The two functions approach the optimum from different directions, but are identical at the optimum.

We have now examined three major aspects of the peasant economy - the dynamic and static problems of the individual peasant and the determination of the parameters which face the peasant. The treatment has been modelled on the comparative static approach of J.R. Hicks in "Value and Capital". The result is a workable system of analysis with which to study a peasant economy. To this we now proceed.

REFERENCES TO CHAPTER II.

- (1) e.g. Henderson, J.M. and Quandt, R.E., Microeconomic Theory, New York, 1971, P309-326.
- (2) Hawley, E.E. and Maurer-Mast, E.E., The Fundamentals of Nutrition, Baltimore, 1943, P47.
- (3) Using conversion table in Hawley, E.E., op.cit., P353.
- (4) Keys, A., Brožek, J., Henschel, A., Mickelsen, O. and Taylor, H.L., The Biology of Human Starvation, Minneapolis, 1950, Vol.I, P74.
- (5) *ibid.*, P723.
- (6) *ibid.*, P723-4.
- (7) *ibid.*, P727.

CHAPTER IIITHE PRE-FAMINE RURAL ECONOMY

"Half a century ago, no disease existed among the potatoes because they were negligently planted, scantily manured, and carelessly weeded. Population began to increase, and rents were raised A high state of cultivation was introduced, and strong concentrated manures invented or composed."

George M'Henry, M.D.

INTRODUCTION

If we consider, to begin with, the Poor Inquiry and the Devon Commission as sources of information about the pre-Famine rural economy, and neglect all other sources, the difficulties in ordering material become self-evident. Both commissions took evidence from all over Ireland and much of the questioning conformed to a certain pattern. The answers, however, do not. That a landlord, a farmer and a labourer would see things differently is to be expected. When, for example, farmers give contrary views, a number of responses are possible.

At the most basic level it would be possible to take a straight headcount of views expressed on a particular matter and to accept the verdict of the majority. We may note immediately though, that the material has already been processed to the extent that a particular aspect has been abstracted. The material is examined and becomes evidence for a hypothesis concerning the aspect we are investigating. Logically the hypothesis is prior to the evidence since the historical material only has existence as evidence relative to the hypothesis.

While this neat logical scheme should be evident in the exposition of completed research, it does not represent the research process. Rather we begin with a very vague hypothesis and, generally, a sea of material. Hypotheses develop, change, are rejected and gradually are refined. This process of refining often leads to a re-interpretation of the original material.

In the previous section we developed an abstract model of the peasant economy. This was developed specifically in interaction with the historical material concerning the pre-Famine era, although it is hoped that this does not lead to a loss of generality. The model's function was to provide a framework for analysis by directing the focus of enquiry. In itself, the model provides an hypothesis concerning the peasant economy. Its validity is measured in its ability to order the historical material.

This material gives us, as it were, a series of snapshots of the contemporary rural economy. If we pursue the analogy further, we can present the investigation process as one of determining the influence of the vantage point taken and the surrounding topology, on the resulting print. The background and prejudices of the observer may be likened to the type of camera used. We obviously would not expect a traveller's description of the rich grazing plains of Meath to be similar to another's account of the struggle for existence on the western seaboard. But an account of the pre-Famine economy cannot be merely an assembly of regional types. Its objective must be to explain them. The model provides a framework, a pointer to the type of factor which causes the rich diversity of the historical material.

Since our primary concern is the response of the rural economy to a profound shock, agricultural production is central, though not in any antiquarian sense. When we study agricultural technique or the influence of soil fertility on production, our interest is the degree of substitutability or complementarity between inputs, between outputs and between inputs and outputs. We have little evidence of

what was happening to agriculture in the crucial year 1846-7. Most of the comments come from people whose primary interest understandably was the relief of distress. We seek to bridge this gap by the qualitative evidence taken from the pre-Famine rural economy and our theoretical grasp of economic dynamics in a peasant economy.

We begin the analysis of agricultural production with a brief survey of basic soil nutrition. The purpose of this is to provide a framework with which we can appreciate the cropping systems employed in the rural economy. The production function is an extremely useful tool of analysis but given that we have insufficient data to estimate one for the pre-Famine period, we must be content with a qualitative treatment. The elements of soil nutrition provide an excellent foundation for this.

The major outputs of agriculture in our period were cereals, livestock and livestock products. The particular mix of these outputs for different types of farm is a central feature of our investigation. We deal with tillage, dairying and grazing in turn, working the material up to a general picture of the rural economy and investigating the internal production relationships. At the end of this section we outline a possible interpretation of Irish agricultural history from the end of the French wars to the Famine. This is included for a number of reasons. It reveals the dynamics of the peasant economy when not subject to extreme crisis. The analysis presented differs from contemporary academic opinion and it is thus apposite to examine the possible paths by which it was generated. Lastly, the process tends to highlight the salient

features of the pre-Famine economy. It is worth emphasising that the picture is very much one formed by looking back from the Famine years and thus is suggestive and is not definitive.

We highlight the functioning of two important markets, those for labour and land. They are treated in this order because of the role of the labourer's agreement with the farmer in the manuring pattern of production gives a natural transition from production.

Similarly the arrangement between labourers and farmers concerning plots of land gives continuity between labour and land.

In strict economic terms, the order of studying markets in general equilibrium is arbitrary. The order chosen, however, does mean that we study markets in order of decreasing flexibility. The commodity markets, integral in production, functioned almost perfectly. Land was the least so, with labour intermediate, probably subject to considerable customary pressure but by no means static.

Agricultural production in pre-Famine Ireland.

(i) The nutrient cycle.

Plant life does not require soil as such to survive. Given some physical support it will flourish in an aqueous solution of essential nutrients. There are a large number of elements which are necessary for plant life but for the purpose of this outline we consider only three - nitrogen (N), phosphorus (P) and potassium (K). Any crop sown will draw these nutrients from the soil. If the crop is then completely removed and the process repeated, the nutrient level will obviously be depleted.

Let us consider the results of some contemporary studies purely in order to highlight the nutrient cycle associated with several cropping systems. We first consider pure tillage, where the land is continuously cropped. Since the most common tillage crops in pre-Famine Ireland were oats and potatoes, their utilization of soil nutrients is given below.

Table 3.1

Approximate utilization of nutrients by oats and potatoes (1)

Plant	Yield/Acre	N(lbs)	P ₂ O ₅ (lbs)	K ₂ O(lbs)
Oats	grain 100 bushels	80	25	20
	straw	35	15	125
Potatoes	tubers 500 cwt	150	80	264
	vines	102	34	90

To achieve the yields indicated the soil is depleted of nutrients at the above rates. When one nutrient eventually becomes deficient in the soil even if other nutrients are adequate, then the growth of the crop would be proportional to the deficient element. Thus continuous cropping without further additions to the soil will result in declining yields. It is therefore clear that in order to achieve a static yield that continuous cropping will require additional application of fertilizer if it is to be productive.

Before looking at alternative cropping systems it is worth noting how the soil can naturally regain nutrients. We will consider only nitrogen as our purpose is purely demonstrative. The element nitrogen is the largest constituent of air but in this form it is

not utilized by plant life. Fixation of free nitrogen into salts is achieved through a number of channels. Bacteria, such as Rhizobia which live on the roots of legumes, and free-living soil micro-organisms fulfil this function. In addition there is atmospheric fixation through electrical discharge and also in rain. None of these ways, however, could support a productive continuous cropping system.

Before discussing possible modifications of continuous cropping it is instructive to look at the nutrient cycle in the diametrically opposed system, agriculturally speaking, of permanent grassland. When arable land is laid down to grass there is a gradual increase in soil nitrogen and organic matter. (Tillage, on the other hand, tends to produce greater aeration and this increases the rate of disappearance of soil organic matter.)

The consumption of grass by livestock inevitably leads to a loss of nutrients from the soil. The nutrient cycle is interrupted by the disposal of livestock products off the farm. The position is illustrated in Table 3.2 by the depletion rates of dairy and fattening respectively. The heavier depletion by dairying is clearly related to the greater disposal of products off farm.

The major difference between the pure livestock and the continuously cropping system is the natural return of soil nutrients via manure. It has been estimated, for instance, that $\frac{3}{4}$ of the nitrogen, $\frac{4}{5}$ of the phosphorus, $\frac{9}{10}$ of the potassium and $\frac{1}{2}$ the organic matter is recovered by the soil in voided excrement. However, because of losses by volatilization and leaching only $\frac{1}{3}$ - $\frac{1}{2}$ of

Table 3.2

Depletion of fertilizer by disposal of animal products.⁽²⁾

Class of product	Ammonium sulfate	Super phosphate	Potash	Carbonate of Lime
Milking cows producing 600 gallons of milk per acre and 275 lb butter fat	160	60	30	21
Cattle beast, 1,000 lb with one beast raised and fattened on farm	116	77	5.5	40

the value of the manure is actually realised in crop production.^{(3)*}

Thus, although the grazing system possesses a loop which returns nutrients to the soil which continuous cropping does not have, the loop, like most aspects of the nutrient cycle, has only a low efficiency. This must not detract from the importance of the return of animal manure to the soil, which is demonstrated in the following table.

* These losses also occur in crop production. Plant composition cannot be the sole criterion of fertilizer requirement - in addition to leaching, for instance, there is also the fixation in the soil of certain elements in a form which cannot be utilized by the plants concerned.

Table 3.3

Yield of dry matter, nitrogen and phosphorus obtained from herbage over a complete year.⁽⁴⁾

Experimental group	Dry matter	lbs/acre Nitrogen	Phosphorus
a) Grasses alone - no return of dung and urine	2,200	50	10
b) Grasses alone - full return of dung and urine	5,900	180	30
c) Grasses and clovers - no return of dung and urine	9,900	410	45
d) Grasses and clovers - full return of dung and urine	15,200	660	75

The full return of dung and urine, combined with the sowing of clover or some other legume, can thus lead to an increase in the grazing potential and thus the return of grassland. It is this aspect of grass culture which is utilised in ley farming. The depletion of soil nutrients by cropping are made good by a period under grass, during which time, with the return of manure and urine, the nutrient level of the soil is restored. The organic matter in the soil is built up by the presence of a sod crop which reduces aeration and this encourages nutrient retention.

This brief and simplified account of soil nutrient has been developed primarily to structure the historical material, which is very considerable and because of this often tends to swamp attempts at systematic analysis. The conclusions we come to are

straightforward, but none the less are of practical importance as concerning the direction of research and the type of question to be framed before the deluge of evidence.

First of all, when we look at the organisation of the peasant farm, the cropping system cannot be studied without reference to fertilizer application. The two are complementary and to generalise about either in abstract will lead to a serious loss of information. In several ways it is their interaction which is a crucial aspect of the pre-Famine rural economy. As we shall see, manuring practice had major repercussions on the mode of operation of the land and labour markets, as well as being essential in agricultural production.

Following from this point, details of how manures were collected or the feeding and housing of farm livestock, assume much more than antiquarian interest. An example of this is the utilisation of waste on farms. If the farm has a cow which for at least part of the year is grazed on waste through the day but is either housed or brought into the farmyard at night then there is a net addition to the nutrient cycle of the cropped area of the farm. Similarly if the cattle are fed for a part of the year on mountain waste then the butter produced by these cattle, even if it is not a particularly large quantity, does not deplete the cultivated area.

Lastly, there are many apparently irrelevant aspects of farm organisation which bear some inspection. For instance, from Table 3.1 we can see the importance of straw in the oat crop and the vines of potatoes in nutrient utilisation. If straw is used on farm and the vines included in a compost then the depletion rates

are significantly reduced. If grass is removed from ley as hay or silage and is disposed of off farm, the drain on soil nutrients is considerable, being two or three times that of a grain crop.⁽⁵⁾

The study of the nutrient cycle, even in a general fashion, gives an important insight into production. If in addition to this we examine the range of techniques of cultivation and livestock management, we build up the production function. Thus in no way is our approach tangential to the central economic enquiry. Rather, the material culture of rural society is the concrete expression of the economic forces the society is subject to.

(ii) Fertilizers and the cropping cycle.

In the following table we produce a breakdown of the evidence of 99 witnesses to the Devon Commission concerning manures and cropping. Since this represents less than a tenth of the total number of witnesses it is clear that a considerable amount of selection took place. This occurred due to two reasons. Although there seems to have been set questions on the mode of culture and manuring practice, the Commission would often pursue a particular aspect of a witness's answer and omit to go back and achieve a comprehensive questioning. Thus there are many witnesses whose evidence fails to mention either manuring or cropping. This means their contribution cannot be used in the array we have chosen, though naturally it is utilised when considering either aspect individually.

Next, the cropping systems were often described very vaguely and this led to a substantial proportion not being used. The most common feature was the witness not making clear whether the land

was rested after cropping or whether the system was continuous. Although the result of being fairly strict is a sharp reduction in sample size, the benefit is one of increased confidence in the results.

We examine below the classifications used in the table in some depth. Even so, it must be emphasised that, particularly in the case of the cropping system, a measure of interpretation in classifying witness's statements is required which is open to error, just as doubts may be raised about the system of classification itself. In defence of the process, it may be argued that it yields valuable results, it is based on a sample of almost one hundred witnesses drawn from throughout Ireland which for historical research is quite sizeable; the alternatives are generally literary evidence where the pitfalls of interpretation are usually considerably greater.

Table 3.4

Manures and the cropping system in pre-Famine Ireland.

(% mentioning)

Cropping system*	No. of Witnesses	Animal	Lime	Sea manure	Bog stuff	Burning	None
continuous p-c	21	44	19	56	31	25	0
continuous p-c-c	11	60	50	30	10	20	0
ley-p-c	13	80	50	30	0	20	10
ley-p-c-c	35	75	75	29	21	11	4
ley 3 crops	10	67	56	22	44	33	0
grasses in rotation	<u>9</u>	100	100	29	0	0	0
	99						

Source: The Devon Commission.

* p signifies potatoes, though references to turnips, which are few, are included; c stands for cereals, generally oats. Thus ley-p-c represents land in grass being broken up for potatoes, then followed by a crop of cereals, after which the land was laid down in grass, for more than one year. If less than one year the system was classified as 'grasses in rotation'.

Before offering any analysis of the table we first examine the classifications used, beginning with manures. By an extended treatment of this we gain a valuable insight into the physical side of production in the rural economy. The application of fertilizers in this period was of major economic importance - as Barrington puts it,

"There is a mass of information available to show that up to the middle of the nineteenth century all manures were collected and applied with a degree of industry and perseverance that appears almost incredible now." (6)

The time spent in this activity was considered better spent than entering the labour market and thus it is important to consider the rationale behind this.

The major types of manure have been discussed in order of the importance accorded to them by witnesses.

(a) Animal.

The most obvious source of animal manure would be the farm's own livestock, though the method of collection is important. Obviously if the animal was housed for part of the day or year then the problem solves itself. However, there could be major differences in the accommodation and feed given to cows. The cow-house⁽⁷⁾ of the dairy

farm would generate much more manure per animal than the byre of the labourer or small farmer. The dairy farmer, to begin with, would feed his cows much better. The poorer man was in a less comfortable position. Evans speaks of single-roomed kitchen byres where the family occupied the top or hearth-end and the cattle the other,⁽⁸⁾ and this could last until May.

Cows kept in such a manner were fed meagrely. The amount of straw consumed led a Roscommon farmer to permit labourers to pick some grass by his ditches in order to supplement their cow feed.⁽⁹⁾ Many small tenants sold their straw - indeed the Clothworkers estates in Derry felt obliged to include a provision in their leases forbidding this.⁽¹⁰⁾ Even if fed properly on hay or straw, Doyle believed the cow would still not yield much manure unless vegetable supplements were given.⁽¹¹⁾

If domestic sources proved inadequate then there were always the scrappings of the road. According to one Devon witness, who reinforces Barrington's view quoted at the beginning of this section, there was "a great look out for animal manure; and I know that children make a kind of livelihood by collecting the horse-droppings along the populous roads."⁽¹²⁾ Clearly in a society uncomfortably close to subsistence, any means of improving yields were seized - "Whilst the father works for wages, his family are occupied collecting manure round the country."⁽¹³⁾ In valuing the cost of grazing for a cow, one farmer deducted from the gross rent the "equivalent for manure" at 17s.⁽¹⁴⁾ Animal manure was thus carefully husbanded and was felt to be the best of the types of manure we consider.⁽¹⁵⁾

The other major source of animal manure in the pre-Famine period was town manure which, it was maintained, owed its power to the night soil it contained.⁽¹⁶⁾ It is unlikely, though, that any animal excrement was ignored in the pre-Famine period. Without widespread rural sanitation it is inevitable that human excrement was a constituent of farmyard manure.

Town manure was utilised wherever possible in Ireland.⁽¹⁷⁾ It provided another loop in the nutrient cycle, for only food actually exported from Ireland can be considered as an overall loss of soil nutrients. What did happen, however, was a redistribution of nutrients to the hinterlands of towns since high transport costs restricted the viable area of exploitation. The availability of town manure was considered an element in the agricultural improvement of a district. One witness from Dundalk thought the most improved agricultural district in the area lay near the town and the unimproved to lie outside this. The reasons he gave were that those near the town had "greater facilities for disposing of their produce, to their having manure more at hand," and only in third place, to "their having an improved system of agriculture."⁽¹⁸⁾

Thus we could expect that growing towns, through their generation of more manure, would make agriculture in their hinterlands more productive. Since the poorest areas of the country were the areas with least urbanisation we have here repeated a further example of a development spiral where success generates more success and failure leads to deeper dispondency.

(b) Lime.

This is not an intrinsic fertilizer but functions more by reducing the acidity of the soil and thus permits plants to utilise the soil nutrients more efficiently, as well as by reducing possible toxicity. Its application, therefore, was not universal but restricted to those areas where it was considered deficient. One witness noted that lime was very much used "where limestone least abounds; because where it does abound, the soil is not so much benefited by its application."⁽¹⁹⁾

This factor led to limestone being transported some distance, six or eight miles being common, which, given the difficulties and costs of transport, is not inconsiderable.⁽²⁰⁾

The importance of limestone may be gauged from several sources.

Weld, in his survey of Co. Roscommon noted that the best pasture land in the county lay within the limestone district.⁽²¹⁾ According to Kilroe in a significant article on Irish soils, the relative infertility of Tyrone compared to Cork, Waterford and other parts of the South-east was the lack of lime there, despite all being areas of old red sandstone.⁽²²⁾ Throughout the central plain and in Connaught, where limestone appears here and there in the low ground, the rock is covered with a rich scanty soil, well suited to store feeding.

According to a study of nineteenth century fertilizer use, liming was about the only positive contribution in the face of considerable depletion of soil nutrients. However, even they note that the quantities used were often excessive by contemporary standards and that this could have seriously impaired crop production.⁽²³⁾

One Devon witness noted that the practice of liming on Lord Hertford's estate had fallen off due to drainage being required to render the application beneficial. (24)

Alongside lime it is probably best to include marl as well, which is unconsolidated deposits of calcium carbonate. The application of marl seems to have been common around Enniscorthy. (25) As with most agents of soil benefit which were naturally occurring, we find the Irish peasant used them wherever it was economically viable.

(c) Sea-manure.

The sea provided a most important source of fertilizer, usually for those sections of society most in need of any help at all in gaining subsistence. This was so particularly on the western seaboard, but under no circumstances was a bounty of nature ignored. North of Belfast, "particularly after the blowing of some winds, there is a considerable quantity of sea-weed drawn from the Whiteabbey shore." (26) With settlement often around the shore, any sea-weed brought in by the tide was convenient for collection and utilization. (27)

Sea-weed was transported for considerable distances inland, with over 30 miles not being exceptional. (28) This was no doubt due to its relative ease of transport when compared to lime or animal manure. It could be dried and packed onto the side of a horse instead of requiring a cart. The trade was considerable - sea-manure worth £4. to £5,000 a year passed through the town of Ballina. According to Foster most of this was sea-weed. (29)

Sea-weed was considered a good manure for potatoes, although constant application, particularly in areas close to the shore, tended to reduce its effectiveness.⁽³⁰⁾ In one area in the west, sea-weed was only used because burning was prevented by the landlord and where bog-stuff was not available.⁽³¹⁾

In addition to sea-weed, sand was also used. Kane notes that 300,000 tons of sand were raised annually in the bay of Youghal.⁽³²⁾ Near Dunmanway sea-sand was considered to "fill" the corn better than lime.⁽³³⁾ Like sea-weed, the sand was transported inland but not for the same distance, probably due to the difficulty in transporting it.⁽³⁴⁾

(d) Bog-manure.

This is a rather vague classification and perhaps "earth-manure" might have been more appropriate. Essentially this mode of manuring amounted to the utilisation of soil from outside the cropping area. There were several possibilities. In some cases it was just a matter of using "mud from the bogs".⁽³⁵⁾ This required a holding to be within roughly three miles of the bog.⁽³⁶⁾ In another case it was raising the clay out of the slopes of drains.⁽³⁷⁾

The "scraping of mountains" for turf mould was common - in fact, between April 1843 and September 1844, Lord Lismore had 230 cases of trespass brought in an effort to stop this trade. The manure acquired was sold at 10d. per car-load.⁽³⁸⁾ Mostly this type of manure was used as part of a composite; the peasants would "scrape it all together", the manure from their pigs, "the scrapings of the road, and bog manure, and the surface of the mountains."⁽³⁹⁾

This opportunist approach to manuring was well brought out by another Devon witness. The poor people, he maintained, "go out into the farmers' places and procure wheaten and the oaten stubble: they have opposite their doors (and it is the only means they have of sustaining nature) a pool of putrid water, into which they throw these stubbles, and they get bog stuff by ass loads, when they can get 5d. or 6d., and throw it down into this place to make a manure."⁽⁴⁰⁾

The quality of the manure resulting from such a scheme was probably highly variable. In one area it was maintained that continuous use of bog stuff led to the soil becoming moory.⁽⁴¹⁾ Still, it provided a further avenue along which the chances of existence were improved, if only slightly, for the poorest section of rural society.

(e) Burning.

This system was the bane of the improvers. The skin was scraped off the old pasture or stubble field with a special instrument similar to the English breast plough. The sods were collected in heaps, allowed to dry and then mixed with turf and burned. The ashes were spread over the field and turned in with a spade or common wooden plough. Burning was not objected to in reclamation, especially where the land was covered with heath or furze. It was considered pernicious though on light shallow soils where sand or limestone was near the surface.⁽⁴²⁾

There would seem to be fairly strict limits to how the system could be used continuously without there being "little else ... left than sand or gravel."⁽⁴³⁾ It was claimed by one Devon witness that burning produced excellent crops of potatoes⁽⁴⁴⁾ but the main reason

for this system was given by another witness. from a mountainous area - "Burning prevails to a very great extent, and several of the small farmers have no other means of manure, and almost all occupiers burn more or less every year."⁽⁴⁵⁾ Without ready access to bog-stuff or sea-manure, too poor to have much livestock, there was little else they could do.

Although we have attempted to classify manures into their principal types, it should be evident from our treatment that generally farmyard manure consisted of anything at all that the farmer considered might possibly be nutritious to crops. The ingredients were dumped in a pit near the door where it "sours and enriches."⁽⁴⁶⁾ We can but agree with the witness who noted, "Manure is highly valued, and carefully husbanded, though not to the extent it deserves."⁽⁴⁷⁾ The last observation seems harsh given the evidence presented above. Two factors might possibly explain it. The first is ignorance, such as allowing the manure to be weakened by rain. Closely related to this though, would be the economic position of the peasant. The physically most efficient method of using and keeping manure (and no doubt agreement would be difficult to find on this topic) is not necessarily economically optimal. The peasant was often in a difficult position with regard to subsistence. Much of what he did was probably haphazard, but not irrational because of that. The chance of a day's wages labouring would be jumped at, and farm operations would just have to suffer.

Having looked at the manures of pre-Famine Ireland we now turn to the cropping system. Classification here is difficult. We have chosen a system that emphasizes the role of the nutrient cycle in

the cropping system, and through this the role of livestock. Naturally, we are entitled to use any perspective at all, as long as the evidence is not distorted by being twisted into particular categories. The point still remains that the classification system is just one of several and thus it is worth examining quite closely.

The major weakness of the system we deploy on Table 3.4 is the neglect of what we may call the level of technique concerned, particularly by what is meant by "ley". Ley is sown as part of a designed rotation of crops with the intention that it should be ploughed up again after a given number of years. The range of technique involved in ley farming may be gauged by a number of quotations from the Devon Commission. At the more advanced end of the scale we have the following account from a landlord of the Ardee area:

"The larger farmers, and those possessing some little knowledge, usually break up (it is part of their farming system) land which has been laid down with clover, either alone or with grass seeds. They occupy it for the purpose of grazing sheep or cattle for two or three years. They rarely go beyond the third, and the most needy do not keep it beyond the second year in grazing, it is then ploughed, and let for potatoes." (48)

At the other extreme we have the evidence of a Waterford auctioneer:

"The farms are in tillage principally, and of a system the most admirably calculated to reduce the land to the very maximum of sterility - a constant succession of white crops, first wheat, where the soil will give it, and then a crop or two of oats, then a sprinkling of dirty hay seed, and then the land let out to rest itself in a sort of pasture that Pharoah's lean kine would starve upon." (49)

This evidence is reinforced by a farmer from Galway, though he lacks the flair of the previous witness:

"those farms from eight acres to twenty acres are both tillage and grazing under, with some exceptions, a wretched impoverishing system of tillage of a part, and resting the remainder, by allowing a few starved sheep and cattle on it until it is considered again able to give, with a small quantity of manure, an indifferent crop of potatoes, and perhaps three or four miserable crops of oats in succession." (50)

The circumstances of the farmer seem to have been a major factor in determining whether clover or another green crop was sown. (51)

The state of stock generally on small holdings seems to have been poor - according to Skilling they consisted of, for holdings of 4 to 12 acres, "a wretched, half-starved horse, a worse fed cow, a pig, and, perchance, a goat." (52) This theme of poorly fed stock was a common observation, already heard from our previous quotations. In a letter to an agricultural magazine, one Meath farmer noted that "almost every farmer keeps more than he can feed well, every deficiency of crop, lateness of season, or rise in price, acts injuriously on him." (53)

It was probably a combination of poverty and proximity to a source of manure that led to the scheme of continuous cropping. On the small farms of Co.Louth, "they never think of having any grass." The land was poor and a large part of it "will not remain long in grass." (54) The likelihood is that even "Pharoah's lean kine" could not feed upon it. On the sea coast of Sligo, however, the availability of sea-manure led to the tenants, after manuring to "generally take one crop of potatoes, and then a crop of oats, and then manure again; so that the ground is not so much exhausted as it would be in other

places."⁽⁵⁵⁾ (This witness suggests that the taking of white crops in succession is the lowest form of agriculture altogether, undoubtedly associated with the poorest section of farmers.) Elsewhere town manure allowed continuous cropping to flourish.⁽⁵⁶⁾

The distinction between continuous cropping and ley farming is not very exact. It breaks down when we consider the system of infield and outfield. This was well described by Skilling:

"A very common course with our farmers is this; to cultivate a few pet fields convenient to the homestead, where the manure can easily be laid down, and the produce drawn in. These fields they call their good land; it is so, for it gets somewhat fair play. The outfields again are ploughed and sowed with grain crops while they will give any return, and until they are overrun with weeds, they are then allowed to rest, dirty, and poor; and this is the bad land, simply because it is badly managed."⁽⁵⁷⁾

Clearly this type of system is intermediate between ley and continuous cropping. Witnesses to the Devon Commission probably described the system which was dominant in their evidence on the prevailing mode of culture. If the infield provided the major proportion of the farm's tillage output then the system would be described as continuous cropping. However, this ambiguity does explain why nearly half of the references to continuous cropping could mention animal manure as a source of fertilizer, despite there being very little house-feeding in pre-Famine Ireland (although, of course, pigs and town manure would also be sources of animal manure.)

This also raises the question of the role of waste ground in the rural economy. In the Gweedore area of Donegal, there was a complex form of transhumance practised in order to ensure the adequate feeding

of livestock. The main base of the system was the shore dwellings clustered together on the edge of the infields. When these fields were under crops the livestock would be driven into the mountains for summer grazing and in the autumn they would be transferred to the islands.

Thus a farmer could have three dwellings. We can easily understand the opposition the tenants gave to Lord George Hill when he brought in Scottish graziers and expropriated their mountain grazing rights. The opposition to such "improvement" as this was rational, as is often the case when it is examined closely.⁽⁵⁸⁾

Although the presence of waste somewhat upsets our neat view of the nutrient cycle, it does not cripple it. Certainly in the Gweedore case, if a man had three dwellings, no matter how crude, then it is likely that the distances involved would make the systematic collection of manure unviable. Even in the case where the grazing was close by, the quality of it would be poor (or it would have been cultivated). The resulting manure would not be extensive, though if the cow was brought back to the homestead at night, it would contribute to the manuring of the infield. Other sources would be either road or mountain scrapings. The main point with regard to the presence of waste would be in the interpretation of holding size.

Perhaps a significant conclusion before we examine the processing of Devon witnesses on cropping is that what we have classified as "ley" farming is not a sign of agricultural improvement, as the quotations on "resting" the land indicate. An obvious point to be dealt with following this statement is whether or not the system of

classification is adequate. If we were in the position of perfect and complete knowledge, this criticism could be upheld. Since we are quite strictly limited by our information, our classification is inevitably loose.

Undoubtedly many agriculturalists would be concerned at the type of cropping systems we have classified as ley farming. This would stem from classifications for a different country or a different time. Ley farming, defined as the planting of grass with the intention of ploughing again in a certain number of years, certainly existed in Ireland. That it was an inelegant affair was a direct consequence of Ireland being an underdeveloped country.

The data, if we can accept that the processing of witnesses gives us a random sample of observations, indicates that potatoes followed by two cereal crops and then ley was the most common cropping system in pre-Famine Ireland. Continuous cropping of potatoes and a cereal crop came next. Comparing these two systems gives us an interesting contrast. The ley rotation, as we would expect, relies considerably more on animal manure than the continuous cropping case (75% of witnesses mentioned this in the first case compared to 44% in the second.) With the exception of lime, where use was dominated by ley farming (75% to 19%), the continuous cropping system demonstrates the emphasis placed on manure sources external to the farm. This was most dramatic in the case of sea-manure (56% to 29%) but present also in bog-stuff (31% to 21%).

It is likely that any potential manure that was readily available in the rural economy was seized upon. The larger farmers would

participate in this system by purchasing manure from the poor whose livelihood was partly based on the production of some description of manure. What Table 3.4 indicates is that, rather than the cropping system determining the particular manure, the causality was probably the reverse. If sea-manure, town-manure or bog-stuff was readily available then a continuous cropping system was possible and likely used.

Intermediate between the two systems we have discussed was ley with more than three crops taken. Here the use of bog-stuff was much more common than in the three course ley system (44% to 21%) and was even greater than the continuous cropping case (31%). Thus the application of bog-manure allowed more crops to be taken and again we have an external manure source permitting a greater intensity of cultivation. This cropping system also had the highest observation of burning (33%. The 25% figure of the continuous cropping system, if correct, is inexplicable. It is likely, however, that burning was mentioned as occurring generally, but not specifically in the continuous cropping system.) which, together with its high utilisation of bog-manure would suggest that this type of cropping system was most used in poor inland areas, near bogs, where burning was not likely to be as detrimental to the soil as the confirmed improvers thought.

The normal period for the land to remain in ley was 2-3 years and this was the reason for the inclusion of our last category, grasses in rotation. The distinguishing feature here was that, although grasses or legumes may be used for two periods in a five course rotation, they were split between cereal crops. Lime and animal manure were the dominant fertilizers (the only other one mentioned

was sea-manure.) The other point of interest was that seven of the nine witnesses concerned came from Ulster.

This could be interpreted in several ways. As regards the high lime use, a lot of the north-east is covered with brown earth type soil which benefits from lime application. Much of the central plain of Ireland, on the other hand, rests on limestone and thus its application would probably not be so effective.⁽⁵⁹⁾ As regards the more limited use of grass it could be that Ulster was not as suited to grass, comparatively speaking, to the rest of the country. The north-east does have a cooler climate, with spring arriving about three weeks later than in the south-west.⁽⁶⁰⁾ This was a point made by Bonn:

"Ulster, in fact, has a more severe climate than the rest of the country, but it also has much less fruitful pastures, which will not clothe themselves with grass, and on which man must do his part if he wants to ripen a harvest."⁽⁶¹⁾

If this was true then the shorter period in grass in the north could be easily explained - man was "doing his part" and the cropping system was a response to less fruitful natural endowments.

Perhaps the major conclusion to this section on the cropping system should be the extent to which sources of manure external to the farm, like bog-stuff and sea-weed, were utilised in the pre-Famine economy. The pressure to crop as much of the farm's land as possible was put down by a Donegal landlord to the fact that although in his area only 1/2 to 2/3 of the farm was kept in tillage, "the rent is calculated on the principle that the farmer should cultivate all the land fit for the plough."⁽⁶²⁾

The economic importance of the extensive use of fertilizers, natural as they may be, is straightforward. Whether or not the farmer concerned used his own labour or purchased the manure from someone who did, the manure gathering was very labour intensive. Across the whole of agriculture, it was an avenue by which labour could be increased relative to land or capital. In an economy characterised by a population surge with little industrialisation, it would appear to be a rational response.

Before leaving cropping systems it would be convenient to examine the system opposite to tillage - pure grassland. The development of permanent pastures in Meath, Westmeath, Longford and other areas following the reduction in tillage after the Famine has been called the "one bright spot" from the soil fertility aspect for the whole of the nineteenth century. (even though this was far below potential.)⁽⁶³⁾ However, this development dates from before the Famine, though naturally it was accelerated by it. According to Doyle, in Co.Meath, "it is not unusual for the owner of several hundred acres to keep them in perpetual pasture, and yet without degeneracy."⁽⁶⁴⁾ The presence of large grass farms, usually located on the best land, seems if anything to be the rule rather than the exception. The large grass farms were for "fattening and finishing cattle."⁽⁶⁵⁾ In the Tipperary district the grazing land was "always the best land Land a long time in grass is the best land; it is most run at, and is always in heart."⁽⁶⁶⁾

Very little seems to have been done on the good grazing land - "No lime, nor manure of any kind, is given to some of the principal grazing pastures in the county of Meath, except what arises from the

foddered cattle, and that only to fields exclusively appropriated to meadow. No tillage is permitted, not even for domestic purposes, oats (the land being too rich for corn) and potatoes are purchased; nor does the grass degenerate, nor is there any moss intermixed with it."⁽⁶⁷⁾

This development may have been associated with the use of clover. Kilroe, in his article on the soils of Ireland, talks of the finishing and fattening land as having "a thick sole of succulent grass interspersed with clovers"⁽⁶⁸⁾ although it would be unwise to rest the case on evidence of over a half a century later. Clover was not only mentioned by many Devon witnesses but also by those in the Poor Inquiry.⁽⁶⁹⁾ The only reliable statistics we have for the immediate pre-Famine period relate to the Bailieborough Poor Law Union. This gives just over 700 st. acres of clover compared to 19,809 oats, 11,492 potatoes, and 40,105 pasture. Of course this does not preclude the presence of clover in the pasture - what is interesting is that in the breakdown for Drumbannon townland over half the farms had a crop of clover, mostly of about one acre.⁽⁷⁰⁾ It is not unlikely that some clover was present on good grassland, though this might not have owed a lot to the efforts of the grazier.⁽⁷¹⁾

The winter feeding of cattle on grassland is of interest because, as previously noted, if a grass crop is removed from pasture land the nutrient drain is severe. The system adopted is well described by Caird and illustrates not only how the nutrient cycle was restored but also how little labour was involved in livestock

farming at the higher end of the scale:

"On the grazing farms, the method of providing the winter food seems to be this. Certain fields are shut up for hay. When it is made, it is built in very large round ricks, a pole being first fixed in the ground, round which as a centre the hay is built. The rick is then encircled with a paling, 12 feet or so distant from it all round. The paling is open below, so as to admit sheep but not cattle. The field is then shut up from stock, that there may be a good after-growth. At the fall of the season the sheep and young cattle are admitted to these fields. When the weather is severe, the sheep go through the paling and eat the hay, at the same time pulling out much more than they eat. The shepherd throws this over to the young cattle." (72)

Some aspects of agricultural technique.

a) Tillage

Our major interest in this matter is the possible substitution between the various factors of production. Because of this we have considerably simplified agricultural operations to four main headings - preparation, planting and shovelling, manuring and taking in. We deal with these in turn.

1) Preparation: The common wooden plough was a heavy, unwieldy instrument that did not penetrate the earth deeply. One man drove a team of 4-6 horses, another held the plough on the ground by pressing down on the beam and a third followed them to turn back the furrows. According to Donnelly,⁽⁷³⁾ one of the most important changes in the period 1815-45 was the replacement of the old Irish plough by the Scottish iron swing plough which broke up the subsoil and made possible the drilling of crops. On the other hand, Armstrong⁽⁷⁴⁾ maintains that the iron plough did not come into general use in the north-east until the decade of the 1850's.

Although there could have been marked regional differences, caution is generally the best policy when dealing with agricultural innovation.

According to *The Farmer's Guide*, ploughing the earth to 4" was considered light, 6" middling and 9" deep.⁽⁷⁵⁾ The land should have been ploughed once in October or November and then left undisturbed until spring when it would be ploughed and harrowed across the first furrows.⁽⁷⁶⁾ The ridges varied from 3½ to 10 feet with 2 feet furrows between them. The furrow was scraped, but not turned and provided earth for shovelling onto the ridges.⁽⁷⁷⁾ The variable width of the ridge was due mainly to the drainage qualities of the area (the ridges would follow the fall of the land and thus would provide natural drainage) and also the nature of the soil.

Spade husbandry had its defenders; Weld advocated it "for turning up a light soil where rocks abound, and the plough cannot be used," where "the long loy, in the hands of an able workman, is an implement at once powerful and efficacious."⁽⁷⁸⁾ In Erris, however, the amount of digging was reduced to taking eighteen inches off the high side of the ridge, and throwing it over to cover the seed.⁽⁷⁹⁾

2) Manuring: It is important when examining the cost structure of tillage operations to realise that the "manuring requirements of virtually every other crop grown in pre-Famine Ireland were provided for in the care given to the potato."⁽⁸⁰⁾ The potato was virtually universal as the first crop in a tillage rotation and thus the manure given to it was also utilised by successive crops.

Although the manure was usually spread in spring, in some cases, like in Co. Tyrone it was spread on the ground in winter (they used bog-stuff mixed with cow-house dung.)⁽⁸¹⁾

3) Planting/Shovelling: The potato was planted in two main forms:

(a) drill - when put in with the plough the drills were generally one yard from centre to centre. The manure was then spread evenly in the bottom of the drills and the seeds planted on top of the

manure 6"-10" apart. The drills were then reversed to cover them.⁽⁸²⁾

If the shovel was used then the ridges were wider, though the actual width varied considerably. On richer ground, such as good pasture land, no manure was used. The sets were spread on the grass of the ridges, about 5 feet wide, and covered with a spade from the furrows.⁽⁸³⁾

(b) lazy-bed: This system was described by Foster as follows;

"A piece of grass land being spread with manure, is marked out into four-foot broad beds, and a trench a foot wide and about a foot deep is dug out between the beds, the earth dug out being thrown over the manure on the surface of the grass and carefully spread over it, affording about three inches in thickness of loose soil on the bed. The trench dug serves the double purpose of a drain to the land, and affords loose soil to cover the potatoes."⁽⁸⁴⁾

As the seeds came up more earth was shovelled over them.⁽⁸⁵⁾

The preparation of lazy-beds was "communal teamwork, undertaken by groups of from 8 to 16 men who shared their labour under the system of voluntary co-operation which distinguished the village community."⁽⁸⁶⁾

Oats were the most common crop which followed the potato. Corn generally was sown broadcast and then covered with earth from the trenches. When ley was being broken up greater preparation was required - the clods were broken up and a strong thorn bush weighted

with stones was dragged over them.⁽⁸⁷⁾ The sods were levelled as much as possible - a system described by Doyle as being "unusually defective."⁽⁸⁸⁾

4) Taking in: The potato required to be lifted with a spade and then pitted, usually near the peasant's dwelling. Oats were generally harvested with the hook although the long-handled scythe was beginning to make its appearance.⁽⁸⁹⁾ Threshing was often done on the public road, as witnessed by Caird:

"They choose a dry smooth part of the public road for a threshing-floor, and winnow the corn by riddling it slowly in the breeze of wind. We drove over the top of several heaps of half-threshed corn in the middle of the road, the threshers suspending their labours till we passed."⁽⁹⁰⁾

If it was raining threshing would take place "between doors" in the barn or even the kitchen since there was a draught there which carried away the dust.⁽⁹¹⁾ Threshing could be mechanised though the cost was probably much too high for most farmers - 2 h.p. models advertised in the Northern Whig cost £25-30.⁽⁹²⁾

The relative costs of the tillage operations may be roughly gauged from Table 3.5. The information comes from three witnesses to the Devon Commission who provided detailed costs for tillage. The figures vary quite widely but even so give some useful indications.

Table 3.5

The costs of principal tillage operations, per Irish acre (£)

Source: The Devon Commission

	OATS			POTATOES		
	109	278	1024**	109	278	1024
Witness	109	278	1024**	109	278	1024
Ploughing/harrowing	1-5-0	-	1-10-0	3-5-0	-	2-5-0
Manure	-	-	-	7-0-0	1-12-5*	12-0-0
Planting/shovelling	-	1-5-11	7-0	1-15-0	1-13-9	2-1-0
Taking out	8-0	1-8-11+	1-18-0++	7-6	1-10-5	1-10-0+

* only labour considered

** wheat

+ includes carriage home

++ includes threshing

The greater cost of potato cultivation stands out very distinctly, which is consistent with Griffith's figures which appear in Table 3.7. However, some caution is required in the emphasis this is given. The greater degree of preparation for potatoes evident in our figures was probably due in part to the potato being the first crop taken after ley, and thus more by its position in the rotation rather than any intrinsic necessity, it required more soil preparation.

Table 3.6

Labour and horse requirements, per Irish acre for oats and potatoes⁽⁹³⁾
(£.)

	POTATOES	OATS
manual labour	3-17-0½*	2-6-1
horse days	42½**	11

* about ½ of these at beginning of year ** manuring 9 days.

Table 3.7

Cost of cultivation per statute acre of some crops⁽⁹⁴⁾

	£	s	d		£	s	d
potatoes	8	10	0	flax	7	8	0
wheat	3	9	0	meadow	1	9	6
oats	3	11	0	clover	2	0	0

The potato was a crop that "cleaned" the ground for cereal crops and this would account for the greater preparation given to the ground. Tillage in general was a means of getting an area in order⁽⁹⁵⁾ and this could exaggerate the labour input. Barrington notes that the slightly higher labour cost of potato cultivation in the period 1837-46 on his farm was due to the extra weeding required to get the farm in order.⁽⁹⁶⁾ Weeding the potato crop was probably done whenever times were slack for the cultivator. (Corn crops tended to be weeded between May and July, though mostly in June. It cost from 2/= to 8/= per acre.⁽⁹⁷⁾).

Since the potato was generally the only crop manured in the rotation, it is obviously important that this be netted out when comparing crops. Even when these factors are allowed for, the evidence of Tables 3.5 to 3.7 do indicate that the potato was a crop which required more effort in cultivation than cereals. The possible substitution between agents which provided that effort really boils down to the relative proportions used of manual and horse labour. Within this area, the possible substitution was between spade cultivation and ploughing. A rough comparison between the two systems can be made from evidence given to the Devon Commission. A ploughing team was considered to be able to manage

$\frac{1}{2}$ acre per day (let us assume 3 men and 4 horses). The same work using spade labour would require more than 8 men.⁽⁹⁸⁾ This must be taken as only a very rough measure between the two.

It is impossible to give a reliable estimate of the extent of spade husbandry. It would have been more common in poorer and less developed areas, where in some cases it would not have been feasible to use the plough in any case. In more developed areas it is likely that the opportunity cost of spade labour was too high for a small cultivator. The ploughing season represented a period of intense activity in the rural economy, where wages would be readily come by and thus the cost of spending a long time digging on the farm was much greater than would be the case in a slack season. Against this, main-crop potatoes were put in right up to the end of May, by which time the spring rush was almost over and so, by planting a bit late, the small peasant could get the best of both worlds.⁽⁹⁹⁾ Probably the observation of a Devon witness, concerning farmers of 5-6 acres, is the best summing up possible - sometimes the plough was used, sometimes the spade, "just as they can afford it."⁽¹⁰⁰⁾ (There was even the case of co-operation where the large farmer lent the small one a plough in the spring in exchange for workers in the harvest.⁽¹⁰¹⁾)

Apart from ploughing, the possibilities of substitution between horse and manual labour were not large. If drill husbandry was adopted then there would be no need for men to shovel earth. Potatoes could be put in with the plough and cereal crops scattered broadcast, with the land then being harrowed.⁽¹⁰²⁾ With taking out the crops there was the chance to use machinery in the case of

cereals, though threshing machines would probably only be viable for the large farmer. Technical improvement was possible, with the substitution of the scythe for the hook.

The principal form of substitution, however, was not between horse and manual labour but between both and land - this would be via the manuring rate. A fall in the manuring rate would require an increase in land to maintain a constant output. Although horses would be used for carriage (and Table 3.4 indicates how important this could be) the principal charge for manure would undoubtedly have been a labour one. Thus, overall, we may say in conclusion that although technique did allow substitution between factors it is unlikely that this would be very extensive. The main avenue by which substitution would occur would be through manuring rates.

One final point may be taken from Table 3.5 before we leave. Going by the expenditure figures, it would seem that springtime formed the major peak in the agricultural year. This assumes that ploughing was done almost entirely in the spring and that potatoes were an important item in rotational practice. Evidence for the first point comes from ploughing charges - 25/= to 30/= for one area in April, 15/= to 16/= in winter.⁽¹⁰³⁾ For the pre-Famine period, there is no objection to the second point. The reason for the second assumption is based on the fact that potatoes emphasise the peak in the earlier part of the year over harvest much more so than cereals. Although manure would have been collected all through the year, its application would tend to be in the spring as well. This tends to contradict the general belief that harvest time was the principal peak in the agricultural year. Perhaps the harvest

required greater urgency than ploughing or sowing due to the weather being required to be more tolerant.

b) Livestock

The principal divisions in livestock management were between rearing and fattening, and dairying and fattening. Since these divisions correspond to land utilisation we have adopted a different system of presentation to the previous section and have instead based it on farm type.

1) Grassland: The system adopted for good quality areas was well described by Doyle, referring to the Dublin area;

"A heavy stock is admitted (the hedge-row shelter being excellent) throughout the winter, until February, so as to eat the grass very close. In dairy-pastures, the milch cows are always housed at night in the severe winter months, but dry stock is left out until the middle of February, when they are taken off the land altogether, and the grass, even where the bottom is cold clay, soon springs up. When the stock is turned on it, fattening horned cattle are generally succeeded at intervals by store sheep, which are left long enough to eat bare what has been rejected by the others, and thus they improve the herbage; for, though if at unrestricted liberty to select their food, sheep, like other animals, will ramble over the whole range, to pick out the most palatable grasses, they will, when hunger compels, eat even the rank herbage which grows where the dung of their predecessors had fallen, and by their own frequent droppings fertilize more evenly the whole surface for the succeeding stock." (104)

The labour requirement for such a system was clearly very small.

As for the grazier himself, the responsibilities of agriculture were not taxing - as one said, "I only buy and sell stock." (105)

For this reason, Green labelled the grazier "a speculator in cattle rather than a farmer." (106)

Most cattle were fit for slaughter between 3 and 4 years, with the more improved breeds slightly earlier and the poorer later.⁽¹⁰⁷⁾ However, a grazier did not raise the cattle from breeding stock. Ireland exported both store and fat cattle and their production involved most farms at some stage of the operation. We are tracing the process back from the final product. For grassland farms the choice between the fat and the store trade was determined largely by the quality of the land.

Good land would be given over to fattening.⁽¹⁰⁸⁾ Two sets of cattle would be fattened a year and according to Doyle, they would be bought in a high condition at the Ballinasloe fair in October and were kept through the winter on foddered hay, though their only shelter would be the hedges. The "early bite" in the fields would have them fattened for June. A fresh stock would be purchased in May and sold off fat in December.⁽¹⁰⁹⁾ Griffith maintained that prime pastures would finish two sets of oxen between April and September, after which sheep were left to graze to December. From January to March the land was rested.⁽¹¹⁰⁾ There is no real contradiction in evidence here, but instead a further reminder of how the particular quality of the land and the climatic conditions can lead to modifications in any system.

Doyle mentions that graziers purchased stock in a forward condition at Ballinasloe. This stock would have been bought by other graziers as yearlings or two year olds in May and then kept until about 3½ years old to be sold at Ballinasloe.⁽¹¹¹⁾ The choice between rearing and fattening was well put by a Mullingar landlord; "As to rearing and fattening, that depends upon the quality of the

land: where it is of sufficient quality, it is so employed; if not, it is confined to rearing."⁽¹¹²⁾ This division would also occur on the same farm - one grazier put young cattle on the poorer land in his farm with the better being kept, as always, for fattening.⁽¹¹³⁾ The land was grazed at the highest rate that it could take without deterioration.

Naturally, the maximum grazing rate will fluctuate with the seasons, with the winter months being the poorest. Store cattle were generally not housed in winter but were given straw as a supplement to what grass there was.⁽¹¹⁴⁾ Most of the evidence concerning the winter feeding of cattle comes from the Poor Inquiry and unfortunately they do not distinguish all the time between milch, stores and fattening cattle so it is perhaps as well to deal with all types here rather than leaving milch cattle out until the next section.

Both milch cattle and those to be sold fat early in the season tended to be housed or given more shelter than stores. They used to be given potatoes and hay and also sometimes oats or turnips.⁽¹¹⁵⁾

In Kerry, "much of the oats now sown is given unthreshed to stock of all kinds in place of hay."⁽¹¹⁶⁾ However, potatoes were more common, in combination with hay or straw, as would be expected considering the extent of potato cultivation. In Waterford, milking beasts got the potatoes raw, while feeding cattle had them boiled.⁽¹¹⁷⁾

There was no particular cause to keep cattle at all in winter if the grass could not take them. One farm of 380 Irish acres observed by Caird kept 200 cattle (2-3 years old) in the summer with 600 sheep

of the same age as well. During the winter only the sheep were kept, 3 to 400 of them.⁽¹¹⁸⁾ The sheep were brought in in the autumn as either full-grown wethers or ewes. If the latter, the lambs were fattened and sold off the following spring when the ewes themselves were fattened.⁽¹¹⁹⁾

Sheep were also kept exclusively. The large sheep farmers kept a breeding stock and sold wethers fat at 2½ years. The ewes themselves would be sold off when they were no longer breeding or if their wool production was falling off.⁽¹²⁰⁾ (In the case of one Mayo grazier this could amount of 1/3 of the old ewes in the breeding stock being culled every year.⁽¹²¹⁾) Sheep were ready for market in anything between 1½ and 4 years. The earlier period was for improved stock, such as Leicester crosses. The latter ones were generally mountain sheep.⁽¹²²⁾

2) Tillage: It might appear somewhat sweeping to class milch cattle, horses and pigs altogether under the title of tillage but this, on the whole, is an accurate reflection of the pre-Famine rural economy. As one Devon witness observed, "There are very few dairy farms, though a great deal of butter is made. Every farmer keeps a certain number of cows, but not exclusively."⁽¹²³⁾

The polar opposites in the rural economy were fattening and tillage, where the marketed outputs of the latter could have been cereals, butter and pigs principally, with of course calves. As we move from fattening to tillage the ratio between these outputs would change, with cereals becoming more important and the age of cattle being disposed of falling.

(i) Milch cattle: A system for the valuation of livestock in the 1841 census was suggested by A.P. Kennedy in a letter he wrote to Larcom. The method contains some interesting speculations though he himself admitted that the data was "all very arbitrary and possibly may be very wide of the mark."⁽¹²⁴⁾ According to Kennedy, the average cow was kept until it was 10 years old, during which time it had about 6 calves.

From calf the value of the beast increased rapidly until, at 4 years old it was in its prime. Kennedy considered three classes of stock; into the lowest class he put half the cows in Ireland with the rest equally shared between the two higher classes. The value at prime of these animals was £5, £8 and £12 respectively. (This wide variation in price due to quality makes it extremely difficult to get any reliable price index for livestock.) If we take the lowest class, the animal depreciated at an annual rate of 5% after 4 years and went to slaughter at 10 years.

The calf was an important product of the milch cow even though about half of them were slaughtered after being dropped.⁽¹²⁵⁾ This compromise between milking qualities and calf bearing has been noted by Crotty⁽¹²⁶⁾ and was also made by a Galway witness to the Poor Inquiry. He had had a good milker but she "would not breed a calf half large enough for us, and therefore I did not keep her."⁽¹²⁷⁾

On the whole the milk was processed into butter. In the north the whole of the milk was prepared for, and churned to extract, butter, whereas in the south the farmer "set" the milk in vessels and churned cream only.⁽¹²⁸⁾ The principal production period was from

May to November, with the peak in June and July.⁽¹²⁹⁾ The residue from butter was fed to pigs.

Although there is considerable evidence on the butter production from cows, it is highly variable, undoubtedly reflecting the different classes of animal and also the amount of feed it received.⁽¹³⁰⁾ Labourers' cattle were often fed on the farms of their employers as part of the wage bargain. If there was waste nearby then this would be utilised. It was estimated that a cow would require 5-6 acres of mountain⁽¹³¹⁾ and it was in the mountain areas of the south-west where the purest form of dairying was practiced.⁽¹³²⁾

(ii) Pigs: Production here was intimately connected with the dairy, on whatever scale. Pigs were in fact the prime converters of most forms of agricultural waste from potatoes too small to eat to stubble.

Breeding sows were usually kept by the larger dairy farmers who sold off their bonhams at 10 weeks old. These sows usually had two litters of 10 piglets every year.⁽¹³³⁾ Irish pigs were rarely sent to Britain as stores but were almost always finished in Ireland. At the beginning of the century this took about 2 years, but by the middle this had been reduced to 15 months,⁽¹³⁴⁾ when they weighed about 2 cwt. The process of fattening involved feeding corn for over two months and this almost doubled the value of the pig.⁽¹³⁵⁾

(iii) Horses: Kennedy valued horses in the same fashion as cattle. They were reckoned to have a working life of 20 years, reaching a

peak value at 5 years at which time the lowest class was worth £7. Thereafter their value would drop by 10/= every other year. The distribution between classes was the same as for cattle with the lowest class having half the population in it.

Horses generally were not much worked in the winter and summer⁽¹³⁶⁾ and were fed on grass from May to October, with hay during the rest of the year. In spring or any other time when they were worked hard they got oats or potatoes as a supplement to their diet,⁽¹³⁷⁾ depending on how well off the owners were. Potatoes usually were cooked as giving them raw was "often causing gripes, colic, and sudden death."⁽¹³⁸⁾

A common criticism of Irish horses was that they were weak and out of condition.⁽¹³⁹⁾ The reason for this was probably because they were undernourished, due to, in part, the fact that an adequate diet was expensive.⁽¹⁴⁰⁾ Flowing from this was the criticism that the Irish peasant misallocated his resources to the extent that his horseholding was too large. This neglects several factors. A horse and cart could earn its owner 2/6 per day and was used particularly in drawing manure and turf.⁽¹⁴¹⁾ (It could shift a 20 cwt load, making 2 trips of about 5 miles per day.⁽¹⁴²⁾) Also, the horse tended to combine the roles of capital good and consumer durable. It provided transport services to a community where public transport was not highly developed. Like cars today, the satisfaction of ownership was considerable and equally, the high costs of operation were considered acceptable.

This general survey of livestock production does not give many indications of how substitution could be achieved between factors. Perhaps the only serious possibility was through Blacker's methods. This centred around the stall-feeding of livestock with green crops which reduced the acreage of grass required on the farm.⁽¹⁴³⁾

This system substituted labour for land and was probably only suited to the small farms where Blacker experimented with it, as close management would be necessary. Stall-feeding was never used extensively in pre-Famine Ireland with animals only being housed in winter months.

Land Utilisation in Pre-Famine Ireland.

The central hypothesis we advance in this section is as follows: holdings on poorer soils tended to be small and labour intensive; those on the best land were large grazing farms with very little labour employed. The dairy farm of medium size, but with considerable tillage as well as, perhaps, some stock rearing was in an intermediate position. Relative to land small farms used livestock intensively, by feeding livestock with crops other than grass and thus the ratio of stock to land area would be greatest on small holdings. The more intensive use of livestock required greater labour input.

This relationship between land utilisation, the size of holdings and the fertility of the soil was demonstrated by several observers:

"The parish (near Kinsale) consists of two very different kinds of land. The part that is best managed consists of pretty good land, and is chiefly occupied by dairy farms. Part is very poor and, there is no dairy kept on it; it is principally inhabited by small farmers."

Asked what was the general size of tillage farms in the area around Carlow, another Devon witness replied that they

"vary from five to thirty acres. The first class are chiefly in tillage, grain crops, and potatoes. Others from thirty to 150 acres tillage, corn, potatoes, and dairy stock. Third class, 150 to 500 acres tillage, rearing stock of cattle and sheep."

Around Mullingar rearing and fattening

"depends upon the quality of the land: where it is of sufficient quality, it is so employed; if not, it is confined to rearing." (144)

However, argument by quotation is inadequate. We thus attempt, in Table 3.8 to demonstrate our hypothesis statistically within the confines of the pre-Famine data. The first regression on Table 3.8 is in many ways the most important. We are examining how holding size varies with two indices - one of land quality and the other labour input. In the first case we have used the townland valuation* divided by the area of the poor law union concerned. Unfortunately we cannot abstract the land valuation from the total and thus urban areas would weight the statistics unduly. Some of the main towns appeared in the data and these were dropped. For labour input population was divided by area. This is unsatisfactory since it does not distinguish between agricultural and other employment. We are forced to use this data as more accurate statistics are not available.

Given these inaccuracies the equation fits the data reasonably well. The value of R^2 , 0.65, is low compared to the other regressions but the data can be held responsible for this. We see from the coefficients of the variables that holding size increased with the quality of land and falls as the labour input rises. This confirms

* See Appendix I

our central hypothesis.

Regressions 2 and 3 express cattle and sheep and cattle by themselves as a linear function of the townland valuation of land and rural population. The fit in both cases is quite good with the higher R^2 value for cattle and sheep indicating that their grazing represented alternative uses for similar land. Taken in conjunction with Regression I they suggest that cattle were used for intensively on small farms since the coefficient for population is positive. Thus as population increased, cattle numbers increased and average holding size fell.

Regression 4 confirms the link between pig numbers and potatoes. Also linked to potatoes are rural population and horse numbers. In the latter case if we take the potato acreage as a measure of tillage generally, we see that horses increase directly with tillage.

Table 3.8

Land division and utilisation in pre-Famine Ireland.

$$\begin{array}{l}
 1) \quad Y = \log (\text{holding size}) \quad X_1 = \log (\text{townland valuation/area}) \\
 \quad \quad \quad \quad \quad \quad \quad \quad X_2 = \log (1841 \text{ population/area}) \\
 Y = 0.958 + 0.437 X_1 - 1.337 X_2 \\
 \quad \quad (27.4) \quad (6.5) \quad \quad (12.1)
 \end{array}$$

(The figures in brackets under coefficients are the t-values.)

$$R^2 = 0.65 \quad \text{Anovar F test} = 79.0 \quad \text{Durbin-Watson} = 1.08$$

2) $Y = \text{cattle} + \frac{\text{sheep}}{6}$ $X_1 = \text{adjusted townland valuation}$

$X_2 = \text{rural population}$

$$Y = \begin{array}{ccccccc} 9981.9 & + & 0.098 X_1 & + & 0.158 X_2 \\ (1.8) & & (3.6) & & (4.8) \end{array}$$

$R^2 = 0.84$ Anovar F test = 74.2 Durbin-Watson = 2.40

3) $Y = \text{cattle}$

$$Y = \begin{array}{ccccccc} 13,651.8 & + & 0.060 X_1 & + & 0.134 X_2 \\ (2.9) & & (2.6) & & (4.7) \end{array}$$

$R^2 = 0.79$ Anovar F test = 56.0 Durbin-Watson = 2.39

4) $Y = \text{pigs}$

$X_1 = 1845 \text{ potato acreage}$

$$Y = \begin{array}{ccccccc} 8,869.8 & + & 0.426 X_1 \\ (2.2) & & (11.0) \end{array}$$

$R^2 = 0.80$ Anovar F test = 120.2 Durbin-Watson = 1.67

5) $Y = 1845 \text{ potato acreage}$ $X_1 = \text{rural population}$

$$Y = \begin{array}{ccccccc} -3,2,261.8 & + & 0.511 X_1 \\ (3.2) & & (12.5) \end{array}$$

$R^2 = 0.84$ Anovar F test = 155.9 Durbin-Watson = 1.99

6) $Y = 1845 \text{ potato acreage}$ $X_1 = \text{horses and mules}$

$$Y = \begin{array}{ccccccc} -21,180.1 & + & 5.780 X_1 \\ (2.2) & & (12.1) \end{array}$$

$R^2 = 0.83$ Anovar F test = 145.8 Durbin-Watson = 1.68

Statistical Sources:

holding size; Devon, P.P.1845, Vol.XXII, P280-283

livestock; 1841 Census, P454-5

valuation data; townland valuation on a poor law union basis is given in Poor Laws, P.P.1849, Vol.XV, Part I, P30-32. Unfortunately this includes both land and buildings. Land and buildings can be separated for the townland valuation on a county basis by using the land and building valuations by poor law union contained in Returns "as respects those Unions in Ireland which extend into two or more counties....", P.P.1872, Vol.LI, and General Valuation, P.P.1868-69, Vol.IX, Appendix I, Unions are then aggregated to counties. Only land valuation is taken, giving 'adjusted townland valuation.'

potato acreage; Bourke, P.M.A., "The extent of the potato crop in Ireland at the time of the Famine", JSSISI, Vol.XIX, 1959, P8

population; on a county basis is given in 1841 Census, P434-5; for poor law union, Agricultural Returns, P.P.1847-48, Vol.57, P89 (also gives area)

It is of interest, when considering land utilisation, to examine the question of the improvement of waste land which often was of contemporary inquiry. Griffith calculated that there were 1.4 million acres improvable for cultivation in Ireland and 2.3 million improvable for pasture.⁽¹⁴⁵⁾ However, this land capable of cultivation represents 3.8% of Leinster at one extreme and 9.8% at the other for Connaught. How did this exist alongside great population pressure and a desperate urge to occupy land?

Before trying to answer this question, it is illuminating to study the situation in the marginal agricultural lands. Gweedore provides a good example as Lord George Hill documented his attempts at improvement (or at least his version of them). When he first arrived he noted that rents were "very small - almost nominal, and there was no regularity as to collecting them: trifling sums were taken at farms."⁽¹⁴⁶⁾ While it is obvious that poor land should command a relatively low rent, this point is easily missed, probably because any rent appears harsh. The purely physical difficulty in collecting rents in desolate areas of the west should not be underestimated - the small battles that the Inland Revenue had with poteen distillers should serve as a measure of the potential difficulties that agents faced.⁽¹⁴⁷⁾

Perhaps the clearest way of investigating the limit of reclamation is to consider the land in the west as free. Obviously, a return on capital invested would be necessary, as well as for the labour expended. Reclamation that involved thorough draining demanded considerable capital and the return was often disappointing. (According to Booth, it was cheaper to buy the fee-simple of good

ground rather than attempt to improve waste. - This, he believed, could only be achieved through the agency of potato cultivation.⁽¹⁴⁸⁾ Grazing provided a better return for such capital, at much less risk.

Since the bulk of reclamation was undertaken by poor peasants, thorough draining was out of the question. Manure was a major problem. While sea-weed was transported inland for considerable distances, transport naturally increased cost. A measure of this cost can be gauged from Caird's estimate that the same team of horses could draw three loads (probably 1-1½ tons) of town manure 2½ miles from Limerick; hire for such a team would be at least 2/6 per day.⁽¹⁴⁹⁾ High transport costs would place reclamation, the bulk of which was inland, in a high cost environment.

According to the 1841 Census, only one holding in four in the range of 1-5 acres possessed a horse or mule. Partly following from this and partly due to topography, methods of cultivation were much more primitive with, for instance, the use of the loy instead of the plough. Both considerations would tend to increase the amount of labour required for crops. If the reclaiming peasant tried to apply manure at a heavy rate, then the labour requirements of his crops would tend to outstrip his own labour, as well as financial capacity. The combination of an infertile soil and the high cost of manuring forced the smallholder to compromise between being a cultivator and a seasonal migrant worker. In this way he was able to acquire additional cash as well as meet a substantial part of subsistence from his own land. The extra cash becomes more important when the assumption of no rent is dropped.

Being in a remote area, such earnings had to be made in a single time period, as there were considerable distances to be travelled to the harvesting area. Thus the labourers would plant early and harvest late and migrate in the intervening period. The closer to a more fertile region the smallholder lived, the more advantage he could take of occasional labour. This explains why so little migration to Britain occurred in the south of Ireland.⁽¹⁵⁰⁾ With earnings spread over the year less unevenly, he could afford more time to cultivate his holding (a consequence of this was that for holdings of 1-5 acres in 1841, the southern counties had higher pig densities, an indication of more waste, compared to the west, where cattle densities were higher.)

It is not surprising, therefore, that of 28 references to burning in the Devon Commission, all but two referred to the west. Sea-weed was only used if bog-stuff was not available. Burning represented a substitution of land for labour and capital. Such extensive resources of land existed because of their infertile nature.

Even with low rents, the small tenant in the west was living on the very edge of survival. The necessity of a long period of absence during the harvesting months added to the harshness of his position. It is not surprising that the west had the highest recorded mortality rate in Ireland.⁽¹⁵¹⁾ Thus, all those who could tried to remain close to the more fertile regions, and thus in reasonable proximity to employment. To them, occasional labouring meant a couple of days work intermittently through the year which built up to a climax during the harvesting months. This was a period when the rural economy was working at almost full capacity. To achieve this

required a combination of labour which was already on farm, the cottier, the small tenant who lived close by or his sons, and the seasonal migrant from the periphery.

Thus the position of the reclaiming peasant in the west of Ireland was the poorest of all. The relatively higher costs of production forced him to leave his home for several months every year. The environment was harsh, the soil poor. Reclamation was not so much an area of opportunity than a chance for survival.

The Labour Market.

In the Walrasian scheme, markets are brought into equilibrium by an imaginary auctioneer who aggregates supply and demand offers at various prices until they balance. The system is idealised and is not intended to be realistic. However, the reasons for it breaking down as regards the pre-Famine labour market provide a good starting point from which to analyse the market as a whole.

Firstly, the labour market was not isolated but functioned closely with the land market; labourers generally did not work for money wages but instead made an agreement with the farmer who employed them to take land in some form. Secondly, labour was contracted for different periods. There was the labourer who was closely bound to his employer, living in a cottage owned by him and farming some of his land. At the other extreme there was the casual harvest worker employed by the day for cash. Next we would have to distinguish between different types of labour, the young or old, man or woman, skilled or unskilled. The list of factors could be

considerably extended. However, one consideration which deserves to be emphasized is information costs.

These would operate at several levels. To begin with, the buyers and sellers would have to come together and thus would incur costs to be informed of the bids in the market. Naturally, there would be more than one market for the whole of Ireland. If a man wanted full-time employment, which market did he go to? The chances are he would have only heard of the ones, say hiring fairs,⁽¹⁵²⁾ in his own locality. More often than not the market would consist of men standing at a street corner, waiting for a farmer to hire them. These would be casual workers, such as were witnessed by Foster in Cavan.⁽¹⁵³⁾

Let us look at the position of the two agents involved. If we take the farmer, then he will wish to know the type of worker he is going to employ. He will know best a man he has employed previously, or one that a fellow farmer has employed. The greatest risk is attached to a stranger - he may be a shirker, quarrelsome etc. Obviously if he is only seeking one day's work then he has only lost a small amount. If it is an agreement for a year the position is much more serious.

The length of the contract also influences the risk for the labourer. If the farmer does not plough the labourers plot properly or leaves it until late in the season, then the labourer suffers a drop in yield. The labourer is in a poor position to terminate his contract since he has not been "paid" at all. The plot is only of use to him at the end of the season; to terminate at the end of the planting season would be to give the farmer his labour during planting as a

free gift. Thus the labourer, like the farmer, is likely to seek employment close to his home district, where information about employers is reasonably good and free.

Even if the contract term is considerably shortened information costs can tend to make the market imperfect. Much of the casual work was undertaken by short term migrant labour. In order to minimise the search time for employment at a peak season when wages and thus the cost of information were high, the migrant labourer was likely to return annually to an area he knew or even to a particular farmer with whom he was satisfied with from previous seasons. Similarly the farmer gains from this continuity; he knows the type of labourer concerned and can rely on a supply. He does not have to spend time hiring labourers during a period of the year when management of the farm is exceptionally demanding.

These types of consideration would lead us to anticipate a market very far from perfect. However, this does not deny that competitive forces do exert influence. Because the land market was operated closely with the labour market, manipulation of rents effectively alters the real wage rate. Although it might cost the farmer to look for labourers to hire during the harvest season, if his usual workers were demanding an increase in pay it might be worthwhile. Information costs would provide the inertia of the system while competitive forces represent the impulse to change.

We can examine the labour market using conventional supply and demand analysis. Each schedule will be examined separately and then their interaction. Before doing so it is worth noting how the

quality of labour influenced the situation. One Poor Inquiry witness divided labourers in the barony of Kells, Co. Meath, into three classes. The "more skilful and able description of labourers, living where there is not a very great superabundance of them" were employed 150 days, the average 115 and the young and elderly 70 days.⁽¹⁵⁴⁾

While the actual figures quoted would vary widely with the circumstance of a region, the quotation does indicate the potentially wide variation in days worked by different types of labour.

So far we have considered labour to be offered in terms of a unit and generally have taken this to be that of an adult male. This is obviously not realistic. The household is probably the best unit to take. This varied, according to what remains of the 1821 Census returns. Mean family size tended to be substantially larger than in England. There seems to have been a gradual increase as one moves west, from 4.86 in Meath to 5.25 in Galway.⁽¹⁵⁵⁾ Obviously when we are talking of employment we must talk of the employment of the family unit as a whole. However, as regards the labour market it is likely participation varied considerably within the unit.

First of all, let us consider a small farm of several acres, with some livestock, say a cow, a pig and some chickens. The opportunity for the wife to enter the labour market would be restricted by more than her family obligations. Milking the cow, seeing to the calf, preparing feed for both, and the chickens, keeping an eye on the livestock; (The cost of dairymaids, "support and wages" according to Griffith's calculation was 1/3 of the total for dairying⁽¹⁵⁶⁾) all these required attention and the wife was the most likely person to do this. Naturally in a peak period such as harvest she would

enter the labour market, along with the children and as such the family would be employed as a unit.

The children's role in manure collecting has already been noted. However, they would sometimes be directly employed, in small tasks. Weld tells how boys from nine upwards collected eggs from cottages. Each had a regular daily beat and they were paid 1/= per 6 score of eggs they brought in.⁽¹⁵⁷⁾ Undoubtedly there would have been numerous such tasks that were performed by children.

It is clear that any unit we choose for labour, whether it be the family or the adult male, will not fit the picture completely. For the smallholder, as regards the labour market, it is likely that the adult male is probably an accurate enough unit for most of the year, though peaks in labour demand would make the family a better one. Bearing this intrinsic ambiguity in mind we shall examine labour demand.

The demand for labour:

In the pre-Famine rural economy, the demand for labour was dominated by the requirements of tillage and this exhibited marked seasonal fluctuations. The importance of tillage comes from an examination of the labour requirements for a grassland farm. Cattle on such a farm could be managed by one man, the herd, for every 50 to 100 acres (and these were probably Irish acres.⁽¹⁵⁸⁾). Admittedly dairying would require more labour but we must distinguish between that spent on tending the cows and processing the milk and that spent on growing the winter feed of the stock. The latter we would consider as tillage. The labour requirements of dairying would be much more

steady than tillage. While labour involved in processing would like follow butter production and thus peak in early summer, this would be somewhat offset by the greater labour required in tending the cows in the winter months when they were not kept on the pastures.

With tillage the peaks were much more dramatic. The agricultural year began with ploughing and digging from February to the end of March. The maincrop potatoes were put down from mid-April through to May (the cereal crops were sown earlier than this, except for wheat which was sown in autumn.) The main peak caused by cereal crops was in the harvesting from mid-August to mid-September, with haymaking from early June to mid-July. The maincrop potatoes were harvested from October to mid-November, when ploughing was also undertaken.⁽¹⁵⁹⁾ The times of farming operations were of course influenced by geographic position - the harvest in the west was, like in Ulster, several weeks behind that of the eastern seaboard.⁽¹⁶⁰⁾

Although agricultural production would lay the pattern of labour requirement, the demand for labour on the market was another matter. Obviously the crucial determinant of whether a farmer came to the market for labour or not was the scale of production on his own farm. Foster, writing of Co. Cavan considered that a farm of 15-30 acres could be worked by one family without any additional labour.⁽¹⁶¹⁾ This can only be taken as a rough guide, with variation caused by quality of land, etc. At peak times the family would work much harder than otherwise and this could cover peaks.

However, once a farm's labour requirement exceeded the capacity of the family the farmer would have recourse to the labour market.

There would be two types of labour required. If the farm was considerably larger than that which could be managed by a family's labour, then the farmer would require a steady source of labour throughout the year. As farm size increased this would diminish proportionally as more extensive cultivation, associated with more livestock per farm, developed. In addition to this steady labour requirement there would be the seasonal peaks. These would be met by hiring men by the day or week rather than the year.

We will examine the labour supply for both cases. The first was generally met by admitting a cottier, the second by seasonal migration.

The supply of labour: (a) labourers agreements.

It is impossible to generalise these as regards the particular provisions as these were so diverse.

Near Strabane, a labourer paid "six guineas for half an acre of oats, half a rood for flax, and ground for planting potatoes, a house and a garden, and a cow's grass and bog; and they give a horse two days, one day to draw clay, and another day to draw the manure out to the field, and a place to put the manure on." (162)

At the other end of Ireland, in Co. Cork, a farmer gives a good example of the comprehensive nature of the labourers' agreement; "I give them a house with kitchen garden, and plenty of turbary, and the grass of a cow and pigs, for £2.2s. a year. I give them then an acre of garden, or two acres, according as the bargain may be, chargeable at from £5 an acre to £7 an acre. For that £7 an acre the ground is ploughed, limed, and dunged by me, and they cultivate a crop of potatoes thereon. The ground at £5 is

let limed and dunged by me, but cultivated by spade husbandry, and to pay for that they get work of 7d a day." (163)

Even from these two examples, the dangers of unqualified generalisation are easily grasped. Often the agreement is limited to an acre of manured ground for potatoes. The most common form of payment was on a yearly basis. The cost of the labourer's land was set off against the number of days he had worked for the farmer, and the difference was settled at the end of the year. There was considerable room for swindling, and disagreements were common.

The central feature of the labourer's agreement was an exchange of land for labour. A separate deal was arranged for a house and garden. The extent of land concerned depended upon the stock of the labourer. If he had a cow, then grazing for it was included, together with some arrangement for winter foddering. The labourer's stock influenced whether he required manured land or not. The difference in rent was considerable. Con-acre rents were high, from £5 to £12 per acre, and were held out to be an example of exploitation of the labouring classes. However, these lands were either manured or were capable of giving a good crop without manure - as in the case of good grassland; land which the labourer manured himself was usually given free.

The advantage to the farmer of the cottier scheme was that he bound the labourer to the farm for a complete year, thus partly avoiding having to pay what he considered the scandalously high level of harvest wages. The labourer acquired land and thus made his existence a little more secure. Payment in money did occur, particularly in the east and near large towns, (164) but one tends to believe that

the farmer who "does not like paying in cash; he would do anything rather than pay in cash" was the most common figure. (165)

Judging by the frequency with which a "cow's grass" appears in labourers' agreements, a considerable proportion of cottiers had livestock.* Even if the cow was of the poorest class, at four years old it could be worth £5, and would put the labourer in a comfortable position. (167) The extent of cottiering varied; in an area around Tandragee, a local investigation revealed that there

* This does not appear to be borne out by the 1841 Census, though P.M.A. Bourke, "The Agricultural statistics of the 1841 census of Ireland: A critical review", Economic History Review, Vol XVIII, has pointed out that as regards pigs, the previous seasons had been poor for potatoes and thus their numbers would have been reduced as the cottier's subsistence had first priority. However, in the explanatory form for the 1841 Census, beneath the columns for the agricultural statistics, it noted "the Enumerator must fill according to his own observation, and the best information he can procure." (166) What probably happened in practice was that any stock grazing on the farmer's land was attributed to the farmer. This was made explicit in the instructions for the official statistics collected from 1847; Report from the select committee of the House of Lords, appointed to inquire into the best mode of obtaining accurate agricultural statistics from all parts of the United Kingdom, PP1854-5, Vol VIII, General Instructions, Appendix C, III(2), P170. This could have affected the statistics for both cattle and pigs as Doyle talks of the pig as being "too frequently, fed on grass ... the mere refuse of potatoes ... with a little bran or distillers' grain to make him up for market," op.cit., P42. Presumably this grass would be the farmers.

were 886 cottiers to 1064 tenant families, with an average holding of just over 10 acres.⁽¹⁶⁸⁾ This would be an extreme case due to the presence of the domestic linen industry. Domestic industry was the most desirable method of spreading labour demand over the entire year and thus reducing the long periods of underemployment.

Apart from the cottiering system, the labourer without land could acquire some for a season by providing manure for it. This system was virtually universal,⁽¹⁶⁹⁾ and pertained to even the better lands. The system of "free crop" was described by an agent from Limerick;

"the labourer not having land of his own, gathers during the year heaps of manure, and in spring applies to the farmers who have land and not manure, who suffer him to put the manure on the land, and cultivate a crop of potatoes. On very poor land, the labourer is suffered to take two crops."⁽¹⁷⁰⁾

According to this witness, from ten to fifteen loads of dung were required to each quarter of an acre. This system of "free crop" was popular even on the higher rented lands, the potato crop paying for the manure and the wheat crop which followed provided the rent.

The free crop system allowed a man access to land without entering the labour market. It was used by the poorest strata of society and those labourers who could not get sufficient employment through the year. It meant that during the troughs in labour demand, the family could be employed in manure gathering, the return for which would be a crop of potatoes in the following year.

However, in areas where average holding size was low many who held land would also require employment. The region itself would provide

employment for only a small proportion of those seeking it. In the west and central Ireland, there was no class of labourers distinguished from the small tenantry; there were "no people who are only small farmers: they are all a class of labourers, if they can get labour."⁽¹⁷¹⁾ Many of these men were forced to become seasonal migrants, whether to the richer areas of Leinster or to Britain.

(b) Seasonal migration.

The 1841 Census estimated that about 60,000 left Ireland to work during the harvest in Britain, though O'Grada considers this to be an underestimate.⁽¹⁷²⁾ Though this migration was of major importance, it should not lead to an ignoring of internal migration. In Kilkenny, for instance, there was a "great influx of these poor men who come from remote parts of Kerry and Connaught (who) deteriorate the labour market here, which is generally regulated by the rise and fall dependent upon the number that come from a distance."⁽¹⁷³⁾ Though this excited understandable opposition from the local labouring community, the farmer had the incentive of being able to recover his crops quicker (as well as restraining wages).⁽¹⁷⁴⁾

It is important to realise that such migration did not only occur from the west; rather it was common from all areas where agriculture was poor and thus unable to provide employment sufficient for the year's subsistence. Those who had only four or five acres near Carrickmacross were in a position identical to their counterparts in the west; "the husband and son will go to Scotland or to England in the harvest, or to Meath or Dublin, and the daughter, perhaps, is hired, or the man may be employed by the more comfortable

farmers ... they strive, by keeping pigs, or going to England, to pay the rent."⁽¹⁷⁵⁾ The congested districts of Ulster, like south-east Derry and the Mourne participated in this movement.⁽¹⁷⁶⁾

Around Limerick, the Spalpeens were "the sons of small farmers and labourers, living in the mountain districts of the country, who, having completed their potato setting in the month of June, come down to the more cultivated districts and aid in saving the harvest, and remain till the potato digging is over, when they return home to dig their potatoes."⁽¹⁷⁷⁾ Thus the density of settlement on poorer soils was maintained.

Seasonal migration, either from the west or the periphery of the more fertile regions, provided the basis of an integrated labour market, with peaks in demand for labour calling forward supplies from outside a locality, which counteracted tendencies leading to a sharp increase in price. As was noted earlier, the bound labourer did not benefit from the peak in wages during the harvest. Thus the returns to labour were driven down so that living standards were low even in the most fertile regions.

The Land Market.

The relationship between landlord and tenant provided a focus of inquiry for all those who were interested in the condition of Ireland in the nineteenth century. Precisely because of this there is a vast literature on the subject and one which rapidly tends to engulf the researcher. Our object in this section is to examine the method by which land was allocated in the pre-Famine rural economy, the constraints to which the various parties concerned were subject and the extent to which the market functioned

competitively. It is apposite to emphasise the limited nature of our object since it provides a rough framework to avoid sinking into a morass of conflicting views on the extent to which the system of land tenure restricted economic development.

Before discussing the limits of the land market it is worthwhile emphasising that the market consists of agents who have the right to dispose of land for the period concerned and those who desire access. We are not necessarily talking of landlords on one side and tenants on the other. The issue is confused since the period concerned was not defined. Instead of one land market there would have been many - the basic unit would have been the year but within this many periods could be taken.

Once a lease for a number of years is taken then the tenant can, unless specifically precluded from doing so by a covenant (which he considers will be enforced) return to the land market and dispose of some of his holding. Thus the existence of leases will change the composition of agents in the market. As an introduction to the study of the pre-Famine land market it is beneficial to examine the economic motivation of using leases at all. A crucial role is played by expectations. If we take the simplest case where no improvement is being considered, then if the discounted stream of rent payments under the lease is less than the discounted anticipated economic rent stream, then there is the motivation to accept. The expectations of rent movements would be firmly linked to future price expectations with some allowance for lags.

When we examine the situation from the landlord's position, there would appear to be little point in participation in the scheme unless expectations were different between landlords and tenants. One possibility apart from this would be administrative costs. These would be reduced by dealing with a smaller number of leaseholders who collected the rents themselves from any subtenants. Another would be the payment of a lump sum as a fine at the beginning of the lease. If a Landlord was intending to make some capital expenditure, say the construction of a mansion, then by giving leases with fines he could perhaps reduce his costs. To borrow the money is certainly an alternative but it is likely that interest rates would increase as the principal got larger. Potential lenders would consider that risk increased as the interest charges became a larger proportion of an estate's income and this risk would demand a premium. Thus it is possible that a landlord could reduce the level of interest by renewing some leases with fines and borrowing less, provided the sacrificed rents were less than the anticipated increase in interest charges.

If we consider the case for improvements, we can assume the above analysis and restrict ourselves to the additional problem. If the tenant is going to invest in the land, then he will accept a lease as long as the sum of the discounted differences between receipts and expenditures which were additional to his anticipated stream without investment is positive. For the landlord, he will offer the holding at a lower rent on lease if the sum of the discounted increments in rents after the lease period is greater than the sum of discounted rents sacrificed during the lease.

The considerable element of uncertainty in price expectations can be taken into account within the discount factor. With reference to the Irish rural economy, the great potential profit associated with favourable price developments reached a peak during the Napoleonic Wars. The eighteenth century practice of splitting large estates into major tracts given under long leases to middlemen resulted in many head landlords being severely limited in their ability to exploit the great inflation in agricultural prices. The magnitude of this may be gauged by an example from the Downshire estates where leases of 40-50 years duration, which fell in during the period 1801-15 were renewed at rents four and five times the previous rate. (178)

With the slump in prices after 1815, head landlords increasingly attempted to regain control of their estates. Middlemen were on the defensive (179) although, at least in Co.Cork, landowners could not oust long leaseholders until they fell in in the 1820's and 1830's. (180) Undoubtedly head landlords would have had to have reduced rents from the wartime rates for at least some of their tenancies at will and yearly tenants. They could have increased the rent roll though by getting rid of the middleman. (181)

Between the end of the Napoleonic Wars and the Famine, there were several broad developments in the land market. As their leases fell in, middlemen were removed. (182) Those leases that were given were for a shorter period (183) - in fact tenancies at will became more common. (184) On the whole, a "much more vigorous" form of estate management was evident in the 1830's and 1840's. (185)

This required additional expenditure though. A 5% commission on

the rent roll for an agent was common and on the Downshire estates, one of the more efficient, administrative costs were 10% of total receipts. (186)

It is impossible to give an indication whether administrative efficiency helped any improvement in agriculture. The 'Scotch agriculturalist' seems to have been a feature of some of the larger estates but the optimism many of the dedicated improvers often was founded on enthusiasm. At most the larger farmers would have benefited. The smaller tenants on the whole would have had neither the time nor the resources to participate to any great extent.

A great deal was talked about leases and their link with agricultural improvement. It is difficult to escape the impression that what such tenants, pleading usually before commissions of British inquirers, really wanted was reduced rents. Compensation for improvements sounded fair and straightforward. The difficulty came in the interpretation of improvement. One can imagine the surprise of the Devon Commission when a witness considered burning the land constituted an improvement. (187) The critical factor with a lease was the level of rent, which comes out clearly in the evidence of a witness to the Poor Inquiry: "in general, tenants would sign leases containing any clauses whatever, as they never think of reading them." (188)

The increasing use of tenancies-at-will and yearly tenancies did not necessarily signify a more efficient market but rather a transfer of economic rent from the middleman and other leaseholders to head landlords. In the majority of cases this probably did not lead to

greater exploitation of the producer but instead a more limited distribution of the rent. We would have a better idea of the market if we knew the turnover rate of tenancies. The very lack of evidence on this matter suggests that it was low, although one observer noted that the only instances of frequent change within short periods occurred on grazing farms.⁽¹⁸⁹⁾

Thus it is likely that rents were fairly sticky even on yearly tenancies. Changes would probably follow a prolonged increase in agricultural income, with a bad season earning the tenant a rebate of rent. The most sensitive rents were probably for short-term, seasonal holdings. We have already discussed labourer's agreements with their employers. While these would have a strong customary element if the labourer was consistently employed on the farm, this would not be the case with con-acre.

Con-acre was the taking of land "merely for the crop or for the season."⁽¹⁹⁰⁾ The crop was generally potatoes, though it was sometimes flax or oats. (In the latter case this was usually taken by more comfortable men whose main interest was the straw.⁽¹⁹¹⁾) The land was generally let in areas of 1-2 roods though smaller areas would be common near towns.⁽¹⁹²⁾ In Co. Down, this area was so common that con-acre there was referred to as "rood land."⁽¹⁹³⁾

The land was generally prepared and manured by the farmer though the system was never precise. It depended partly on the land - good grassland would not require manure and was valued highly. If the labourer prepared the land then this obviously would be taken into account when the price was agreed upon. We are taking

the defining characteristic of con-acre to be the letting of land for a season which was manured or capable of producing a crop without manure. It is to be regarded as distinct and in contrast to the free crop system discussed earlier. It was the presence of town manure as well as of townfolk demanding it that led to con-acre being more common near towns. (194)

The con-acre rent was generally paid in cash or "at least the agreement is that it shall." (195) This was the case near towns (196) but as we move further into the country the rent, "when the time draws near" was often paid partly or wholly by labour. (197)

Such payments by labour would suggest that in the rural areas con-acre often merged into a species of labourers' agreements with farmers. However, the general thrust of evidence would imply that a significant proportion of con-acre letting was given to individuals not connected in any way with agricultural production on the particular farm concerned. The importance of this is that it would have allowed market forces to determine the rent much more freely as any customary element in labourers' agreements would have been lacking.

The rent for con-acre ground had to be paid before the crop was removed from the field. (198) Most farmers allowed the crop to be dug though before this. If the crop was deficient then it was generally left to the farmer and no rent was paid. (199) However, the labourer usually tried to avoid this if it was at all possible. His credit worthiness with the farmer, and no doubt with other farmers in the area, would be damaged (200) and his chances of procuring con-acre in the following season would be prejudiced.

Some farmers demanded a promissory note for the rent from the labourer at the time of letting and would sue for this in cases of default.⁽²⁰¹⁾ Often, an abatement would be agreed, or at least labour would be taken in part settlement.⁽²⁰²⁾ Although there undoubtedly would be farmers who would prosecute such defaulters, it would only be worthwhile in the case of a labourer who had sufficient means to pay any judicial award. Thus circumstances would probably provide the strongest constraint upon the farmer, quite apart from any social sanction.

Thus though rents between landlord and tenant might be generally sticky, the presence of a considerable degree of subletting did tend to make the market operate more efficiently. The extent of con-acre may be gauged from the fact that in 1845 16.8% of the potato crop in the southern counties of Ireland were under the system.⁽²⁰³⁾ Some caution must be exercised in the interpretation of these figures. There is ambiguity concerning whether free-crop was considered as con-acre. If, as is likely, it was not, then the extent of subletting is underestimated significantly.

While subletting improved the efficiency of the land market, the degree of competition was not unlimited due to the presence of associations among the peasantry. These associations had great economic importance and it is unfortunate that so much of the evidence about them inevitably comes from those they opposed. It is important to realise that, for the most of Ireland, a stout social, cultural and religious⁽²⁰⁴⁾ wall separated the landlord class and the peasantry. Violence was never far from the surface and it would erupt with any significant disturbance of the status quo.

It is natural that we tend to focus on the more spectacular outrages but it is well worth looking at several 'everyday' incidents first.

On taking up his appointment as agent to the Shirely estate in 1843, Stuart Trench was faced with an application for a reduction in rent from a mass meeting of tenants. The atmosphere of the meeting was pregnant with threat and ended with Trench "blackened with bruises, stiff and sore, and scarcely able to stand."⁽²⁰⁵⁾ Although Trench was a man who did not fear hyperbole, the impression of total alienation between landlord and peasant, not to say of threat, rings authentic. When the reduction was not given, a secret society was formed to frustrate any attempt by the authorities to enforce payment.

This was not one of the celebrated cases of outrage but one of the many upsets in rural life. A similar incident was when a Clare landlord was attacked despite being in a crowd. The local landlords maintained that any sea-weed between the high and low watermarks belonged to them. The men who made a living from collecting the sea-weed disagreed and their reaction was automatic and violent.

The objectives of the agrarian societies were local in character and encompassed any issue that impinged economically on the peasantry. Naturally the possession of land was of paramount importance, but as well as this they would attempt to prevent the employment of strangers where local labourers were available, frustrate the collection of tithe or any other obligation and generally resist any infringement of what might be considered customary rights, be it collecting sea-weed or mountain grazing. The analogy to a trades union is direct.

The functioning of the agrarian society demanded a community interest and, equally, a community sanction. The activities of the society were directed rationally, as is brought out in a remarkable passage of a contemporary account:

"the offenders undertake to carry into effect their wishes, by means not of moral but of physical sanctions; to give their opinion the weight of the Law of that state, by arming it with sanctions as painful as those employed by the criminal law The outrages in question are committed by the offenders as administrators of a law of opinion, generally prevalent among the class to which they belong. In this character they look, not merely to particular, but also to general results not merely to themselves, but also to those with whom they are leagued, and with whom they have an identity of interests." (206)

An issue that affected the peasantry directly as a whole could arouse considerable activity. Although the tithe agitation had strong religious overtones a measure of potential peasant resistance may be gathered by considering that in December, 1831, in Co. Kilkenny, a 40 man detachment of constables supervising the collection of tithe encountered several thousand peasants. In the battle which followed a chief constable and 16 of his men were killed. (207)

Although the constabulary were hated, especially when they enforced the landlord's will, most of the ire of the agrarian societies was directed against the tenant who broke the rural code - especially the man who took the farm of another who had been ejected. Depending on the gravity of the offence, he might be slain, tortured, his livestock killed or mutilated, his hayricks or buildings put on fire.

The rural code extended to dealings between farmer and labourer, which became particularly acute in Roscommon, Leix, Kilkenny,

Tipperary and Limerick.⁽²⁰⁸⁾ The peasantry was far from being a monolithic class. However, to function the agrarian society required a strong sense of identity in a particular community. Thus the major conflicts were probably between the poorer tenants and landlords on the one hand and labourers and better off farmers on the other. Labourers and the poorer tenantry would be hard to distinguish anyway in most areas.

Against the agrarian societies the landlords could rely on a constabulary establishment of 8,935 men in 1844 (which rose to 12,385 by 1851.⁽²⁰⁹⁾) However, for the most part, the local gentry were not willing to use the force to its full economic potential. Peel, when he was Secretary, fulminated against the gentry in general and the magistrates in particular for not giving local leadership. The gentry did not want the financial and social consequences of using the constabulary extensively. Their reasons are not hard to find. To consolidate holdings, for example, would be a direct challenge to the agrarian societies. To carry this through would require strong measures and much diligence. Even if the consolidation was successful, the new tenants would have to be protected and encouraged. It would no doubt be difficult to get such tenants in the first place. On top of this managerial difficulty there was the psychological pressure of being under constant threat of assassination.

The regard with which landlord society looked upon the agrarian societies may be gauged from the cartoons of 'Captain Moonlight' which appeared in the press. Generally he is a brutish, sub-human type, equipped with blunderbuss. Far better not to provoke the

creature into nocturnal activity and let the rents be at below the full market value. (The agrarian societies did not object to rents in principle but only to the level of them.)

Thus there were powerful forces resisting an efficient land market in pre-Famine Ireland. Despite this, the very wide access to land, encompassing virtually the whole of rural society, must have permitted market forces to exert themselves. Although economic rents were being received throughout the rural economy the dominant theme as the Famine approached was the tendency for those rents to be concentrated in fewer hands, as headlandlords squeezed out middlemen and the larger farmers squeezed labourers.

Agricultural Developments, 1815-45.

This section is devoted to an examination of Crotty's interpretation of the development of Irish agriculture from the end of the Napoleonic Wars to the Famine. The picture of the pre-Famine economy developed in the above analysis differs somewhat from Crotty's and it is for that reason why an alternative explanation for the pre-Famine decades is being developed. It must be stressed that an account of the developments of this period is not being given. Rather it is an alternative hypothesis based on a retrospective look from the 1840's.

The central tenet of Crotty's view rests on the price changes after 1815. Although all agricultural prices fell, the price of tillage products fell more so. Grassland product prices stabilised sooner and recovered better. In an environment of falling prices farmers

were motivated to adopt the lowest gross output per acre so as to minimise windfall losses and this reinforced the price incentive to favour grassland rather than tillage in agricultural production.

The swing to grassland was not marked because of a number of factors. There was a lack of capital with which to form herds. Cattle prices were falling as well and this environment did not favour major investment. Landlords did not ruthlessly pursue their own interests; they had been used to tillage being a major rent provider during the inflation of 1760-1815 and took time to realise that a major change had occurred; they were not particularly perceptive economically. There was the sheer difficulty of removing a dense rural population, rendered dangerous by agrarian societies. Indeed, "faced with the pressure of growing population, agriculture in many respects continued the old pre-1815 trends towards increasingly labour-intensive farms." (210)

Crotty's argument is consistent and tenable, but it is open to criticism. First of all, the price data is not so damaging to tillage as Crotty suggests. Using his index of Dublin market prices, with 1812-15 = 100, oats were in 1836-40, 76, butter 86 and beef 77 (beef prices reflected the provisions trade rather than that of live cattle, but the two were closely related.) (211) Crotty himself indicates that butter should be included in with tillage products rather than livestock. Thus the fall in price was not so detrimental to tillage as Crotty suggests, especially when it is considered that the peak in prices during the Napoleonic Wars was more marked in tillage. (212)

Crotty supported his argument that production was swinging away from tillage by the 1830's by the use of export statistics. Though the dangers of mechanically interpreting exports as a measure of total production have been stressed by Lee, the increase in tillage exports demonstrate clearly that it was "ceding its ground in peculiar fashion:"⁽²¹³⁾ comparing the 1835 statistics with the average of the five years preceding 1818, butter exports increased from 422,000 cwt. to 827,000, oats from 72,000 to 376,000 and pigs from 563,000 to 857,000. In the same period cattle exports rose from 88,000 to 117,000,⁽²¹⁴⁾ (though in the five years preceding 1813 cattle exports were 108,000). Crotty is forced to concede that the increase in tillage exports was maintained by "the process of reclamation and tillage of waste lands (which) went on on a very substantial scale in the decades before the Great Famine."⁽²¹⁵⁾ The existence of such reclamation has been challenged by P.M.A. Bourke in his analysis of the 1841 Census statistics and he argues for a much more conservative rate, though any definitive interpretation is impossible due to the limitations of historical statistics.⁽²¹⁶⁾

The other pillar of Crotty's argument is that the margin of profit on cattle rearing increased. This relies heavily on a single stock book for empirical evidence, though this will be limited whatever the position.

Since accurate statistics of agricultural production are just not available, the use of any proxy will be open to criticism. The strength of Crotty's argument does not rest on his statistical evidence but much more on a coherent economic hypothesis from which the statistics were interpreted. However, the central point of this

was the movement in price against tillage products. This is not as strong as the weight placed on it suggests. Moreover dairy cattle were an integral part of the tillage farm and the pure dairy farm was rare. Thus there was no dichotomy between tillage and dairying but rather a division between pure grassland and tillage/dairying.

Crotty largely ignores the role of land quality. A large proportion of the smallholdings were on poorer land. Even if these were cleared, the land would not fetch a high rent precisely because the land was not fertile. It would not be capable of maintaining heavy grazing. Certainly permanent pastures were successfully developed but this is quite consistent with the development of tillage on the poorer areas. In fact, permanent pastures could be considered as a technical improvement restricted to existing good land which quite possibly had always tended to be grazed much more than cropped.

The economic variable which is of central importance in the interpretation of the period 1815-45 is the price of labour. Crotty formulates this as "population pressure" which is unsatisfactory because of its vague economic meaning. The momentum of population growth, despite high emigration, meant that in the period 1815-45 the returns to labour were driven down towards physical subsistence. The falling price led to a lower marginal rate of technical substitution with either land or livestock (the principal form of capital) being economically rational.

Substitution between labour and land or livestock was easiest in tillage and extremely limited in pure grassland. The principal form it took was the increased application of manure, mainly on the lower

quality soils. Economics is most interested in what happens at the margin. Between the continuously cropped, small tillage farm on poor soil and the large holdings on good pasture for fattening, there was a steady graduation. Any change that occurs does not change tillage farms into grassland or vice versa but rather alters the intensity of tillage on most farms.

In the decades before the Famine it was the farms at the lower end of the scale that were able to use labour more intensely through increased tillage and manuring. This would provide a strong economic force favouring tillage. On the other hand Crotty's point on the price data favouring pure grassland products is valid. This would provide an economic force favouring grassland. The result of these two forces in opposite directions would not lead to stagnation but rather to the development of tillage on the poorer soils which were, given the factor price structure, most suited to it. At the other pole, good land could be brought up to permanent pasture status. The movements would be complementary and not contradictory.

The main criticisms against Crotty may be summarised as follows: he maintains a too rigorous division between tillage and dairying and tends to neglect the aspect of land quality. The economic relevance of the demographic growth during the deflationary period is underestimated. The analysis of the rural economy presented above does provide an alternative interpretation, hopefully as consistent as Crotty's. Lastly, it must be noted that Crotty's work on the period we consider was an introductory historical section to a work which was a major stride forward in the interpretation of agriculture in Irish economic development. Any criticism of it must recognise the thorough grasp of the subject which the author possesses.

Conclusion.

An important theme in our study of the pre-Famine economy has been the functioning of markets. While it is relatively easy to analyse the forces which would restrict competitive market operation it is difficult to judge their overall effect. Let us take the labour market as an example. The poverty of the Irish struck many of the foreign travellers who visited the country. It is interesting though to note how this was distributed.

There is a striking observation made by one traveller concerning Co. Meath, a county famous for its rich agricultural land.

"Here the finest cattle, and the best and most abundant harvests, are produced; and here all the improvements in cultivation which have penetrated from England into Ireland made the greatest advances... Yet they appear almost incredible to the traveller who passes through those districts for the first time. At first he probably supposes himself already arrived at the worst part of Ireland; for until he has seen the West, he can have no conception that human beings can live more miserably and poorly than those in this most fruitful district in the neighbourhood of Dublin, or that an inhabited and cultivated land can present a still wilder aspect than the rich corn plains of Meath, Kildare, and Westmeath." (217)

This is reinforced by the Halls, who noted that "although misery is not to be encountered upon highways, or adjacent to pleasant meadows, the towns, into which the poor have been driven, are thronged with squalid countenances." (218) (The depressed condition of the labouring class in Meath was also put down to the land not being suited to corn and also the scarcity of fuel) (219)

The example of Meath suggests a reasonably efficient labour market operated throughout Ireland. It was not a collection of relatively insulated markets. It would be desirable to study regional wage trends but the existence of labourers' agreements makes this untenable. The nominal day wage is meaningless unless taken together with the number of days worked, local employment prospects and the rent of the farmers ground. Systematic details of these aspects are rarely given. Although a rural proletariat, in the sense of a class divorced from the land, did not exist, the combination of the cottier system and harvest migration meant there was a considerable reservoir of available labour which could rapidly engulf any increased demand and severely reduce any differentials.

The question can in fact be broadened to consider the idea of "incentive income." This concept was introduced by J.R. Bellerby in a paper on the distribution of farm income in the U.K. (220) By it he meant the financial incentive of enterprise as such, after allowance had been made for a fair return on capital invested, etc. In the discussion on the paper one contributor, G.S. Gouri, thought that while the concept "should have a use for general theory ... it would be greatly limited in India mainly because the ordinary man there has no choice of occupation; he has to choose between being a farmer and starvation." (221)

But does accepting this necessarily invalidate the notion of "incentive income"? It certainly may be vital to acquire land to survive, in de Beaumont's words, to "possess a plot of ground or starve." (222) But, as noted previously, there was in Ireland a major difference between prime agricultural land and the poorer soils which

were generally the ones that were heavily subdivided. As Crotty has pointed out,⁽²²³⁾ the bulk of total rent was paid by the large tenants purely due to the proportion of total land they held. Thus although there was a grim struggle for the life and land in poor regions, in the wealthier ones there was a steady stream of emigration.

The opportunities for employment, for both land and labour, outside agriculture, were severely limited. The position was depressingly revealed by the 1841 Census; only 14% of the population lived in towns with over 2,000 inhabitants.⁽²²⁴⁾ However, as farm size increases, the importance of the tenant's and his family's labour as a proportion of the holdings total labour requirement diminishes, and social factors generally tend to emphasise this. Thus the entre-preneurial role would grow in importance with farm size and this would demand a return. After all, if only a return to capital is gained from production, why participate in it at all?

The National Debt ensured a much easier living.

If "incentive income" exists at one extreme of farm size, what happens to it as size is steadily reduced? In fact, we have already discussed this situation. The free labourer could earn a positive differential over the cottier with respect to the daily wage rate, but yearly earnings would be quite a different matter. The uncertainty over this would make it worthwhile for the cottier to accept the lower daily wage rate. The guarantee of being able to find an outlet for one's labour was incentive enough to become a small producer. Any "incentive income", at the lower end of the

production scale would be swallowed up by the increased risk to the landlord of letting to a small tenant.

It is impossible to say at what level "incentive income" was obliterated. Some idea might be gained from de Tocqueville's surprise that the "wretched dwellings of beggars" along the road from Kilkenny to Mitchelstown, were the homes of tenant farmers with 20 or 30 acres of land.⁽²²⁵⁾ In his estimate of the potato consumption of those holding 20 to 50 acres, Dowdall refers to "the poverty of the far greater portion of them."⁽²²⁶⁾ While such observations can only be taken as rough indicators, they do suggest that quite substantial farms, by pre-Famine standards, could be uncomfortably close to the cottier's level.

REFERENCES TO CHAPTER III.

- (1) Tisdale, S.L. and Nelson, W.L., Soil Fertility and Fertilizers, New York, 1975, P492.
- (2) Whyte, R.O., Moir, T.R.G., and Cooper, J.P., Grasses in Agriculture, F.A.O., 1959, P102.
- (3) Tisdale, S.L., et al, op.cit., P575.
- (4) Whyte, R.O., et al, op.cit., P105.
- (5) Whyte, R.O., et al, op.cit., P99.
- (6) Barrington, T., "The yields of Irish tillage food crops since the year 1847". Department of Agriculture and Technical Instruction for Ireland, Journal, Vol.XXI,P217.
- (7) Devon, 738, Q8.
- (8) Evans, E.E., Irish Heritage; the landscape, the people, and their work, Dundalk 1942, P60.
- (9) Devon, 259, Q21; 270, Q116; 414, Q49; 628, Q8; 444, Q81.
- (10) Devon, 165, Q5; see also 507,Q7.
- (11) Doyle, M., A cyclopaedia of practical husbandry and rural affairs in general, London, 1844, P114.
- (12) Devon, 88, Q9; see also 548, Q42; 849, Q60.
- (13) N.a., The south of Ireland and her poor, London, 1843, P38.
- (14) Devon, 61, Q97.
- (15) Devon, 86, Q67.
- (16) Northern Whig, 17/1/1844; see also the advertisements for town manure in the same paper for 17/2/1844, 2/2/1844.
- (17) Devon, 56, Q36; 58, Q9; 97, Q10; 101, Q8; 269, Q6; 273, Q7; 806, Q33; 892, Q41; 913, Q7; 975, Q5; 1012, Q5.
- (18) Devon, 56, Q36.
- (19) Devon, 202, Q5.
- (20) Devon, 66, Q6; 202, Q5; 210, Q11.
- (21) Weld, I., Statistical Survey of the County of Roscommon, Dublin, 1832, P180.
- (22) Kilroe, J.R., "The Soils of Ireland", in Coyne, W.P. (ed), Ireland, Industrial and Agricultural, Dublin, 1902, P32.

- (23) Walsh, T., Ryan, P.F. and Kilroy, J., "A half century of fertilizer and lime use in Ireland", JSSISI, Vol.XIX, 1957, P109, 106.
- (24) Devon, 94, Q12.
- (25) Devon, 940, Q9; 941, Q4; 945, Q3.
- (26) Devon, 102, Q5.
- (27) Devon, 937, Q20.
- (28) Devon, 123, Q11; 377, Q8; 452, Q12; 454, Q7-8; 461, Q9; 513, Q7; 528, Q6; 571, Q11; 572, Q14; 576, Q9; 598, Q19-21; 843, Q4.
- (29) Devon, 461, Q9; Foster, T.C., Letters on the condition of the people of Ireland, London, 1846, P203.
- (30) Devon, 571, Q12; 348, Q5.
- (31) Devon, 528, Q6.
- (32) Kane, R., The Industrial Resources of Ireland, Dublin, 1845, P289.
- (33) Devon, 727, Q11.
- (34) Devon, 595, Q14; 709, Q7; 727, Q11; 729, Q7.
- (35) Devon, 369, Q9; also 206, Q50.
- (36) Devon, 528, Q6.
- (37) Devon, 259, Q20.
- (38) Devon, 852, Q12-23.
- (39) Devon, 858, Q89; also 742, Q6.
- (40) Devon, 855, Q81.
- (41) Devon, 528, Q6.
- (42) Donnelly, J.S., The Land and the People of Nineteenth-Century Cork, London, 1975, P30.
- (43) Devon, 528, Q6.
- (44) Devon, 423, Q80.
- (45) Devon, 381, Q11.
- (46) Devon, 864, Q39; also 564, Q6.
- (47) Devon, 96, Q7.
- (48) Devon, 62, Q41.

- (49) Devon, 912, Q7.
- (50) Devon, 513, Q12.
- (51) Devon, 228, Q42; 270, Q29.
- (52) Skilling, T., *The science and practice of agriculture*, Dublin, 1846, P106.
- (53) *The Irish Farmers and Gardener's magazine and register of rural affairs*, Dublin, 1839, P31.
- (54) Devon, 268, Q13, 21.
- (55) Devon, 7, Q52.
- (56) Devon, 892, Q41.
- (57) Skilling, T., *op.cit.*, P107.
- (58) E.E. Evans, in the introduction to the facsimilie reprint of the 5th edition of Lord G. Hill, *Facts from Gweedore*, Belfast, 1971, P.XIV-XV.
- (59) Freeman, T.W., *Ireland*, London, 1972, P60-62.
- (60) *ibid.*, P58.
- (61) Bonn, M.J., *Modern Ireland and her Agraian Problem*, Dublin, 1906, P42; see also P37.
- (62) Devon, 186, Q5.
- (63) Walsh, T., Ryan, P.F. and Kilroy, J., *op.cit.*, P109.
- (64) Doyle, M., *op.cit.*, P420.
- (65) Devon, 270, Q15; also 7, Q171; 307, Q6.
- (66) Devon, 846, Q22; also 851, Q8.
- (67) Doyle, M., *op.cit.*, P420.
- (68) Kilroe, J.R., *op.cit.*, P29.
- (69) *Poor Inquiry*, Appendix F, P204, 251, 313; Devon 68, Q13; 79, Q11; 91, Q21; 101, Q13; 103, Q17; 118, Q12; 135, Q8; 163, Q16; 220, Q22; 250, Q13; 266, Q9; 514, Q10, 749, Q10; 789, Q56; 918, Q11; 938, Q8; see also *The Irish farmers' and gardeners' register*, Dublin, 1844, P233.
- (70) Summary of the results of the experiment tried under the direction of the Lords of the Committee of Privy Council, in 1845 and 1846, to obtain agricultural statistics in the Union of Hartley Wintney in England, the county of Edinburgh in Scotland, and Bailieborough Union in Ireland, P.P., 1847, Vol.LIX, P8.

- (71) See Foster, T.C., op.cit., P49.
- (72) Caird, J., The plantation scheme; or, the west of Ireland as a field for investment, Edinburgh, 1850, P11-12; also see Devon, 7, Q182.
- (73) Donnelly, J.S., op.cit., P37.
- (74) Armstrong, D.L., An economic history of agriculture in Northern Ireland, 1850-1900, unpublished Ph.D thesis, Queen's University Belfast, P347.
- (75) The farmer's guide, compiled for the use of the small farmers and cottier tenantry of Ireland, Dublin, 1842, P45.
- (76) Ibid, P91, P161.
- (77) E.E. Evans, Irish heritage, op.cit., P90.
- (78) Weld, I., op.cit., P658.
- (79) Devon, 26, Q20.
- (80) Bourke, P.M.A., the potato blight, weather, and the Irish Famine, unpublished Ph.D thesis, University College Cork, 1967, P131.
- (81) The Irish farmers' and gardeners' register, and manual of practical horticulture, floriculture, arboriculture, botany, etc. etc., Dublin, 1844, P36.
- (82) The farmer's guide ... op.cit., P91-92; The Irish farmers' and gardeners' register ... op.cit., P36; the wording of Devon, 812, Q9 suggests drill husbandry was not common.
- (83) The Irish farmers' and gardeners' register ... op.cit., P36.
- (84) Foster, T.C., op.cit., P51.
- (85) The farmer's guide ... op.cit., P92.
- (86) Evans, E.C., Irish heritage, op.cit., P93; see also Weld, I., op.cit., P660.
- (87) Evans, E.E., ibid., P91.
- (88) Doyle, M., op.cit., P399, also P570.
- (89) Donnelly, J.S., op.cit., P37; Armstrong, D.L., op.cit., P348.
- (90) Caird, J., P33., also Devon, 728, Q52; Weld, I., op.cit., P655.
- (91) Evans, E.E., Irish heritage, op.cit., P125.
- (92) N.W., 3-2-1844.

- (93) Barrington, R.M., "The prices of some agricultural produce and the cost of farm labour for the past fifty years", JSSISI, Vol.IX, 1886-87, P150.
- (94) Griffith, R., General valuation of Ireland: Instructions to valuers and surveyors, Dublin, 1853, P28. .
- (95) Devon, 306, Q30.
- (96) Barrington, R.M., op.cit., P148-151.
- (97) Poor Inquiry, Appendix F, P204, 220, 226, 232, 236, 246, 250, 256, 264, 268, 271, 289, 302, 306, 312, 315, 318, 322.
- (98) Devon, 255, Q38; Green, E.R.R., "Agriculture", in The Great Famine, P100; Devon, 259, Q25.
- (99) Bourke, P.M.A., Thesis, op.cit., P67, also P70.
- (100) Devon, 894, Q9.
- (101) Devon, 124, Q31.
- (102) Baldwin, T., Introduction to Irish farming, London, 1874, P27.
- (103) Devon, 270, Q83.
- (104) Doyle, M., op.cit., P419.
- (105) Devon, 17, Q71.
- (106) Green, E.R.R., op.cit., P105.
- (107) Poor Inquiry, Appendix F, P207, 229, 234, 249, 253, 258, 262, 266, 281, 286, 291, 295, 309, 313.
- (108) The following references in the Devon Commission give some impression of this. Unfortunately ambiguity between Irish and statute acres, grazing and fattening, etc., mean that a systematic processing of the references is not feasible. However, the thrust of the evidence does suggest that the best land in an area was generally utilised for grazing: Devon, 270, Q16; 276, Q28; 369, Q41-42; 416, Q29; 418, Q30; 444, Q26; 447, Q17; 463, Q26; 597, Q14-15; 617, Q13-15; 627, Q13; 628, Q17-20; 631, Q7-9; 644, Q19; 660, Q20-21; 663, Q14; 851, Q9; 1017, Q23-27.
- (109) Doyle, M., op.cit., P420.
- (110) Griffith, R., op.cit., P31; see also Devon, 1004, Q10.
- (111) Poor Inquiry, Appendix F, P207; also Devon, 369, Q32.
- (112) Devon, 416, Q20.
- (113) Devon, 308, Q12.

- (114) Poor Inquiry, Appendix F, P207, 254, 258; though also P313 (climatic factors?)
- (115) Poor Inquiry, Appendix F, P207, 251, 253, 277, 299, 303, 304, 307, 309, 313, 317, 321.
- (116) Poor Inquiry, Appendix F, P277.
- (117) Poor Inquiry, Appendix F, P303.
- (118) Caird, J., op.cit., P114.
- (119) Poor Inquiry, Appendix F, P229.
- (120) Poor Inquiry, Appendix F, P236.
- (121) Baldwin, T., op.cit., P144.
- (122) Poor Inquiry, Appendix F, P207, 229, 239, 253, 258, 261, 269, 273, 277, 281, 286, 295, 299, 317.
- (123) Devon, 416, Q20; also 684, Q5.
- (124) National Library of Ireland, Larcom Papers, Ms7525, letter of Kennedy to Larcom 15-8-1843.
- (125) Lyons, J., "The history of our dairying industry", Agricultural Ireland, Vol.16, 1959, P159; Donnelly, J.S., op.cit., P41.
- (126) Crotty, R.D., Irish agricultural production: its volume and structure, Cork, 1966, P87.
- (127) Poor Inquiry, Appendix F, P208.
- (128) n.a., "The dairying industry in Ireland", in Coyne, W.P.(ed) Ireland: Industrial and agricultural, Dublin, 1902, P236.
- (129) ibid., P239.
- (130) e.g. Devon, 800, Q27; 687, Q8; Griffith, R., op.cit., P32; also Poor Inquiry, Appendix F.
- (131) Devon, 463, Q26.
- (132) Devon, 684, Q13.
- (133) Doyle, M., op.cit., P545.
- (134) Donnelly, J.S., op.cit., P43.
- (135) Shaw, A.W., "The Irish bacon-curing industry", in Coyne, W.P., op.cit., P243.
- (136) Poor Inquiry, Appendix F, P251.
- (137) Poor Inquiry, Appendix F, P227, 265, 269, 372, 383, 387.

- (138) The Irish farmers' journal, 1845, P904.
- (139) Poor Inquiry, Appendix F, P251, 269, 285.
- (140) The Irish farmers' journal, 1845, P903-4.
- (141) Devon, 484, Q73; 349, Q16; 598, Q19.
- (142) Doyle, M., op.cit., P420.
- (143) Gourley, R.S., The social and economic history of the Gosford estates 1610-1876, unpublished M.Sc.(Econ) thesis, Queens University Belfast, 1973, P165-6.
- (144) Devon, 734, Q4; 965, Q7; 416, Q20.
- (145) Devon, Report, P53.
- (146) Lord George Hill, op.cit., P18.
- (147) Connell, K.H., "Illicit distillation", in Irish peasant society: Four historical essays, Oxford, 1968, P10-11.
- (148) Booth, R.G., Second report from the select committee of the House of Lords, on colonization from Ireland, P.P.1847-48, Vol.XVII, Evidence Q2709-12.
- (149) Caird, J., op.cit., P84-5.
- (150) Freeman, T.W., Pre-Famine Ireland: a study in historical geography, Manchester, 1957, P42.
- (151) Cousins, S.H., "The restriction of population growth in pre-Famine Ireland", Proceedings of the Royal Irish Academy, Vol.64, C, P90.
- (152) Armstrong, D.L., op.cit., P521-523; these are not mentioned often in the literature of the pre-Famine period.
- (153) Foster, T.C., op.cit., P17.
- (154) Poor Inquiry, Appendix D, P30, 27.
- (155) Carney, F.J., "Aspects of pre-Famine Irish household size: composition and differentials", in Cullen, L.M. and Smout, T.C. (ed), Comparative aspects of Scottish and Irish economic and social history, 1600-1900, Edinburgh, P36.
- (156) Griffith, R., op.cit., P33.
- (157) Weld, I., op.cit., P141-2.
- (158) Poor Inquiry, Appendix F, P206, 242, 257, 261, 265, 269, 272, 286, 290, 295.
- (159) This section relies heavily on Bourke, P.M.A., Thesis, op.cit., P67, 131.

- (160) Weld, I., op.cit., P185; Bonn, M.J., op.cit., P48.
- (161) Foster, T.C., op.cit., P14.
- (162) Devon, 190, Q54.
- (163) Devon, 740, Q28.
- (164) Pim, J., The condition and prospects of Ireland and the evils arising from the present distribution of landed property, with suggestions for a remedy, Dublin, 1848, P68.
- (165) Devon, 416, Q76.
- (166) 1841 Census, Form B, p.xcii.
- (167) National Library of Ireland, Larcom Papers, Ms.7525, letter of Kennedy to Larcom, 15/8/43.
- (168) Public Record Office of Northern Ireland, Tandragee Estate Office Papers, D1248/X.
- (169) e.g. Devon, 77, Q75; 83, Q57; 71, Q58; 90, Q89; 91, Q22; 92, Q67; 94, Q82; 95, Q22; 96, Q45; 97, Q84; 101, Q86; 102, Q46; 109, Q9; 115, Q62; 132, Q29; 138, Q88; 139, Q28; 152, Q67; 167, Q31; 186, Q35; 202, Q31; 206, Q50; 207, Q53; 208, Q86; 209, Q57; 213, Q31; 254, Q59; 270, Q116; 343, Q32; 548, Q42; 578, Q17; 867, Q17; 891, Q40; 652, Q4,5; 848, Q29; 858, Q88; 864, Q37.
- (170) Devon, 652, Q4.
- (171) Devon, 454, Q62.
- (172) O'Grada, C., "Seasonal migration and post Famine adjustment in the west of Ireland", Studio Hibernica, No.13, 1973, P52.
- (173) Devon, 891, Q39.
- (174) Devon, 894, Q23; 978, Q51.
- (175) Devon, 248, Q2.
- (176) Johnson, J.H., "Harvest emigration from nineteenth century Ireland", Institute of British Geographers, Transactions, No.41, 1967.
- (177) Devon, 652, Q31; also 720, Q8.
- (178) Maguire, W.A., The Downshire estates in Ireland 1801-1845: The management of Irish landed estates in the early nineteenth century, Oxford, 1972, P29.
- (179) e.g. Lyons, F.S.L., "Vicissitudes of a middleman in County Leitrim", Irish Historical Studies, Vol.IX, 1955.

- (180) Donnelly, J.S., op.cit., P12.
- (181) ibid., P13-14 for examples of this.
- (182) Poor Inquiry, Appendix F, P142, 144, 145, 148; Donnelly, J.S., op.cit., P53.
- (183) Poor Inquiry, Appendix F, P142, 146, 148, 154, 160, 167, 171, 181.
- (184) Poor Inquiry, Appendix F, P154, 156, 158, 159, 160, 164, 168, 171, 173, 177, 198.
- (185) Donnelly, J.S., op.cit., P52.
- (186) Maguire, W.A., op.cit., P20, 69.
- (187) Devon, 555, Q12.
- (188) Poor Inquiry, Appendix F, P143.
- (189) Poor Inquiry, Appendix F, P143.
- (190) Poor Inquiry, Appendix F, P2.
- (191) Poor Inquiry, Appendix F, P1, 3, 18, 19.
- (192) Poor Inquiry, Appendix F, P1-36; 1 rood 5 witnesses;
1-2 roods 11 witnesses.
- (193) Poor Inquiry, Appendix F, P31.
- (194) Poor Inquiry, Appendix F, P4, 5, 10.
- (195) Poor Inquiry, Appendix F, P4; also P1, 3, 11, 12, 14, 16, 21, 29, 33, 34.
- (196) Poor Inquiry, Appendix F, P19, 20.
- (197) Poor Inquiry, Appendix F, P9; also P6, 8, 17, 23, 24, 25, 29, 32.
- (198) Poor Inquiry, Appendix F, P3, 4, 7, 8, 10, 11, 13, 14, 15, 16, 18, 19, 23, 30, 31, 32.
- (199) Poor Inquiry, Appendix F, P4, 8, 12, 14, 15, 16, 18, 19, 20, 25, 30, 31, 33, 34.
- (200) Poor Inquiry, Appendix F, P3, 11.
- (201) Poor Inquiry, Appendix F, P3, 10.
- (202) Poor Inquiry, Appendix F, P3, 12.
- (203) Bourke, P.M.A., "The extent of the potato crop in Ireland at the time of the Famine", JSSISI, Vol.XIX, 1959, P8.

- (204) Several aspects of this are seen in Bowen, D., *The protestant crusade in Ireland, 1800-70: A study of protestant-catholic relations between the Act of Union and Disestablishment*, Bristol, 1978, P127-192.
- (205) Trench, W.S., *Realities of Irish life*, London, 1966, P27.
- (206) Lewis, G.C., *Local disturbances in Ireland*, Cork, 1977, P77.
- (207) Broeker, G., *Rural disorder and police reform in Ireland, 1812-36*, London, 1970, P212.
- (208) Lee, J., "The Ribbonmen", in Williams, T.D. (ed), *Secret societies in Ireland*, Dublin, 1973, P28.
- (209) A statement of the amount of constabulary force in each county, county of a city, and county of a town in Ireland, P.P. 1844, Vol.43: P.P. 1851, Vol.50.
- (210) Crotty, R.D., *op.cit.*, P42; also P36, 47.
- (211) *ibid.*, Appendix I, P293.
- (212) *ibid.*, P286, "beef prices do not appear on the whole to have increased as rapidly as other prices did" in the period 1786-88 to 1816-20.
- (213) Lee, J., "Irish Agriculture", *Agricultural History Review*, Vol.17, 1969, P68-70.
- (214) Crotty, R.D., *op.cit.*, P276-7.
- (215) *ibid.*, P43.
- (216) Bourke, P.M.A., "The agricultural statistics of the 1841 census of Ireland: A critical review", *Economic History Review*, 2nd series, Vol.XVIII, 1965, P382-391.
- (217) Kohl, J.G., *Travels in Ireland*, London, 1844, P19.
- (218) Hall, Mr. and Mrs. S C., *Ireland: its scenery, character etc.*, (3 vols), London, 1841, Vol.II, P373.
- (219) *Devon*, 6, Q63.
- (220) Bellerby, J.R., "Distribution of farm income in the United Kingdom, 1867-1938", *Journal of Proceeding of the Agricultural Economics Society*, Vol.10, No.2, 1953.
- (221) *ibid.*, P139.
- (222) de Beaumont, G., *Ireland: social, political and religious*, London, 1939, Vol.I, P299.
- (223) Crotty, R.D., *op.cit.*, P52.

- (224) 1841 Census, P434.
- (225) de Tocqueville, A., Journeys to England and Ireland,
translated by G. Lawrence and K.P. Mayer, ed. J.P. Mayer,
London, 1958, P158.
- (226) Thom's Irish Almanac and official directory, 1848, P165.

CHAPTER IV

AGRICULTURAL PRODUCTION, 1845-47

"Small farmers cannot till because they have not seed, and because they cannot purchase it; large farmers cannot procure labourers sufficient for their purposes, because they cannot give them wages and food as heretofore."

Correspondent of Tipperary Vindicator.

Introduction.

The radical restructuring of agricultural production that occurred in Ireland over the Famine period demonstrates the dynamic potential of a peasant economy. Between the years 1841 and 1851 the number of cattle and sheep in Ireland increased by over 20%. This took place against a background of terrible mortality and large-scale emigration. The mechanism by which these changes occurred is clearly of great interest and it is unfortunate that the statistics of agricultural production, which begin in 1847, had not been collected even a year earlier.

The break in statistics between the tables of the rural economy contained in the 1841 Census and the official agricultural returns from 1847 in itself would suggest that we look at the Famine era in two periods, pre 1847 and afterwards. Since there were no major shocks in the first half of the decade we can reasonably take the Census data to represent 1845, when we also have adequate estimates of the potato acreage.

Although the division of the Famine period is forced upon us by the available statistics, there are also other factors which support this approach. While 1845 saw the potato crop seriously affected by the blight, the profound shock to the rural economy came with the devastation of the 1846 crop. Thus 1847 was the first year of recovery as regards agricultural production (though this was also the harshest of the Famine years). The period 1845-47 thus encompasses the blight and the first step taken after it. The detailed examination of these years gives an indication of the

mechanism whereby the rural economy responded to the blight. This can be made much more clear if we telescope the two years together and consider the position of the individual peasant abstractly at first, along the lines of the model developed in the first chapter. This can then be brought closer to reality by looking at the effects of the blight on four different types of farm, drawn from the evidence contained in the 1841 Census and our previous analysis. From such a standpoint we go on to an analysis of the course of change in the rural economy in general for the period 1845-47.

The effect of the blight:

Although the physical effect of the blight was obvious in the stench of decaying vegetation, its economic consequences require more elaboration. We can divide them, to begin with, into two separate components, the income effect and the cost effect.

(a) The income effect: the potato crop was an output for the peasant farm like any other. In our model we assumed that all outputs were marketed at the end of the production cycle. If we assume for convenience that the whole of the potato crop was lost then this would entail a loss in anticipated income for the peasant farm.

The magnitude of this loss will depend on a number of factors. Obviously the relative weight of potatoes in the output mix of the farm will be of major importance. The larger the proportion, the greater the loss of anticipated income. However, the loss of the potato crop will entail substitution by other commodities, which will entail an increase in their price. Thus the fall in income due to

the loss of the potato crop could be compensated by higher prices for other produce, depending on their relative importance in total output.

(b) The cost effect: we now shift our attention from the cycle which suffered the blight to the following cycle. The potato now changes from being an output to being an input. First and foremost to an analysis of the Famine, the potato was the staple article of consumption for the rural population. If the wage rate was close to the subsistence level (in the sense we have treated the question when dealing with the supply of labour hours) then we would expect an increase in the wage rate proportionate with the rise in the price of foodstuffs.

The analysis of the peasant economy which we have developed suggests that substitution characterises the relationship between factors of production. Thus we would expect substitution against labour in production, that is, labour intensive outputs would, *ceteris paribus*, be reduced and outputs using less labour increased. The potato and its substitutes like cereals, were also used as inputs for livestock. Again substitution against these inputs would operate, most likely in favour of land.

The blight and the particular farm:

The above analysis of the effect of the blight is useful for dealing with the aggregate economy for its concepts are easily grasped. However, in order to make the hypothesis concerning the Famine changes in production more precise it is worth looking at the comparative static analysis developed previously. In order to make the discussion

more relevant to the Famine period, we will consider in detail the position of four different types of farm as described in Table 4.1. The livestock figures for this table come from the 1841 Census. Due to ambiguity about the acreage units, the Ulster counties have been removed from the aggregate figures. We have assumed that the average holding for each division was in the middle of the acreage range and this has been converted to statute measure. The estimate for the potato acreage is based on pig numbers and the equation estimated in the previous chapter. The corn and pasture figures are guesses from the analysis of cropping practice. It should be clear that Table 4.1 is only a very rough guide to typical pre-Famine farms. However, it does give us a tangible framework with which to approach the period.

In the model developed of the peasant economy, the effect of an increase in price of any commodity upon the demand for an input was considered as the result of three effects - those of budget, output and input substitution. We develop the analysis with relation to the potato even though this is, to a large extent, too elaborate for the overall analysis of the rural economy. Its advantage is, that in developing one area in detail we highlight the central features of the adjustment mechanism and also the types of assumption we are forced to make.

Table 4.1

Estimates of agricultural production on pre-Famine farms.

Area (st.acres)	cattle	horses	pigs	potato acreage	corn	pasture
4	1	0	1	2	2	1
16	2	$\frac{1}{2}$	$1\frac{1}{2}$	3	5	4
37	4	$1\frac{1}{2}$	3	6	12	12
>49 (?)	14	3	$5\frac{1}{2}$	11	22	?

We must note at the outset that the comparative static approach relates to a system which has been displaced from equilibrium by a small change in one of the parameters. This we are taking to be a rise in the price of potatoes. To give the analysis a more concrete form we will consider the effect of this price rise upon the demand for cows, taken as inputs to production. (In this case we take cows to be homogeneous commodities, not specified by age.)

Given that the system has been in equilibrium, we may now look in turn at each effect which the rise in price of potatoes will have upon the demand for cows, beginning with the budget effect. This will take account of two forces. Firstly, the rise in the price of potatoes will increase the income of the peasant, taken as the sum of physical commodities, valued at market prices, in the possession of the peasant at the conclusion of the previous cycle. However, this income is purely nominal. The increase in the price of potatoes will lead the peasant, in the general case, to allocate more of his income to consumption if he is to maintain its real level. If the peasant's consumption is predominantly potatoes then his income may not suffice to ensure the minimum consumption for his continued survival. This will be the limiting case.

This need to allocate more of current income to consumption will also affect the investment budget. We cannot say in general whether it will be reduced or increased. A peasant who is wealthy may consume few potatoes as we consider them to be inferior goods. In this case the extra amount allocated to consumption in order to maintain its real level will be small. The increase in income due to the rise in price of potatoes could more than cover this and lead to a larger investment budget.

The second element in the budget effect will be the consequence of the change in the investment budget upon the demand for cows. By our earlier assumptions we would expect that less cows would be demanded as the investment budget fell. For wealthier peasants the reverse would operate and thus the sign of the budget effect is indeterminate.

Let us now consider the output substitution effect. The rise in the price of potatoes will increase the expected price of potatoes in the following year and this we would expect to stimulate potato production. What effect more of the investment budget being allocated to potatoes would have on the demand for cows would depend on whether or not there was some input-output complementarity present. Generally we would consider the effect would be negative.

The same type of considerations operate as regard the input substitution effect. The rise in price of potatoes will lead to substitution against them as inputs. The effect of this on the demand for cows would depend on the technical relationship between the two and the alternative inputs available. Thus if the alternative fodder crops were more expensive, the substitution of them for potatoes might lead to a drop in the demand for cows, due to their reduced profitability. Both substitution effects are therefore indeterminate though probably negative. This emphasises the importance of the budget effect in the overall summation, as it is the only one which could be decisively positive.

The comparative static analysis we have undertaken does not, from the above, appear to be very instructive. However, it does serve to highlight areas in the analysis which are of special interest.

First and foremost is the importance of the budget effect. The discussion on the output substitution effect would suggest that one effect of high potato prices would be to encourage their production in the following cycle. One factor operating against this would be the high cost of seed potatoes. Still, to reinforce this we may assume that the blight imposed a shift in the production function against potatoes, which would severely weaken the output substitution effect.

The major weakness of the comparative static analysis is that it occurs in the neighbourhood of equilibrium. In the case we are considering this means that the markets have settled after the initial shock of the blight. Thus the rise in price of the potato which we deal with in the comparative static approach is subsequent to the major market effect caused by the blight, which is our central interest. On the other hand, the tâtonnement process may be considered as the summation of comparative static experiments over all individuals and markets. This is the heart of the matter. Thus although the analysis developed above is too elaborate for our purposes, by pursuing it for a while we gain an insight to the adjustment process which is valuable for even a less sophisticated approach.

We will continue to look at the blight attack in terms of three effects, but in a more general sense than in the above analysis. To begin with we will consider the markets for only three commodities - cows, cereals and potatoes. Other commodities will be considered as subsidiary to these. The potato crop will be assumed to have failed completely and the production function to have shifted against it.

Thus to the peasant producer, the same level of inputs used prior to the blight will now give a lower expected yield. We assume that this dominates any price expectation effect.

The income effect of the potato blight will differ between farming units. The relative effect can be gauged by considering the ratio of the potato acreage to the cereal and also the potato acreage to the number of cows. (We are taking holding size to be a measure of the productive potential of farming units.) On both these counts, the smaller holdings are clearly the ones worst affected by the blight. We would expect that the larger holdings would have roughly double the potato acreage in cereals. This would be further emphasised since it is likely that some part of the potato acreage on the larger farms would be in con-acre or free crop. The blight would have left the labourer without subsistence for the future. On the other hand, the farmer would have had the labour of his subtenant through the spring and summer. Thus for these acres under con-acre, the farmer would not have suffered a pressing loss.

We can simplify the objectives of the peasant's on the smaller holdings to being survival. Their staple foodstuff had been lost. The physical commodities they are left with amount to their cow and corn. Upon this there are several claims. First of all there is the rent for the land which had been used in the previous cycle. Roughly speaking, the cereal crop and the butter and calf produced by the cow paid for this. If the peasant is going to stay in production then not only will the rent have to be paid but also the cow will have to be fed over the winter. Previously the straw from the corn crop and the potato ensured this. Thus we had two pressures

on the peasant, to find the rent for the past year and the fodder to keep his livestock going over the winter. This is on top of the immediate drive of his own survival.

Unfortunately his troubles do not cease even here. The production plan for the next cycle will not be the same as the blight cycle. The potato has been characterised in our analysis as an inferior good which was the dominant means of subsistence of the majority of the rural population. In the absence of this, people will shift their diets to other foods. These will be generally foodstuffs previously rejected as being beyond the peasant's budget. If a large proportion of peasants are near to the physical subsistence minimum, then the result will be an automatic increase in the real price of labour. It is worth emphasising that this will occur even if the price of corn does not increase beyond the previous year's level.

However, let us now assume that the price of corn is set internationally and that this experiences a sharp rise. This will have two consequences. One will be that, by our simple expectations model, that the peasant will consider corn likely to be a profitable crop to plant in the coming year. On the other hand the cereal crop is a more labour intensive output than dairy products (we consider the farm to have three outputs - dairy (calf and butter), cereals and potatoes.) Labour costs have risen substantially and this will run contrary to the price-expectation effect. It is likely that the labour cost effect will dominate the price one as the latter would likely be associated with a particular crop failure.

Thus, on the production side, the new cycle's outputs will tend to shift from the labour-intensive crops like potatoes and cereals to livestock products, butter and calves. The pattern of inputs into agricultural production will also change. Our estimates of land utilisation on smallholdings indicate very little pasture and even this was likely to be waste ground. The feedstuff tended, as indicated in our previous chapter, to be straw and potatoes in the winter. These would be highly priced in the coming cycle and would be substituted for by grass and hay. However, matters do not end here. The provision of fodder for livestock would be reflected in the current crop plantings. There would be a swing away from labour intensive fodder crops to ones which used land more extensively.

This movement to reduce the level of labour input would be evident as well in the mode of crop cultivation. As we have seen in the previous chapter this would be achieved mainly by the reduction of manure inputs, which were substantially a labour charge. A consequence of this would obviously be a drop in yield. With this swing away from labour then, how would the various types of farm fare?

A crucial point to remember in attempting to answer this question is the proportion of the household labour expended on the holding. The smallholding in Table 4.1 is labour surplus and thus part of the household's income is derived from wages earned by working for other farmers. Now a consequence of the blight will be a considerable excess supply of labour which will greatly reduce the chance of the smallholder gaining such employment.

The smallholder is thus in an unenviable position. The labour required on his holding has been greatly reduced. There are economic forces lowering the crop to gain ratio on the farm which will be further emphasised by the shift in the production function against the potato. The net income per acre from the holding we would thus expect to fall, though this assumes that the rent level remains constant. To avoid this assumption, we will extend the concept to that of a surplus. The economic surplus of the farm, per acre, we would expect to fall.

Thus the smallholder is caught by two forces. On his particular acreage, unless his landlord abates the whole of the rent, his income will have fallen considerably. Outside his farm the chances to earn wages are slim. The response would be to attempt to extend his livestock and to take on more land. Unfortunately we has just suffered a loss of income from the blight. The cost of subsistence for himself and his family has dramatically increased, as has the cost of maintaining livestock. The opportunities for earnings outside his own holding have been greatly reduced, which previously contributed significantly to his income. On top of all this he is to increase his livestock holdings.

Clearly, if the smallholder's pre-Famine income was close to the physical minimum there is very little likelihood of him being able to do this. There are some ways whereby a very few could have continued and increased their production. They might have had some cash resources or a more wealthy relative. The blight might not have affected some fields and this would have given the tenant a windfall gain. He might have been employed by a landlord who kept

the contract going. Generally though, we would expect the smallholder to be left destitute.

We have studied the position of the smallholder closely as the forces acting on him, which will operate throughout the rural economy, are most dramatically illustrated. The direct income effect of the blight will, however, be proportionally less as potatoes are a smaller part of total output. Thus as we move from the smallholders towards the wealthier farmers the loss due to the blight is reduced and, most importantly, is likely to be offset by the increase in cereal prices.

The new wage level will still affect all farmers, but as long as he is not forced to seek employment outside his own farm, this will not have a major effect on his income. Thus the larger the farmer, the more important cereals and livestock products would be in his output mix and the more likely he would benefit from the blight. The better-off farmer would not be seeking employment so the existence of an excess supply of labour would not in itself affect him.

Despite his potential income gain, the new price regime will force changes in production upon even the middle range of peasants. Although production on these types of farms was less labour intensive compared to smallholdings, there would still be a pressure to substitute land for labour. In order to maintain their income in the long-term these farmers would have to increase their livestock numbers. Unlike the smallholders they would be in a much better position to achieve this. Not only would the resources of the farmer be greater but the reorientation towards livestock would be less

extreme as livestock were already an important part of production. Even so, fodder would be more expensive and any labour required would also have increased in cost. The greatest difficulty in adjustment would be for the farmers in the strata immediately above the labour surplus farms, where potatoes had been important as products, where a substantial part of the cereal crop would have been utilised on farm and where a major switch towards livestock would be required.

If we now look at the grazier, we see a type of farm which will scarcely be affected by the blight. Little labour was required as there were few crops grown, the stock carried over the winter being relatively small. Any changes in production would be due expectations concerning cattle prices. Thus if we begin with the grazier and move towards the smallholders two conflicting trends are in evidence. Firstly, the pressure to change production plans increases as we make the movement. Secondly, the ability to affect these changes decreases as we approach the smallholders. With this in mind we can make some general observations concerning aggregate supply and demand for particular commodities.

Let us begin with the market for cows. In our basic model we assume that all commodities are traded at the end of the cycle and thus we can concentrate on the demand side. In reality we would have expected the immediate supply of cows to come from smallholders who had been made destitute and the continuous replacement process which would have covered depreciation. As regards demand we have noted that it will reflect the pressure to move away from labour intensive production. This will in turn be reflected in a desire by farmers generally to increase the size of their holding. Since the land

market is so closely related to the one for cows it is worth looking at it in more detail. The pressure to increase holding size does not amount to an outward shift in the demand curve for land. There will be a shift in the curve but its direction is indeterminate. While the increase in the wage level, *ceteris paribus*, will result in an outward shift, all other things are not equal. The prices in the cereal and cow markets will change and we cannot neglect the effect of the blight on income.

To attempt to resolve these conflicting influences let us consider the individual's demand schedule. Now all farmers, with the exception of the graziers, will be altering their production plans to stress livestock production. Whether we consider the land or cow market, the extent to which the farmer can achieve his aim depends on his resources and by this the income effect of the blight. As regards the smallerholder this effect was substantial and negative, though as we consider better-off peasants the negative effect is reduced and for some will be positive. Let us consider the following example: all markets but the one for cows are in equilibrium. We wish to compare the demand curves for cows in two areas, one with a fairly low pre-Famine average holding size, the other with a higher one. Total resources in the two areas are the same, valued at current market prices. As the price of cows varies, the resources are adjusted to maintain this equality. From our analysis we expect that the aggregate demand curve in the area with the higher average holding size would lie to the right of the curve for the other area. In general, the more substantially negative the income effect of the blight has been, the more to the left the demand curve will lie.

Before we attempt to derive any conclusions from this, let us look first at the alternatives open to the peasant apart from participating in production. For the Famine era these were twofold. Firstly there were the welfare provisions provided by the State. It is likely that the peasantry regarded these as very inadequate and to be avoided at all costs. The second alternative, emigration, was much more significant, and affected most of all the small farmers above the smallholders. They would have to sharply increase their livestock numbers and would have the resources to bid up the price of cows and thus land, even though this might have entailed a lower income in the short run. They would have remained in the market as buyers longer than in the case where there was the possibility of emigration as this establishes a trade-off between future expected income abroad and the expected income from maintaining agricultural production in some form. Without emigration the only alternative to production is the mercy of the State. Its existence sets a floor to the level of future expected income considered adequate by the peasant, which will be above the physical minimum, the floor without emigration.

Let us consider a simple model of emigration, where income levels abroad are constant and the passage has a fixed cost. There is major disutility attached to emigration, based on uncertainty concerning the new land and the emotional cost of leaving the homeland. The only variable influencing the peasant's decision is thus future expected income. Let us assume that the prices of cows and labour are taken as a rough measure for future income, price expectations for outputs being assumed to have already been formed. To the peasant forced to increase his livestock numbers, a relatively small increase in the

price of cows or labour could easily make him emigrate. Given that there were a large number of small farmers in that position we would expect that small increases in the price of cows would lead to substantial emigration. The existence of emigration thus has the important consequence of making the aggregate demand curve for cows and thus land substantially more elastic and shifting them to the left. We would thus expect that any price change in the market for cows would be moderate.

As a final note we must recognise that though the price changes make it likely that for many peasants, their future expected income will be lowered, it also means that their resources at the end of the blight cycle could be substantial in nominal terms. Once the rent is paid and also the outlays for the coming year then the nominal nature of the value of the resources is cruelly apparent. However, if the peasant defaults on rent then quite a substantial number who would have probably been reduced to destitution had they remained in production, could take their chances with the emigration ships.

We conclude our analysis of a simple model of the blight with a short summary. The blight leaves no potatoes and shifts the production function away from the crop. In addition, the cereal price which is set internationally is suddenly raised. This, together with the production function shift, causes a significant increase in the cost of labour. Production plans are changed away from outputs and methods that are labour intensive towards livestock husbandry. Thus farmers with the same level of expected real income will have, after the blight, substituted land and livestock for labour. This demand for cows and land will not cause a sharp rise in their price because of

emigration. As well as the increased elasticity of the demand curves due to emigration, the blight will lead to a shift in them through its effect on income. The direction of this will be ambiguous because the higher cereal price will counteract the loss of the potato crop.

The Course of Agricultural Production, 1845-47.

We have developed a model of the rural economy which has suffered a shock in the failure of its basic foodstuff. Even with a simple model though it is perplexing how indeterminate or sensitive to assumptions its results are. Its advantage is its explicit framework with which to approach the period; it suggests a mechanism by which changes occurred and thus highlights special areas for investigation. The model and the changes in production over the period detailed below are separated only in exposition. They cannot be contrasted as a priori and a posteriori. Taken together it is hoped that they explain, rather than speculate or narrate.

We can divide the changes in the rural economy into several major areas. First of all we look at the income effect of the blight. Production changes we have divided broadly into tillage and livestock. Lastly we note the course of emigration during the period.

(1) The income effect: before even looking at the incidence of the blight it is worth pausing and observing the state of the rural economy in the early 1840's. The most useful short hand measure is the series of prices of the principal agricultural products presented in Fig.4.1. Unfortunately the livestock series can only be taken back to 1841, though for sheep and cattle the picture is one of slight depression for the early 1840's. When we look at oats and butter, the major

Fig 4-1

Prices of several agricultural products, 1831-54

1853 = 100

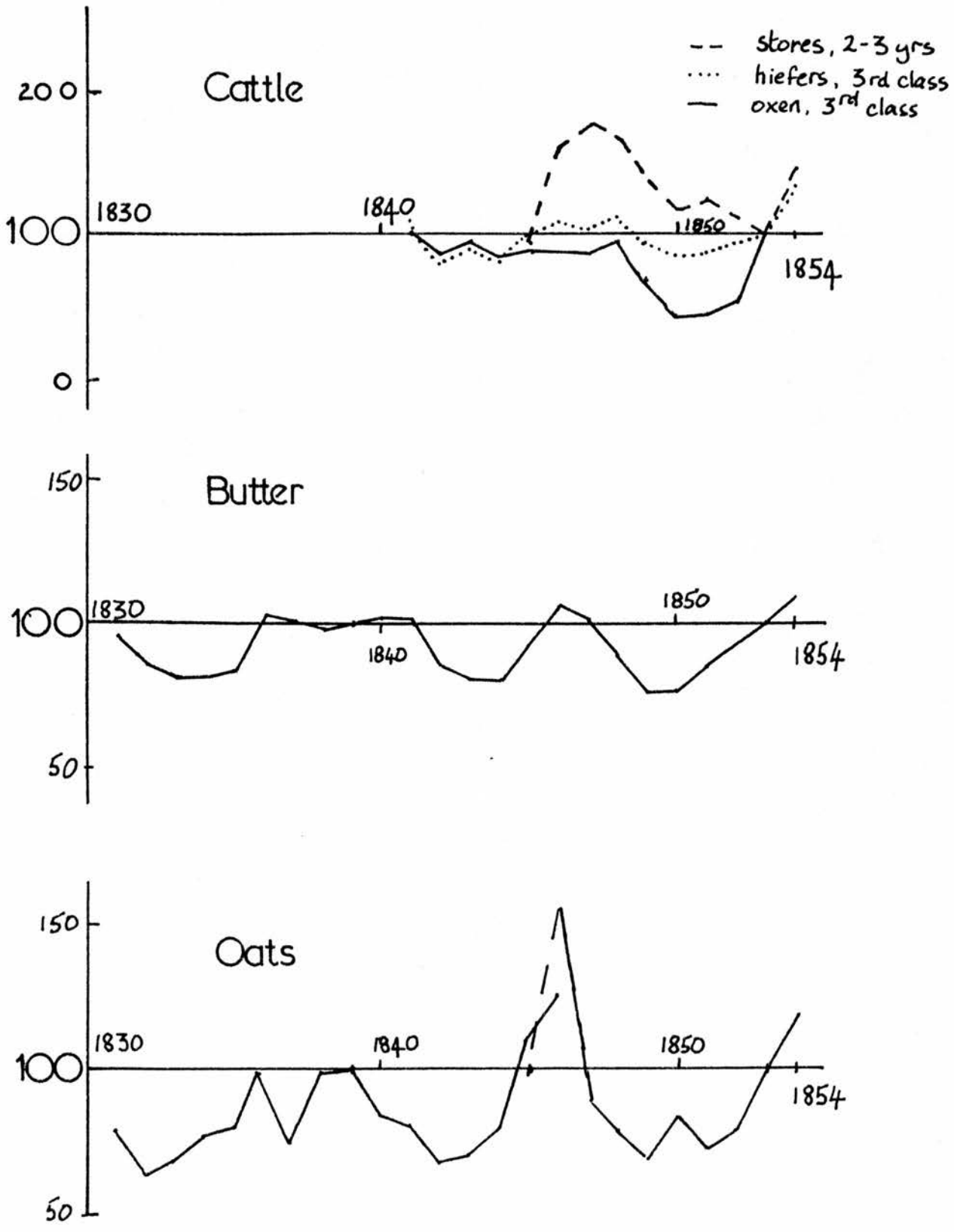


FIG 4.1

Sources: The prices of oats, butter and stores 2-3 years were taken, from 1845, from Barrington, T., "A review of Irish agricultural prices", JSSISI, Vol.XV, 1927, P251. Those for heifers and oxen are Ballinasloe prices, as contained in Report on wholesale and retail prices in the U.K. 1902, with comparative statistical tables for a series of years, PP1903, Vol.LXVIII, P110. The earlier price series for oats and butter came from the series contained in the Northern Whig, 1844. These were weighted by the quantities of oats brought to Cork Market in 1844 as contained in the Cork Examiner of that year and the butter deliveries recorded in n.a., "The dairying industry in Ireland", in Coyne, W.P.(ed), Ireland: Industrial and agricultural, Dublin, 1902.

outputs of the smaller farms, the position becomes much more gloomy. In both cases the price series resembles the poor years of the early 1830's.

Early in 1844 a writer in the Northern Whig referred to the "present depressed state of agriculture",⁽¹⁾ and there are scattered references to landlords who had reduced rents. It was the "past and present depressed prices of grain and cattle" which formed the basis of Trench's baptism in estate management at Farney in 1843.⁽²⁾ Though 1844 was described as a year with "full average crops" and "remunerating prices",⁽³⁾ maybe better than previous years, the picture that emerges is of a depression which would have pressed hardest upon the smallholders. We would not expect them to have considerable reserves: rather they were attempting to have their rent reduced.

We turn now our attention to the year 1845. The oat and barley crops were above average, the wheat crop average. Despite the loss of part of the potato crop farmers were "well paid for their crops" and were "in a safe and prosperous state".⁽⁴⁾ The price of oats was the highest it had been for over a decade; butter prices had increased and so too had cattle. Against this, it is estimated that the total output of potatoes fell by almost one third.⁽⁵⁾ It is impossible to give any reliable estimate of the size and type of farm on which the shortfall in the potato crop would have been matched by the increased prices of agricultural produce. However, we can be fairly sure that the trend in the years immediately prior to 1846 was to increasingly pressurise the smallholder, while the larger farmer did substantially better.

1846 was a year when the shock of the blight and its consequences would have sharply affected almost all farmers. The estimated potato output was about one-fifth of the 1844 level.⁽⁶⁾ Although cereal prices climbed even higher than in 1845, crop yields were poor. In Monaghan the crop was considered to be one-third less than average yield, it was a "poor, light crop" in the region generally.⁽⁷⁾

(Later it was considered that the deficiency was even greater than first thought.) The flax crop had half the usual yield.⁽⁸⁾ Cattle prices were stable, though there were outbreaks of disease. This did not prevent a speaker at a tenant-right meeting declaring that the large farmers "had suffered nothing by the calamity of this year." On one estate, when rent reductions were being calculated, it was considered that the larger farmers had the "advantage of unusually high prices, which makes up for the loss of the potato crop."⁽⁹⁾

Thus in both blight years not all farmers suffered; many more though, would have done much better in 1845 than 1846. In the latter year, the profits of the overwhelming majority of farmers would have been reduced.

(2) Production changes 1845-47: The changes in this period we have considered to have occurred under the impulse of two major forces - the shift in the production function away from the potato and high labour costs, superimposed upon the loss of income due to the blight.

Unfortunately it is impossible to distinguish statistically between the income loss and any shift in the production function; given the state of data available. If we look at Regression 1 in Table 4.2 below we can see that the change in the potato acreage between 1845 and 1846 is successfully explained by four variables. The role played

by the proportion of the 1845 crop lost is clearly major. This could be interpreted as peasants appreciating the function change more rapidly the harder they were hit though the income effect would also be important. The latter would be also caught by the number of cattle on holdings 1-5 acres. This would represent a measure of the relative importance of smallholders who were the most severely affected section of the rural economy. It must be noted though that the idea of a shift in the production function is only an approximate concept for a number of different considerations, such as expected yield as well as the purely technical aspects due to the potato type and manure rate. The significance of the proportion of the crop in conacre indicates the abandonment of this practice by many farmers and labourers due to the loss on the operation they would have suffered in 1845.

The change in the potato acreage from 1845 to 1847 can be explained by two variables, the townland valuation and the number of cattle on holdings 1-5 acres, as seen in Regression 2. This demonstrates the intensity of potato cultivation on smallholdings and the decimation of this section of the rural economy during the Famine era. Various combinations of holding groups were run in this test but the 1-5 one gave the best fit.

Both the regressions we have referred to relate to the southern 23 counties due to ambiguities concerning the acreage units in Ulster. When the 32 counties are taken together, as in Regression 4, the best fit is given by cattle in the holding group 1-15 acres. This is probably due to the acreage unit used predominantly in Ulster being smaller than the one for the rest of the country. Since the same

Table 4.2

Agricultural production 1845-47: some statistical relationships.

1. Data Southern 23 counties.

Y = Change in potato acreage 1845-46

 X_1 = No cattle on holdings 1-5 acres X_2 = Townland - land X_3 = 1845 conacre proportion X_4 = Proportion of 1845 crop lost

$$Y = 30,969.3 - 0.344X_1 - 0.095X_2 + 544.140X_3 - 74,092.4X_4$$

(3.2) (2.1) (11.7) (2.2) (2.7)

$$R^2 = 0.8987 \quad \text{Anovar F test} = 39.9 \quad \text{Durbin-Watson} = 2.528$$

2. Data Southern 23 counties.

Y = Potato acreage change 1845-47

 X_1 = Townland - land X_2 = Cattle on holdings 1-5 acres

$$Y = 42,106.1 - 0.306X_1 - 2.435X_2$$

(3.6) (8.9) (3.4)

$$R^2 = 0.833 \quad \text{Anovar F test} = 50.0 \quad \text{Durbin-Watson} = 2.397.$$

3. Data Southern 23 counties.

Y = Cattle increase 1841-47.

 X_1 = Townland - land X_2 = Cattle 15-30 X_3 = Horses change 1841-47

$$Y = -4,477.8 + 0.021X_1 + 0.621X_2 + 2.541X_3$$

(3.2) (3.2) (4.6) (5.2)

$$R^2 = 0.814 \quad \text{Anovar F test} = 27.7 \quad \text{Durbin-Watson} = 1.933$$

4. Data 32 counties.

Y = Potato change 1845-47

X₁ = Townland - land

X₂ = Cattle 1-15 acres

$$Y = 43,787.1 - 0.290X_1 - 1.181X_2$$

(4.2) (9.8) (3.9)

R² = 0.812 Anovar F test = 62.7 Durbin-Watson = 2.355

5. Data 32 counties.

Y = Cattle increase 1841-47

X₁ = Townland - land

X₂ = Cattle 5-30 acres

X₃ = Horses change 1841-47

$$Y = -4,968.8 + 0.018X_1 + 0.421X_2 + 3.090X_3$$

(2.1) (2.2) (5.3) (4.2)

R² = 0.625 Anovar F test = 15.6 Durbin-Watson = 1.672

6. Data 9 counties

Y = Cattle increase 1841-47

X₁ = No cattle 15-30

X₂ = Horses change 1841-47

$$Y = -433.39 + 1.466X_1 + 2.793X_2$$

(0.12) (5.8) (3.0)

R² = 0.890 Anovar F test = 24.3 Durbin-Watson = 2.387

Statistical sources: as in Table 3.8. In addition, the proportion of 1845 crop lost came from Correspondence, (Commissariat), PP1846, Vol.37, P36 and 1847 stock figures from the Agricultural Returns of that year.

ambiguity exists concerning the potato acreage no weight can be put upon this result.

A measure of the increase in labour costs is given by the price series for the principal foodstuffs, presented in Fig. 5.1. There are several points of interest here. The blight did lead to a sharp rise in the price of oatmeal from over 12 to over 16/= per cwt between October and November 1845. It remained at about this level though with fluctuations, until the blight returned. This relative stability was probably due to the arrival of Indian corn, which more than anything else demonstrates the open nature of the economy and how prices were set internationally except for potatoes.

1846-47 saw a dramatic rise in the prices of both Indian cornmeal and oatmeal. This very high level, against a background of high international prices, persisted throughout the agricultural year. Although the peak was exceptional, it must not lead us to ignore the fact that by 1848 the oatmeal price was roughly that of 1845 before the blight attack. Indian cornmeal, which would be more significant when considering wages was not appreciably above the level of the early 1850's, when prices were sharply depressed. Unfortunately we cannot compare the Indian corn level to the pre-blight period.

It is interesting to note the level of potato prices in the early 1850's. This was roughly double the level of 1843-44. Although this fits in with our production function thesis, it could not be regarded as being any more than being consistent. However, although we probably never will have sufficient evidence to compare real wages pre-Famine to the early 1850's, this would tend to suggest that labour

costs, if not real wages, rose. Accordingly we might summarise the situation by saying that the agricultural year 1846 was characterised by high food prices and the following year by exceptionally high ones. Thereafter there was a sharp drop with low prices by the early 1850's except for potatoes.

The high price and restricted supply of potatoes led to a change in diet. The partial failure of 1845 led in Cork the labouring classes by the end of February to resort "even at this early period" to the use of oatmeal and coarse flour as substitutes. In February Cork was receiving half and by April one third of its usual supply of potatoes. By March it was estimated that the consumption of bread in the city had increased by 50-60%.⁽¹⁰⁾ In a memorial written by County Antrim tenants at the end of 1846 they maintained that though pork and butter sold well, no advantage could be taken of this since the usual food for swine was absent and "the dietary changes rendered necessary in our families, by the absence of the potato, oblige us to appropriate a much larger portion of the produce of our cows to household purposes than heretofore".⁽¹¹⁾ According to one observer in Wicklow in January 1847, turnips were the principal article of food, with the consequence that in six weeks their price rose from 15s to 35s per ton.⁽¹²⁾

The particular diet followed after the failure of the potato would depend on income and local factors. The majority of the rural economy would be seeking the physical minimum intake at lowest cost. Many would not be able to afford even that. The consequence of this, as we have said before, would have been a sharp increase in labour costs. For the moment we will look at the reaction of only one

section of the rural economy - the larger farmers. This can best be analysed by breaking down the labour expended on the farm to household and non-household.

In the pre-Famine rural economy the land and labour markets were closely linked. The labourer generally made an agreement by which the wages he earned were set off against the rent of a piece of land. With the consecutive occurrence of blight the system broke down.

The produce of the plot no longer provided subsistence for the year - with the disaster of 1846 the labourer was lucky if he could stretch a couple of months from the crop. Clearly he would now ask for cash wages. Because of the exceptionally high level of foodstuff prices, these wages would be nominally high. But the matter was not as simple as that. With high labour costs the farmer would be especially vigilant in attempting to reduce to the minimum any additional labour he required. His pattern of demand was sporadic, depending on the production mix of his farm. It most certainly would not be steady throughout the year.

This pattern of demand was the reverse to what the labourer sought. The essential point to him was not a day's labour but rather survival for a period of a year. The government had initiated various forms of relief but generally entry was very restrictive. Few labourers would risk being struck off relief lists in order to get a few days labour from a farmer. This search for steady employment would give the supply curve for labour an upward shift in addition to the effect of high food prices. Thus the farmer who employed three or four cottiers would likely reduce their number or cut them out altogether.

The ejection of cottiers is a recurrent theme in the evidence we have for the Famine period. "The farmers, scarcely without an exception, have discharged the whole of their servants, both male and female. Numbers of both sexes have offered to remain and work with farmers for their 'food' alone, without any wages - but even this the farmers say they cannot afford";⁽¹³⁾ "the destruction of houses has been large in the north, as well as in other districts, but the people have been ejected principally by the farmers, the parties ejected being what are called cottiers";⁽¹⁴⁾ "Labourers not easily obtained for agriculture owing to the preference for the Public Works, said to arise from the money payments and constant employment".⁽¹⁵⁾ These quotations illustrate the main thrust of the evidence.⁽¹⁶⁾

Faced with labourers demanding steady employment, farmers tended to meet peaks in labour demand by using the labour resources of their own household intensively: "the farmers now have obliged their wives and daughters to take the spade, in consequence of the manner in which their own resources have been limited; they send their children now to do that employment which they formerly paid labourers for doing";⁽¹⁷⁾ "all that the farmers, who were above destitution, could accomplish with horses of their own ..., by their own labour and that of their families, had been performed; but they employed no hired labourers".⁽¹⁸⁾ It is interesting to note Tuke's observation that a considerable part of the harvesting around Newport was undertaken by women since they were paid less than men.⁽¹⁹⁾ What could have been happening was that farmers employed whole households when they required labour to reduce the wage rate, since feeding the family was the labourers objective.

Under the new conditions there was no room for the con-acre system - it was exploded. It had been closely identified with the potato and was dependent upon it technically as a crop which produced a high yield of a foodstuff per acre. It was highly labour intensive - a characteristic which now condemned it, quite apart from the inability of labourers to finance subsistence until the crop was ready to be consumed. "Con-acre has nearly disappeared in these parts," William Bishop reported of the Cork area in December, 1846, "The people do not adapt themselves to the altered conditions - nor do they make any effort to supply a new class of food to produce future subsistence - they take P(ublic) Works as an immediate source of relief and throw themselves on them." This would have been outrageously unfair but for his next sentence, "Even if they were disposed to cultivate their pieces of ground, they have not means of subsistence whilst doing so."⁽²⁰⁾ The position was well summed up by Bishop: "The 'cottier', or 'con-acre' system is abolished, and he is now virtually a labourer in every sense of the word, and must be provided for as such."⁽²¹⁾ The conclusion succinctly stated the dilemma which faced the government and which horrified them.

An important element of the free crop and cottier system was the collection of manure during off-peak periods of the year by which the labour input to agricultural production was increased. The blight ended this. The collection of manure had previously incurred only a very slight opportunity cost. Now the poor peasant had no means of subsistence. His only chance was to get onto a government relief scheme. The opportunity cost of manure collection became very high - the peasant's time horizon dropped from a year to a week. In County Kerry in January, 1847, an Inspecting Officer noted that

"the collection of sea-weed, formerly so much attended to at this season of the year, is now apparently forgotten."⁽²²⁾ At a meeting in County Limerick at the same time a speaker said "he looked round where the poor cottiers had been accustomed to make their heaps of manure, and, not in one instance out of ten could he see any attention bestowed upon this necessary precaution."⁽²³⁾ Finally, Griffith noted that the reduced demand for manure had led in Limerick to its price falling by half.⁽²⁴⁾

There are several references to the land which had been allocated to con-acre being sown with oats.⁽²⁵⁾ Unfortunately this tells us little of what was happening to overall crop acreages on the larger farms. The high cost of labour was an obvious deterrent to increased cereal planting. On the other hand, fodder was required for the livestock which, if there was no tillage, would be the only source of income. The food requirements of the household would be a significant proportion of the net output for many farms, even though in the pre-Famine period they may have had several cottiers on them. This being so, they would probably save transport and retailing costs by growing their own crops. Indian corn was not an article which was consumed enthusiastically.

Thus there are a number of possibilities. On the large farms, it would be a straight matter of the price expectation effect and the input substitution one against the potato working together against the increased cost of labour. The considerable uncertainty generated by the Famine could make it less likely that there would have been a substantial price expectation effect, though the international setting of the price would operate against domestic considerations,

at least with regard to expectations of the commodity price. In addition to this, the demise of the potato would lead to a requirement for fodder which would have been partly met by increased cereal planting. The cereal acreage on large farms might, then, have been extended, though it is unlikely that this would have entailed an aggregate crop increase. Several observations suggest that business on the large farms was not greatly disturbed by the blight, though obviously there would be a switch from the potato. The large farmers were noted as "attending as usual to their business" at the end of January, 1847, and were "beginning to use the plough freely."⁽²⁶⁾ According to one inspecting officer the large farmers intended "to sow much grain this year".⁽²⁷⁾

The same considerations which led the large farmers to sow more grain would apply to the medium sized farms. It would be fair to call these family farms which, before the blight would have had a couple of cottiers and probably about ten statute acres of crops. The cottiers could have been ejected and the labour resources of the household used to full potential. The desire to guarantee subsistence by physically growing it would probably lead farms of this size to grow proportionally more additional cereals than the large farms. Livestock numbers grew rapidly on these farms* and consequently so did the fodder requirement. This would reinforce the switch to cereals on the family farms.

The remaining type of farms we have to consider are the small, labour surplus ones. With the blight their subsistence for the coming year was taken away. Few would have had the resources to stay in production, let alone try to expand their livestock. There was

* see below

considerable alarm expressed, particularly by officers superintending the government relief measures, over the lack of cultivation of the smaller holdings. Several quotations will give the tenor of their remarks: "little if any preparation appears to be making for the ensuing season, the lands are almost neglected"; "the smallholders of land are quite at a standstill"; "scarcely any of the smallholders are tilling their land".⁽²⁸⁾ However, such views need to be treated with caution. All the quotations referred to above were made in January (1847), a period in the year not associated with intense agricultural operations.

This criticism was voiced by the Rev. Mathew, in a letter to Trevelyan: "As I have been much through the country latterly, I can assure you that agriculture has not been neglected. The quantity of wheat sown is as large as usual. The season for the spring crops has not yet arrived ... It is still too early for oats and potatoes. The ground remaining undug, in which the blighted potato crop was planted, gives to the country a neglected appearance".⁽²⁹⁾ While reasonable, these views are too optimistic. Reports of abandonment of land continue after January. The mechanism is well sketched in a letter by Dobree: "We are now in the month of March, when the Irishman's agricultural labours usually begin, but there is not a move towards cropping the small holdings. The occupants have no seed, nor money to buy it; no manure nor time to devote to labour that will not return them the present day's subsistence; the animus also is wanting, for they calculate that a grain crop after the rates and rents have been paid cannot maintain them. It is, I think, difficult to disprove this proposition."⁽³⁰⁾

In the autumn of 1846, the Tipperary Vindicator gave the position of 39 families, consisting of 231 individuals, who were dependent on 24 acres of bad corn; 26 of the families had 1 acre or less to tide themselves over the coming year.⁽³¹⁾ Clearly these would have been very small cultivators, though there are several points worth noting. The proportion of total cereal acreage cropped by peasants of this scale, while small would not have been insignificant. Next, the acreages mentioned are incapable of maintaining families for a season - still less could they pay any rent upon the land. Even holdings considerably larger would have difficulty in achieving both these objectives. Lastly, smallholders, even in ordinary seasons required to earn wages from other farmers in order to survive. Such opportunities would have been severely restricted. Thus although Mathews is correct in his comment concerning the timing of agricultural operations, it is difficult to see how smallholders could have kept in production.

Lack of seed was given by a number of observers as the reason why production was so neglected.⁽³²⁾ This was just another way of saying that "they have not means to work their farms",⁽³³⁾ which would be predictable considering the circumstances. The land held by smallholders was generally abandoned. An editorial in a March edition of the Cork Examiner talks of, for extensive districts, "scarce a trace of cultivation observable.... It is readily admitted that at the immediate neighbourhood of the towns there is something like the activity and preparation of former years ... but ... the small farmers, with very few exceptions, are neglecting their usual occupations, and that the same apathy and apparently reckless indifference to the future characterise the once 'strong farmer'."⁽³⁴⁾ The Tipperary

Vindicator in the same month notes that the cultivation of the soil was "still almost totally neglected".⁽³⁵⁾

If we return to our regression on the change of potato acreage 1845-47 we can further interpret the significance of the proportion of farms of 1-5 acres. Such farms would have been decimated by the blight and areas where they were predominant would have seen cultivation severely depleted. If we return to the overall cereal acreage, we see that the aggregate change was a result of the resolution of several forces. If we look at the reaction of farms across the spectrum, a hiatus occurs at the level of the family farm. Below that it is likely that production was severely affected by the blight and that a large proportion of such farmers would not have been able to continue production. Farms around the family level would have increased the production of cereals most of all, even though at peak periods this led to great intensity of labour and possibly the hiring of some more. The fodder requirement plus the family's subsistence⁽³⁶⁾ would provide a great spur. Large farms would probably have increased cereal acreages slightly, though not to the extent of family farms. We would thus expect the greatest swing to cereals to occur in areas where family farms were the dominant type.⁽³⁷⁾

It is likely that the aggregate oat acreage fell even though smallholders would have a lower cereal to roots ratio compared to family farms. We therefore consider that the decimation of the smaller had a greater effect on overall oat acreage than the increase in production on family and larger farms. The issue would be readily resolved if statistics were available but unfortunately they are not.

Bourke has estimated aggregate figures to be⁽³⁸⁾

1845 2.5 (million statute acres)

1846 3.0

1847 2.2 (official statistics)

Such estimates are notorious for raising many more questions than answers. The 1846 figure, based on constabulary reports, appears a bit high as it implies that the increase in the oat acreage compensated for the reduction in the potato acreage. However, the direction of the change would certainly appear justified, with the major fall 1846-47 reflecting the death of the smallholder.

This discussion concerning tillage crops provides a useful starting point to examine the change in livestock numbers. Again according to the Bourke's estimates, about one-third of the potato crop was fed to animals and about one-fifth of the oat crop, mainly to horses.⁽³⁹⁾ The sharp increase in the prices of both these crops would naturally affect their use as inputs to livestock.

This is seen directly in the case of pig numbers, which fell by almost one million, 1841-47 (76%).⁽⁴⁰⁾ Initially farmers used the pig to convert tainted potatoes into a saleable commodity which, at least in Galway, led to the peasantry giving "unheard of prices" for young pigs.⁽⁴¹⁾ This was obviously a short-term reaction. The number of pigs sold in Cork market soared to almost 40,000 in 1846, compared to 17,000 in 1844.⁽⁴²⁾ Although the number was large, according to Bishop, "the quality and weight (the greater part being half-fed store pigs...)" was "quite inferior".⁽⁴³⁾ The demise of the pig is seen in their export to Britain, which in 1846 was almost

half a million, compared to a total population of 1.4 million in 1841.⁽⁴⁴⁾ This fall in numbers particularly struck William Bennet; it was "a remarkable feature to an eye accustomed to Ireland."⁽⁴⁵⁾

Although the pig population was reduced throughout Ireland, it was most pronounced in a belt of counties from Mayo to Louth. In these counties a high proportion of the pig population was reared on smallholdings - 74.6% in Mayo were on farms of less than 5 acres, 64.4% in Roscommon. Numbers in these counties fell by more than 70%. However, the proportion of pigs held on farms of 5-15 acres was also important. Generally the change reflected the crisis faced by the smallholder. The areas where he was dominant suffered heavy falls, reflecting his destitution. In other areas the pig was kept on in his traditional role as the converter of farm waste into meat. The smallholders did not have even enough waste. The pigs "like so many walking savings' banks, paid their owner's house rent, have ceased to exist with the cottier."⁽⁴⁶⁾

The fall in income suffered by many farmers made the consumer durable services rendered by horses luxuries which could no longer be afforded. The decline in crop acreage, particularly that of the potato, together with the fall in manuring, further emphasises the drop in demand for the services of horses. At the same time their cost increased due to the rise in price of their feedstuffs. There were frequent references to the high mortality rate of horses - they were "dying in great numbers".⁽⁴⁷⁾ According to Dobree this was due to the high price of oats and the hard work they were doing in circulating food to the interior.⁽⁴⁸⁾

Unlike the cow whose milk could be easily converted into a saleable commodity throughout the year, the horse provided services whose value was realised once a year at harvest. The demand for these services fluctuated widely and there was an obvious temptation to reduce its upkeep to the barest minimum in the off-peak period. Judging by the observations concerning horse mortality, many peasants underestimated the "barest minimum". On the other hand, what was to be done with a horse? According to one newspaper, the horses belonging to small farmers, or "such of them as have not gone to the tanyard - are incapable of field work, and ... they themselves (the peasants) cannot afford to lose the day's pay which the Public Works contribute". (49)

This quotation raises several points. The first is that many horses in the pre-Famine days tended to be kept in poor condition. With the changes in agricultural production during the Famine period, there would have been a substantial increase in the supply of horses to the market, together with a drop in demand. The horses concerned would likely have been in fairly poor shape with equally poor pedigrees. Thus it is likely that the market price would have been very low and that it would be easier to scrap them (i.e. the tanyard) rather than to maintain them. But for many peasants, particularly those in the west or in outlying regions, the tanyard or similar establishment would have been a considerable distance away. In addition to the effort required to affect the sale for a weakened man or woman, there would be the realisation that the possibility of continued production had been largely given up. The sale of a horse on a glutted market could make the difference between survival and death, but at the cost of losing any hope for the future. If he was

on the Public Works, the peasant would have some income coming to the household. There would be a strong urge to hold onto the starving animal with the hope that both it and the household could scrape through, for a further year. Given the position of smallholders, it is likely that their aversion to risk was reduced (further): desperate men are reckless.

It is obvious that the cost of maintaining livestock was an important consideration in accounting for the changes in agriculture 1845-47. There are two aspects of the problem - how to feed the livestock in the present season and, secondly, what fodder to provide for the next winter. The exceptionally high price of potatoes ruled them out. The Belfast price series for two possible substitutes, meadow hay and oat straw show no pronounced trend at all in 1846 (which was considerably below the level of 1844-45). A sharp increase did occur early in 1847 though, and by May meadow hay was almost 4/6 per cwt compared to just over 2/= a year before. The Belfast prices are backed up by Barrington's index where both 1846 and 1847 prices for hay were below that of 1845 (69, 81 and 92 respectively.) Thus from the angle of maintenance, cattle and sheep were a better proposition than horses and pigs, whose traditional diets were made up of articles whose price had soared. Since straw was a joint product with oats whose acreage had likely expanded, at least 1845-46, the supplies to the market probably matched the increased demand due to the increase in cattle and sheep numbers.

The potato could also be substituted for by the turnip. They seem to have been planted mainly by the better-off farmers,⁽⁵¹⁾ for fodder rather than food. (Tuke noted that some of the small farmers

in Connaught had sown the seed like grass.⁽⁵²⁾ While the turnip was favoured against the potato since it was not susceptible to blight, it would have suffered from its fairly high labour requirement. On the other hand, it would serve the same technical role as the potato in rotation. By 1847 the turnip acreage was almost one-third greater than the potato acreage though the latter was historically at a very low level. It is likely that a significant proportion of this substantial acreage was used for human consumption.

If the increase in labour costs was a major criterion for the choice of fodder crop then one possibility would be to increase the proportion of grass on the farm and let this become a relatively more important input to livestock than previously. Since it required very little attention, it would be attractive for the short-run, particularly since many smallholdings were being vacated.

We have deliberately left the change in cattle and sheep numbers to this late stage in the discussion of the changes in agricultural production 1845-47 for a number of reasons. Within the logic of our model, it reflects the position of the change in the causal chain. The growth in cattle numbers was a result of the shift in the production function away from the potato, the income loss consequent to the blight, together with the high level of labour costs during the Famine. It was a culmination of a process. The other reason for leaving cattle and sheep numbers to this point is that the change, given that there was a major crisis in the rural economy, was remarkable. Precisely because it is so remarkable it is worth examining first the environment in which it took place in detail, before its specific study.

To begin with it is instructive to note the provincial change in cattle and sheep numbers. (Following Crotty, 1 cow is taken to be equivalent to 6 sheep.⁽⁵³⁾) Although the overall increase in cattle and sheep was a modest 5.7% this masked very pronounced trends in the provinces. Ulster increased its stock by one fifth, Leinster hardly changed and Connaught lost 6%. Counties Antrim and Tyrone increased their stock by 39% and 30% respectively, while Mayo lost 36%. To explain these very varied responses we return to our treatment of crop acreage. For clarity we consider only three types of farm - the smallholder, the family farm and the large farm. As before we are taking the family farm to be defined by post-blight conditions i.e. it is likely to have had several cottiers in the pre-Famine period who were discharged after the blight.

We may deal quickly with the farms on either extreme of the family farm. Generally we have taken it that the smallholder was rendered destitute by the blight. This is obviously a sweeping generalisation. Holdings were continuously distributed by resources and thus our division into smallholder and family farm is to some extent arbitrary. Some poorer peasants would have survived the blight, through having hoarded some cash, been only lightly affected by blight or some other favour from chance. The point is that these would have been the fortunate few. In any case, these would have behaved similarly to family farms.

For the large, commercial farm, it is unlikely that it was gravely affected by the blight at all. There would be some loss due to the blight, some gain from the cereal crop. Labour was expensive and thus would provide a force restraining tillage, though fodder would still

be required by livestock. The potato acreage would be cut sharply, with a slight change, probably an expansion, in the cereal acreage. Livestock numbers would not be greatly affected.

The situation on the family farms is the most interesting. We have postulated previously that it is likely the cereal acreage would have been increased with the onset of the blight, though any increase in total tillage on such farms would have been small. The labour input to tillage would have been sharply reduced and since manuring was the most variable part of labour input, lower yields would be a consequence. However, the effect of this in the first year would not have been great as the stock of soil nutrients would take time to run down.

The higher labour costs would have reduced the net surplus per acre of tillage (i.e. that which was to be divided between "incentive income" and rent which is taken to be a residual payment.). The peasant could not be assured that the lower surplus would result in a lower rent. The peasant would be motivated to increase the scale of his production and thus to increase the gross surplus in order to counteract the lower surplus per acre. The increase in production was constrained by the peasant's budget and therefore he would have to choose, broadly speaking, between cattle and cereals.

The single most important factor in this decision was probably the cost of labour to the farm. There is a significant body of evidence which highlights the efforts made by the family farms to keep in production. Wives and children were fully employed in tasks generally left to the man in the pre-Famine period. The cost of this

was not high since the peasant would look to his income to provide for his whole household in the first instance. Nutritionally speaking additional food would be required to cover the additional work being undertaken.

Such considerations cease to operate when it becomes a matter of employing additional labour. We have noted that this type of labour would require constant employment to induce it to leave the Public Works. It would be expensive. Thus we would imagine that marginal costs to the farmer would increase sharply once employment was increased beyond the household's resources. Since even at this level net output was probably low, it is unlikely that production would be extended greatly in excess of household capacity.

Against tillage, livestock production was much less labour intensive. It would not have demanded the physical strength of tillage and thus was more suited to the spectrum of household labour supplies. Thus our analysis would suggest that, given there was a budget constraint, production would favour livestock as total labour input would probably have to be within the household's capacity. The extent of which livestock numbers were increased would naturally depend on the initial resource position of the farm. This we approximate by the holding distribution.

Given this background we may now examine statistically livestock change over the period 1845-47 as represented by Regressions 3, 5 and 6. They are divided into Ulster and the southern counties due to acreage ambiguities. For the southern counties the change is explained satisfactorily by three variables:- the land value,

cattle held on holdings 15-30 acres and the change in horse numbers 1841-47. In the Ulster case the land value does not play a significant role. If we take all 32 counties the relevant cattle division becomes 5-30 acres and the fit is much poorer. We interpret the change in horse numbers to be a proxy for the course of tillage production. The positive coefficient this has in Regression 5 is most interesting. It would seem to indicate a degree of complementarity between tillage and livestock in production. Those areas which experienced large increases in cattle and sheep had a much smaller fall in the horse population. The need to provide a foodstuff for the household and fodder for the livestock would explain this.

The role played by land value is puzzling. Possibly the Ulster counties were more homogeneous as economic areas. With the southern counties greater disparities exist with Mayo and Meath as extremes. This might reduce the efficiency of using the change in horse numbers as a proxy for tillage change. Land value might be required as a second variable to take account of this. When we regress without horse change, land value does not register as significant. A complementary explanation would be that for many southern counties the demise of the smallholder was the most important factor explaining livestock change and that this is best caught by two variables. For both regressions we take the number of cattle on holdings 15-30 acres to reflect the positive contribution made by the family farm. Thus the statistical evidence is consistent with our analysis.

One point which we have neglected to make clear in our discussion is the type of livestock described as "cattle" - basically whether we are talking about milch cows or dry cattle. The evidence is tenuous but

on the whole supports the view that at the very least milch cows played an important role in the increase on family farms. These, of course, were the type of farm which was the traditional backbone of the dairying industry. If we look at the price evidence, it is noticeable that butter, which was very low in 1843 and 1844, climbed up in 1845 and remained at the higher level to 1847. Fodder prices kept fairly stable though labour costs were extremely high. If we look at Fig. 4.2, we can see that milch cow prices showed a marked increase after the blight became evident in 1846. (The prices are from reports of fairs in newspapers and thus must be approached with caution.) However, a fairly definite trend is evident, consistent with an increase in demand. With the destitution of the smallholder we would have expected supply to have increased, which makes the price evidence stronger again.

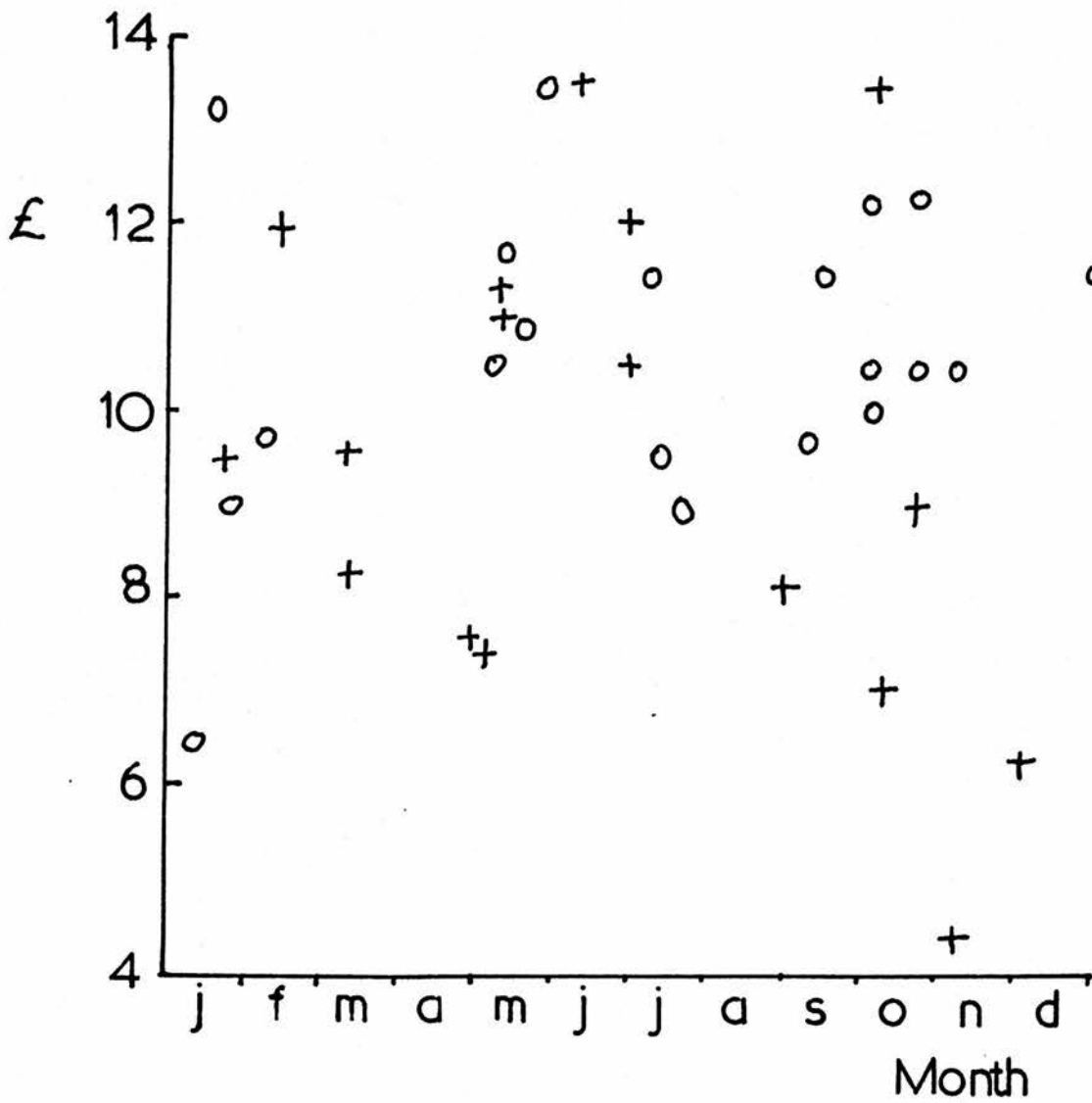
The prices paid for cattle at Ballinasloe Fair in October, show oxen (unfortunately not more precisely defined) with a fairly stable price over the period. Heifer prices show a recovery after 1845 and the ratio of oxen to heifer prices (both 2nd class beasts) drops from 1.30 in 1845 to 1.19 in 1846 (the values for the two following years were 0.96 and 0.95 respectively.*) If we take oxen to be stores and heifers to be beasts with the potential of being converted into milch cows, then this data supports the view that demand was favouring milch cattle. Against this the Barrington index shows the price of 2-3 year old stores increasing from an index of 100 in 1845 to 170 in 1846 (with 1-2 year stores at 129 in this year).⁽⁵⁴⁾ However, to judge from later years, the 1845 figure appears extremely low (though not borne out by the Ballinasloe series).

* see Fig. 4.1

Fig 4-2

Price of milch cattle

1845 = +
 1846 = o



Perhaps it is safest to conclude that family farms probably increased their number of milch cows and began also to rear more stores. Since the smallholders suffered heavily and would have tended to have mainly milch cows, it is likely their aggregate numbers would not have increased dramatically. Much of the overall increase would thus be in store cattle.

While discussing cattle in this period it is worth drawing attention to the persistence of pleuro-pneumonia in this period. In fact, the 1851 Census notes its existence in some part of Ireland in every year from 1841 to 1850.⁽⁵⁵⁾ It spread to the north in 1845 where it made "fearful inroads in some districts". The newspapers also note many other local outbreaks.⁽⁵⁶⁾ This evidence makes the increase in livestock numbers over the period all the more remarkable. The fall of almost half a million in sheep numbers may be put down to several factors. According to Crotty, wet weather, which was frequent during our period, increases the prevalence of disorders such as liver fluke.⁽⁵⁷⁾ In addition to this sheep were a risky proposition during the Famine era as sheepstealing was common. Thus our concentration in the period 1845-47 is upon cattle.

In our analysis above we have referred several times to the economic surplus of the farming operation and have left in abeyance how this was divided between landlord and tenant. Unfortunately the course of rents and estate management over the Famine period is a research project in its own right. In the northern counties, to judge from newspaper reports, rent reductions were fairly frequent. These were generally graduated - for instance, the Earl of Erne gave a 50% reduction for tenants paying up to £10, 33% for those £10-15 and 25%

for those tenants paying up to £20. It was considered that the larger farmer "has the advantage of unusually high prices, which makes up for the loss of the potato crop".⁽⁵⁸⁾ Elsewhere landlords were not so accommodating, nor tenants meek. A report in the Cork Examiner maintained that the "accounts that reach us from all parts of the country are but repetitious of landlord incursions on the crops and stock of the luckless farmers, with, in many instances, retaliations of a formidable character". "Every day the effects of the extensive and fast-spreading conspiracy against the payment of rent is becoming more manifest".⁽⁵⁹⁾ These latter reports relate to 1847 whereas the first one refer to the previous year. Clearly by 1847 landlords were getting desperate. Evictions were becoming more frequent.⁽⁶⁰⁾ (According to Donnelly these began in earnest in 1847.)⁽⁶¹⁾

Thus it is likely that as the period advanced, what the blight could not achieve in the destruction of the smallholder, the landlord completed. It must be emphasised, however, that the land thus cleared would likely not be of high quality and therefore would not command a relatively high rent. We would expect then, that supplies of this type of land would increase rapidly. On the demand side family farms would be seeking to increase their acreage but the rate they would do this at would depend upon increasing their livestock. Their ability to do this would be linked to their rental. Landlords likely had to accept a lower rent as the price of having a paying tenant. 1845-47 probably saw the rent level of poorer land falling relative to that of the richer, since farms on the latter would tend to be large and would have suffered little during the period.

Rent, even for a smallholder, represented a significant sum. It would have given many the opportunity to emigrate who could not have done so if they had had to settle with the landlord. In 1846 passage to British North America cost between 50s and 60s and to the U.S. between 70s and £5.⁽⁶²⁾ With the sudden exodus they doubled, but then fell to their previous level. Even without the increase, emigration abroad would be beyond the means of a labourer, though he could possibly make it to Britain with his family. By withholding their rent and selling everything else, a large proportion of the rural population would have been able to emigrate. The return of the blight in 1846 caused a panic which led for the first time to a heavy autumn exodus. (See Fig. 4.3). The scale of the emigration thereafter was exceptionally high.

It was estimated that about a quarter of the 1847 emigration was made up by the well-to-do, though some contemporaries considered it to be higher: "Three of the most competent observers of the time believed that it was the small farmer, if not indeed the class above him, who formed the backbone of the 1847 movement; and, all through the year, newspapers drew attention to the numbers of the 'well-to-do' amongst the current emigrants."⁽⁶³⁾ Obviously if family farms were to extend their acreage this had to be found somewhere. Those who surrendered land could have been touched with panic or suffered more in proportion to their neighbours. In any event they joined the stream of humanity fighting disease and hunger across the Atlantic and in the new world.

Fig 4-3
Emigration overseas 1841-55
('00,000)



Source: MacDonagh, O., The Great Famine, P388.

The best way to conclude this chapter is perhaps to note the changes which occurred over the period in the one poor law union for which we have statistics, Bailieborough. As Table 4.3 indicates, there was a significant increase in the corn acreage (22%) and a more dramatic fall in roots and greens (- 72%).

Table 4.3

Crop acreages in Bailieborough P.L.U., 1845-47.

	1845	1847	change
Corn	20,297	24,808	+ 4,511
Potatoes, Turnips and Greens	12,348	3,447	- 8,901
Meadow and Clover	<u>3,408</u>	<u>4,397</u>	<u>+ 989</u>
TOTAL	36,053	32,652	- 3,401
Potatoes	11,492	1,071	-10,421

The union was mainly in County Cavan though also in County Meath, an area of family farms in the pre-Famine period. Between 1841 and 1847 cattle and sheep numbers rose by 15% in County Cavan which would mean proportionally for Bailieborough an increase of about 1,400. Even allowing for considerable error in this estimate, this would suggest that little land went out of agricultural use. However, the union would not be representative of the economy as a whole - in fact it is unlikely that any one could be so designated.

The most active economic units were the family farms. The smallholders would be facing great difficulty and would have sharply reduced their output. On the other hand, large graziers would have hardly been affected. Bailieborough was a union where the family farm was dominant and thus the slack due to the difficulties of the smallholders was taken up by the family farms being extended. In areas where the smallholder was of greater relative importance it is likely that only part of the land going out of their cultivation was taken by other farms and thus production fell even more so.

REFERENCES TO CHAPTER IV.

- (1) NW 27.1.1844; rent reductions mentioned NW 26.12.1843; 6.2.1844 and 23.4.1844
- (2) Trench, W.S., op.cit., P16
- (3) NW 4.1.1845
- (4) NW 2.1.1846; see also NW 11.10.1845
- (5) Bourke, P.M.A., "The extent of the potato crop in Ireland at the time of the Famine", op.cit., P11
- (6) ibid., P11
- (7) NW 8.9.1846
- (8) NW 19.9.1846
- (9) CE 27.1.1847; NW 1.10.1846
- (10) CE 27.2.1846; 16.2.1846; 3.4.1846; 27.3.1846; see also NW 16.4.1846
- (11) NW 22.12.1846
- (12) Correspondence, January to March 1847, (Commissariat), P.P.1847, Vol.52, P20
- (13) PROI, Relief Commission Papers, Inspecting Officers Reports (RCP,IOR), Bishop, 2.1.1847 (1A 50 64A)
- (14) Poor Laws, Q2324
- (15) RCP,IOR, op.cit., Hill, 22.12.1846
- (16) See also:- Hill, 30.12.1846; Hotham 23.1.1847; Gallway 9.1.1847; Archer 13.12.1846, op.cit. ; Pim, J., The condition and prospects of Ireland and the evils arising from the present distribution of landed property: with suggestions for a remedy, Dublin, 1848, P69; T.V. 20.1.1847; Correspondence, January to March 1847, (BOW), P.P.1847, Vol.52, P143
- (17) Poor Laws, Q1370
- (18) Correspondence, January to March 1847, (BOW), P.P.1847, Vol.52, P143 see also, Pim, J., op.cit., P113
- (19) Tuke, J.H., A visit to Connaught in the autumn of 1847, London, 1848, P9
- (20) RCP,IOR, op.cit., Bishop 5.12.1846; also Douglas 7.12.1846 ibid. ; Poor Laws Q3245

- (21) Correspondence, July 1846 to January 1847, (Commissariat), P.P.1847, Vol.51, P365
- (22) Correspondence, January to March 1847, (BOW), P.P.1847, Vol.52, P100
- (23) CE 27.1.1847; also Correspondence, July 1846 to January 1847, (BOW), P.P.1847, Vol.50, P329
- (24) Correspondence, (Commissariat), P.P.1846, Vol.37, P110
- (25) *ibid.*, P110, P135
- (26) Correspondence, January to March 1847, (BOW), P.P.1847, Vol.52, P244, P115, P107, P100
- (27) RCP, IOR *op.cit.*, Bishop 12.12.1846
- (28) Correspondence, January to March 1847, (BOW), P.P.1847, Vol.52, P125, P115, P100, P99, P107, P110
- (29) *ibid.*, (Commissariat) P67
- (30) *ibid.*, P194
- (31) TV 16.9.1846
- (32) TV 20.1.1847; RCP, IOR *op.cit.*, Bishop 2.1.1847; Douglas 25.1.1847. Correspondence, January to March 1847, (BOW), P.P.1847, Vol.52, P107
- (33) *ibid.*, P237
- (34) CE 10.3.1847
- (35) TV 6.3.1847; see also 10.3.1847; NW 10.12.1846, 18.2.1847, RCP, IOR, *op.cit.*, Bishop 5.12.1846
- (36) see RCP, IOR, *op.cit.*, Archer 13.12.1846, Douglas 28.11.1846
- (37) see NW 20.3.1847
- (38) Bourke, P.M.A., *The potato, blight, weather, and the Irish Famine*, *op.cit.*, Appendix 4, P1-7
- (39) *ibid.*, P2; Bourke, P.M.A., "The use of the potato crop in pre-Famine Ireland", *JSSISI*, Vol.XXI, 1968, P86
- (40) 1841 Census, Agricultural Returns, 1847
- (41) NW 16.4.1846; Correspondence, July 1846 to January 1847, (Commissariat), P.P.1847, Vol.51, P6
- (42) CE 1.1.1847
- (43) Correspondence, July 1846 to January 1847, (Commissariat), P.P.1847, Vol.51, P333

- (44) Quantities of grain and flour (of Irish growth) and of agricultural produce imported into Great Britain from Ireland, P.P.1849, Vol.L, P3, and 1841 Census, P454-5
- (45) Society of Friends, Transactions of the central relief committee of the Society of Friends during the Famine in Ireland, in 1846 and 1847, Dublin, 1852, P161; also P169, 209
- (46) Correspondence, January to March 1847, (Commissariat), P.P.1847, Vol.52, P122
- (47) *ibid.*, (BOW), P244; also P253; (Commissariat), P20
- (48) *ibid.*, P122
- (49) TV 10.3.1847
- (50) Barrington, T., *op.cit.*, P251
- (51) RCP, IOR, *op.cit.*, Bishop 5.12.1846, 12.12.1846
- (52) Tuke, J.H., *op.cit.*, P7
- (53) Crotty, R.D., *op.cit.*, P90
- (54) Barrington, T., *op.cit.*, P251
- (55) The census of Ireland for the year 1851, Part VI, General Report, P.P.1856, Vol.XXXI, P358-364
- (56) NW 6.3.1845; also NW 8.10.1844; 2.9.1845; 7.10.1845; 8.9.1846; 20.10.1846; CE 27.1.1847
- (57) Crotty, R.D., *op.cit.*, P48-9
- (58) NW 1.10.1846; see also 10.10.1846, 17.10.1846, 24.10.1846, 27.10.1846, 31.10.1846, 3.11.1846, 5.11.1846, 7.11.1846, 14.11.1846, 21.11.1846, 26.11.1846, 28.11.1846, 1.12.1846, 19.12.1846; TV 11.11.1846, 14.11.1846
- (59) CE 20.9.1847; 18.10.1847; see also NW 10.9.1846, 17.11.1846, 12.12.1846
- (60) CE 29.9.1847; 18.10.1847, 1.11.1847, 5.11.1847; TV 2.9.1846
- (61) Donnelly, J.S., *op.cit.*, P124
- (62) MacDonagh, O., "Irish emigration to the United States of America and the British colonies during the Famine", The Great Famine, P361-2
- (63) *ibid.*, P321

CHAPTER V

THE BRITISH RELIEF SCHEME

1. PRELUDE

"Good God, are you to sit in cabinet, and consider and calculate how much diarrhoea, and bloody flux, and dysentery, a people can bear before it becomes necessary for you to provide them with food?"

Sir Robert Peel.

Situation.

Early in August, 1845, the British prime minister, Sir Robert Peel, received a letter from the Isle of Wight which stated that a disease had broken out among the potato crop there. Thus the "blight", which had been present for several years previously in N. America had crossed the Atlantic. Subsequent inquiries made by the Home Secretary revealed that there was a significant outbreak in the south-east of England. Towards the end of August reports of the disease were coming in from Europe. It was clear that a major attack on the potato crop was a distinct possibility.

While concerned with the affect this would have on the British mainland, where the potato had become a significant part of working class diets, the government realised that the greatest threat was to Ireland. Both the Poor Inquiry and the Devon Commission had attested to the importance of the potato in the subsistence of the bulk of the population. These reports were reinforced by the experience of anyone familiar with the country, which Peel was, having been Chief Secretary there. Anxiety turned to consternation when, on 13th September, the editor of the *Gardners' Chronicle*, Dr. Lindley, held up publication to announce that the "potato Murrain" had "unequivocally declared itself in Ireland".⁽¹⁾

Rumours of blight in Ireland had been circulating before this.⁽²⁾

A Ballycastle farmer, writing to the *Northern Whig* on 23rd September, said that the blight had made rapid progress there since the previous month. Thus the outbreak in Co. Antrim at least would appear to have occurred in August. This month had begun with wet and cold weather.

The Northern Whig had noted that "the reports from the country are very unsatisfactory. All (grain crops) are more or less laid." Ironically it added "The rain has been, so far, very beneficial to the Potato crop."⁽³⁾

The weather had been instrumental in the spread of the blight, which was a fungus, *phytophthora infestans*. The weather in August - cool with several days of high humidity and calm, was ideal for its propagation and spread. Due to the late season of the attack in 1845 there was little loss of crop due to defoliation (The fungus attached itself to the leaves of the plant and spread through the foliage). Rather the damage was focussed on the rotting of the tubers. Spores of the fungi were washed down the leaves through the soil and affected the tuber in this manner rather than through the haulms. In fact, if the potatoes had been left in the ground for several weeks after the haulms had withered, the spores would have died before the lifting of the potatoes.⁽⁴⁾

One section of contemporary scientific opinion, led by the Rev. M.J. Berkeley, did support the fungus theory, though it was unable to give a rigorous scientific proof of the hypothesis.⁽⁵⁾ Lindley, a leading botanist in addition to being editor of the *Gardners' Chronicle*, maintained that the blight had been caused by a surplus of water in the potato. (the growing season had been characterised by heavy rainfall.) This view was supported by the decomposition of the infected potato into a messy sludge, though this actually was a secondary development consequent to fungal attack.

The government was faced with a situation where there was uncertainty over both the nature and the extent of the blight. Combined with this there was mounting pressure in Ireland for the government to act to prevent any outbreak of famine. Peel's experience in Ireland had convinced him that the Irish possessed a proclivity for exaggeration and thus his immediate response was to procure more information. This took two forms.

Firstly, the constabulary in Ireland, from the 16th September, were directed to compile weekly reports on the loss of the potato crop. By 16th October a bad state of decay was noted in 17 counties and by December it was calculated that a quarter of the crop had been lost.⁽⁶⁾ Well over half (60%) of the electoral divisions in Ireland which reported had losses of between one quarter and a half of the total potato crop.⁽⁷⁾ Since only 12% of electoral divisions reported losses greater than a half of the crop it was clear that the government would have a breathing space with which to prepare for the coming shortage.

Alongside this statistical operation, Peel established a scientific commission to determine whether the diseased tubers could be treated in any way so as to reduce the loss still further. By late October they were at work in Ireland. Since they were operating within a situation of strictly limited knowledge, contemporary scientific opinion may be excused for having sharply differing views over the nature of the blight. However, Peel may be criticized for appointing men who held the same view, the surplus water theory.

The commission had been established to inquire into the best means of (i) preserving potatoes dug up apparently sound (ii) of using diseased potatoes (iii) procuring seed for the coming year. While the nature of the blight was not an explicit subject of their inquiry, it obviously underpinned their approach to the remedy. Since they believed the blight was caused by surplus water, then the potatoes which were apparently sound should be kept dry before consumption. They recommended that ventilation holes through the potato pits should be made by means of sods of turf and that the potatoes should be kept dry by putting turf mould on each layer of tubers. The government, more as a demonstration of sincerity than practicality, published 70,000 copies of these instructions and gave them wide distribution.

The measures failed utterly though it is unlikely they were widely employed. Although the commissioners admitted the possibility of the fungal theory being correct they "resolutely ignored" it in their suggestions.⁽⁸⁾ Even if it had been accepted it is difficult to imagine what measures could have materially altered the situation. Much later, the use of a copper sulfate spray was stumbled on to prevent blight but though there were some indications which might have suggested this, they were agonisingly lost among the plethora of observations and remedies, from the impractical to the ridiculous, which abound in such situations.

The spores of the fungus can live from year to year as resting spores in the ground or actively in the core of stored potatoes. While the correct spraying procedure would have changed the course of 1846, it could not have altered the outcome of 1845. Even with determined

government intervention, a comprehensive treatment programme would have been extremely difficult to assemble within a year in an economy so backward as Ireland's was. Basically, within the constraints of contemporary knowledge, machinery of government and underdevelopment, science could offer no real solution and nature would have to take its course as regards native food supplies.

By November it was clear to the government that there had been a major loss in the potato crop and that there was no way in which science could change this. In Ireland, concern was mounting. The Drogheda Argus reported that it was "pitiful to see the poor people actually crying about their crop - their all."⁽⁹⁾ Concern was not purely altruistic. Also in November, notices were posted on church doors in Clare, Limerick, Louth and Cavan telling people to pay no rent on account of the potato failure.⁽¹⁰⁾ Public opinion was alarmed by the apparent lack of government activity, which culminated on November 3rd with a deputation of public figures seeing the Lord Lieutenant. Their cold reception led to an outcry.

Peel was actually formulating a programme to tackle the shortage. The most contentious though ironically not the most significant was the repeal of the corn laws. Before looking at these measures, it is as well to note that local failures had been frequent. The worst of the minor failures had occurred in 1821 and in the following year an estimated one million sought aid.⁽¹¹⁾ The government set up a relief committee which in 1822 dispensed £175,000. There was also a major public works scheme. It was this type of solution that the government attempted to employ again - donations to local relief committees in proportion to their subscriptions and a system of

public works to carry over the labouring classes in the period of distress.

In contrast to 1822, there now existed in Ireland the poor law system. The poor law had been passed in 1838 and Ireland had been divided into 130 unions, each with its own workhouse. By 1845, 123 of these were open.⁽¹²⁾ However, as the architect of the system himself noted, "it must not ... be expected to work miracles" and the law provided for public works in the event of major distress, such as the potato failure, whose nature was likely to be temporary.⁽¹³⁾

It was generally accepted that even in normal years, the lower strata of rural society were semi-starved in the months before the potato crop was lifted (July and August were called the "meal months"). It was considered beyond the poor law system to deal with this and so outrelief was forbidden. The workhouse was made as unpleasant as possible; discipline was strict and the family was broken up. Accordingly it was detested in Ireland and entry into it was the last resort and in itself formed a most accurate test of destitution. Semi-starvation with independence was preferred during the summer, as long as there was the prospect of a potato harvest. In the event of a failure, public works were to be provided as it was recognised that the workhouse system would otherwise be overwhelmed.

Although the 1845 failure was serious, its effects were not immediate. Traditionally the season of distress was not the year of the failure but rather the following one. Depending on severity,

there would be a rise in the numbers seeking relief during the winter and spring months, reaching a peak in the period just before the potato harvest was due. The effect of a failure was thus cumulative and in this light the considered response of the government in October, 1845 was justified, though the Irish viewpoint is easily understood. However, by November a train of measures had been set in motion.

It is difficult, when examining the various measures adopted by the British government, to avoid being lost in a sea of tragic detail. In order to avoid this, the relief scheme has been divided into three sections which are chronologically reasonably well defined. The government is considered to be an exogenous agency, faced at the beginning of each period with a particular situation - in this section it is the failure of 1845.

The system adopted to deal with the situation is analysed in the following fashion. Firstly, we examine the structure of the system - how it was to be administered and the form the relief took. Next we deal with the policy concerning the distribution of food. Lastly we examine the specific legislation which was passed to deal with the distress. The aspect of constraint is given particular attention as the mortality which occurred would suggest that overall, the relief system failed. The immediate question is then why more aid was not provided. Following the study of the system proposed, we look at its operation. The approach adopted is not ideal. The division of the Famine era into three periods is to some extent arbitrary. However, our objective is not a narrative. Rather it is to examine the experience of that proportion of the labour force in

the rural economy we have characterised as "excess labour supply", what measures were taken to alleviate their suffering and the economic consequence of those measures. It is hoped that this approach may provide a framework for any study which attempts to render the government as an endogenous agency.

The relief system.

(i) administration.

On November 1st, Peel proposed to the cabinet the establishment of a relief commission. By the 18th its members were nominated and it held its first meeting two days later.⁽¹⁴⁾ The commission stood at the head of local relief committees which were to be established in Ireland. The lieutenants of counties were to form these committees for convenient districts, generally parishes, and they were to comprise of the lieutenant or his deputy, magistrates, an officer of the Board of Works, local officials from the poor law union, local clergy, a coast-guard where applicable, and any other "active and intelligent" gentlemen the lieutenant might select.⁽¹⁵⁾

The local committees were charged with several functions:

(i) they were to make townland lists of the circumstances of the families of those applying for relief. Those without means of supporting their families were to be given tickets which would qualify the holder to a place on the public works. (ii) in the absence of local public works schemes they were to set those requiring relief to work on the most profitable and natural sources of employment in the district (iii) they were to buy supplies from government depots and, in localities where there was an inadequate

distribution system, they were to retail the supplies - though this was only to the destitute and then in return for work.

The local committees were financed from local subscription to which the government provided a donation. This donation, like all expenditure on Famine relief required the sanction of the Treasury. Thus the relief commission, like every other government body involved during the Famine, came under the influence of the permanent head of the Treasury, its Assistant Secretary, Charles Trevelyan. His position of holding the purse strings gave him considerable authority. His personality ensured that he exercised it. As regards the implementation of relief policy and indeed its framing, he became the single most important individual in the period.

Relief committees were formed throughout Ireland in March and April, 1846, and by 10th August there were 648 of them.⁽¹⁶⁾

They were an important link between the government relief machinery and the situation on the ground. Although their reports were not treated uncritically they alerted the government to dangers and provided a general fund of information. By involving local elements, particularly the clergy, it ensured that the government did not appear totally arbitrary.

(ii) distribution.

Since the relief commission was formed in November, several months before the real period of distress was anticipated, its first duty was the preparation of depots from which food could be distributed.

Although the depots could have been stocked with domestically produced cereals, this was rejected because of their cost. Any substitute for the potato would have to share its former quality, its cheapness. On 9th-10th November, 1845, Peel had ordered the purchase of £100,000 of Indian corn in the U.S. and its shipment to Ireland.⁽¹⁷⁾ In doing so he had acted on his own authority and had not waited for Treasury sanction.

The objective was twofold. By providing enough meal which, at the rate of 1 lb. per day per person, could support almost half a million people for a period of 3 months, the government was materially improving the food supply situation in Ireland.⁽¹⁸⁾ Secondly, by selling the corn "a little under the market price",⁽¹⁹⁾ it was hoped that speculation by dealers would be reduced. The main purchasers of the meal were to be local relief committees who would distribute it gratuitously where there was distress but at cost where there were some resources. This was especially important in the more remote and backward areas, particularly in the west. The general poverty of the region had given little stimulus to the growth of a distribution network; the bulk of most families' food was grown by themselves. The surplus grown on the farm in the form of cereals or livestock was appropriated by rent.

Thus the relief commission was first of all to receive and store the Indian corn which arrived at the end of January. It was concerned when it was found out that elaborate drying was necessary for the corn in addition to special milling. In February the commission was reorganised and an executive committee was formed which met daily; its instructions were drawn up by Trevelyan. The chairman was Routh

who had been head of the Commissariat which supplied food for the British Army. (This was a civilian department, responsible to the Treasury, and had been much run down since the Napoleonic Wars.)

Early in February the relief commission undertook to establish and supply food depots around the west coast. A commissariat officer was placed in charge of them. Either the poor would come directly to the depots to purchase food or it would be done through the agency of the relief committees. Corn dealers were not to be supplied as the government did not wish to become a wholesaler. Its intention was to restrain the dealers' speculation, not to form an alternative distribution system.

(iii) measures.

In accordance with the strictures of contemporary political economy, the government did not intend to give any gratuitous relief to the abled bodied less it demoralised them (further). Rather it set out to provide those temporarily distressed by the blight with an alternative source of employment. This it did by initiating a system of public works.

The core of the system was contained in the first two of four acts which received the Royal Assent on 5th March, 1846 (9 Vict. c.1-4). 9 Vict. c.1 merely increased the amount by which the Commissioners of Public Works could advance as a grant - an additional £50,000 was permitted. The bulk of the provisions of former acts relating to public works were to apply except for the amendment that instead of 3 JP's being required to convene a meeting to apply to the Lord

Lieutenant for public works, now 2 JP's and 3 cess-payers were suffice. (This was to make the process quicker in the more remote areas.)

By 9 Vict.c.2, grand juries, as assembled at the last spring assizes or assembled under warrant of the Lord Lieutenant, were required to appoint extraordinary County Presentment Sessions to consider proposals for relief works, as might be laid before them by extraordinary Baronial Presentment Sessions. If approved they were to be executed in the ordinary way by contractors, by means of advances from the Consolidated Fund, the whole of which was to be repaid by the counties. Works under this act were limited to repairing the roads, breaking stones, cutting hills etc., though only for relief purposes.

These were the major acts which governed relief in the 1845-46 season of distress. Underlying them was the feeling that the works executed should have a social utility and they should not be construed as giving gratuitous relief to the able-bodied. Both acts used the existing machinery rather than bringing out any administrative innovations. The Commissioners of Public Works had been formed many years before. The grand jury was the administrative organ of the county and was responsible for the maintenance and extension of roads in the county.

While the machinery was in existence it had to be extended in order to meet the scale of the problem. The schemes submitted to the Board of Works had to be examined by engineers to ensure their viability. The time taken for this naturally depended on the staff

available. The strain on the system would depend on this and the volume of employment it had to provide. This time lag between submission and authorization could lead to acute suffering. It was made necessary by the underlying principle that the works have social utility. The suffering this caused no doubt distressed the government; the alternative, basically the gratuitous distribution of relief horrified them and blotted out compassion. That there should be constraints upon relief was entirely legitimate. However, constraints are logically secondary to the objective of the provision of relief, the alleviation of suffering. What strikes the observer is how often the operation of the constraints was elevated above the basic principle of relief.

The two remaining acts, 9 Vict. c.3-4, extended the role of public works to harbours and land drainage. Unfortunately harbours in the west required to be strong enough to withstand the battering of the Atlantic. Their construction was costly and not suited to relief.⁽²⁰⁾ The land drainage scheme was complicated and implementation took time.

Constraints.

There was no need, under the workhouse scheme, to devise a test of destitution as willingness to enter a workhouse in itself was the test. The workhouses were organised so as to, in the words of the Poor Law Inspectors, "offer relief on terms that none but the really destitute will accept."⁽²¹⁾ However, this did not operate in the case of public works. With chronic underemployment except in the harvest and planting season, the opportunity to earn money wages would be seized on by a large proportion of the rural population.

In the pre-Famine period, it was usually the grand jury which was concerned with public works. It held presentment sessions to which applications were submitted, signed by two persons paying grand jury cess (the county tax). Those approved by the session were printed and circulated, after which they were submitted to the grand jury for approval. Those approved were put to a judge for this fiat. In addition to the approval of the grand jury and a judge, any freeholder, who objected to any particular presentment could contest its legitimacy, even after the judge had given his fiat, by trying it by traverse in front of a jury. (22)

Though the initial sum for these works was advanced from the Consolidated Fund, the whole of the eventual cost was repaid by the county and secured by the county cess. This was levied entirely upon the occupiers within the county and not upon the landlords. It was this liability which formed a check upon the generosity of the county. Any particular road, for instance, would benefit some tenants but not the majority, though all would have to contribute to it. The system was devised to form a trade-off between these competing interests, though the grand juries tended to be dominated by the large landowners who tended to approve of those which benefited their particular estates.

The second relief act, 9 Vict.c.2, operated entirely within the above system with the exception that special baronial and county presentment sessions could be organised. However, in addition to the grand jury system there was another method of executing public works. This was by a mixed system of grants and loans. By 1 and 2 Will.4 c.33 grants could be made to certain poor districts in Ireland which

were subject to destitution. In such times internal improvement could be affected so as to afford employment for the labouring poor. These were carried out by the Board of Works who would advance half of the estimated expense as a loan, secured by grand jury presentments. One quarter of the cost was to be met as a free grant and the remaining one-quarter was to be contributed by the proprietors who chiefly gained by the improvement.

The Poor Law Act of 1838, 1 Vict.c.21, recites the above act and increased the sum available. The mode of application was, however, amended so that if any three or more parties in a county considered it expedient to apply for public works, notice was to be given in the barony concerned of a meeting of justices and cess payers associated with the last presentment sessions held in the barony. If a majority of these approved, then a memorial was to be sent to the Lord Lieutenant for the execution of the works. If approved by the commissioners of public works, then the proposals were to be sent to the Treasury for sanction where the conditions of repayment were signified.

The requirement of 1 and 2 Will. 4 c.33 that there had to be destitution in the locality concerned led the Treasury to approve only three schemes in the period 1837-46.⁽²³⁾ As noted previously 9 Vict.c.1 reduced the number of JP's required for the presentment session and extended the funds available, but basically recites the earlier legislation. The act effectively cut the cost of improvements by half. This might provide an incentive for some occupiers to apply for improvements. Since the remainder of the cost was to be repaid over 20 years, the tax liability, for those

who benefited from the improvement, would be a weak deterrent to those seeking material benefit from the legislation.

This would clearly make the Treasury the main organ of restraint as the new relief act had dispensed with the grand jury altogether. This would be purely administrative and depended crucially upon the information it received of the level of distress in areas from which applications for works had been lodged. There would, however, be a fair section of the local population whose interest would be to exaggerate distress, quite apart from those genuinely concerned about the destitute, whether through altruism or fear of disorder. This would place a heavy responsibility upon the local Board of Works officers. The efficiency of the constraint would tend to be inversely proportional to the scale of distress.

The basic defect of the legislation, that baronial sessions were conducted more for private than public interest, was recognised quickly.⁽²⁴⁾ Since this could not be readily modified, Trevelyan resolved that if the application could not be efficiently restricted, then the numbers applying for the works would be. Since labour for money wages was attractive to a large proportion of the rural population, entry to the works was to be restricted by the relief committees. They were to investigate the condition of each applicant and give a ticket only to those who had no other means of support. (The ticket was presented to the Board of Works official at the works and gave access to the holder.)

In addition to this it was emphasized that the money payments for those on the works should be below the usual rate of wages in the

neighbourhood.⁽²⁵⁾ This was intended to ensure that works would not attract labour from local employment.

Operation.

(i) Workhouses.

Since the workhouse system was the existing mode of relief it is here we begin. As is clear from Table 5.1, workhouse numbers were not substantially different from the normal year of 1844-45 right up until after the harvest of 1846. The aggregate figures, given in Fig.5.2, show that the number of inmates was steady in the early distress period, though a seasonal drop is evident in the autumn for both the years 1845 and 1846.

Table 5.1

% utilisation of workhouses, 1844-1846.

Number in workhouse as % capacity	November 1844	March 1845	November 1845	March 1846	November 1846
0-24	23	9	16	12	1
25-49	55	54	75	49	8
50-75	26	34	22	40	37
75	9	17	9	20	83 (45 > 100)
No Return	17	16	8	9	1

Source: Copies or extracts of correspondence relating to the state of union workhouses in IRELAND, PP.1847, vol. 55, P.64-73.

If we turn now to Table 5.2 we see that the main difference between 1844-45 and 1845-46 was in the period March - September 1846.

(Given that the agricultural year was roughly March to September, it is reasonable to consider the "relief" year to be September - September, that is, as being dominated by the harvest.)

In that period the number relieved increased by 50% over the comparable period of the previous year. However, the average number of days a pauper stayed in the workhouse fell significantly, from 93 to 77, which could suggest that a greater proportion of inmates were temporary, possibly awaiting alternative relief. The general picture as concerns workhouse relief was thus one of a system coping with the situation without great strain.

Table 5.2

Aggregate workhouse statistics 1844-46.

Period	No. of unions making returns	Number relieved	Average no. of days each pauper stayed	Weekly cost of provisions	
				s.	d.
Sept. 1844- March 1845	108	67,852	95	1.	5.3
March 1845- Sept. 1845	112	73,556	93	1.	5.5
Sept. 1845- March 1846	118	78,541	90	1.	8
March 1846- Sept. 1846	114	110,653	77	1.	9

Source: 12th annual report of the Poor Law Commissioners, PP.1846, vol 19, P.140-143.
13th annual report of the Poor Law Commissioners, PP.1847, vol 28, P.204-207.

This was brought out in a letter written by a poor law commissioner in October 1846 to the Home Secretary. He considered that "the state of the funds in all the Unions in Ireland collectively is more flourishing this year than in the last,"⁽²⁶⁾ though he admitted that some unions would have to borrow to keep workhouses open. (Payment of interest was illegal though.) Only three unions had applied for loans from the government to defray current expenses.

(ii) Relief Works.

The flaw in 9 Vict. c.1 was rapidly appreciated by local interests and applications flooded in,⁽²⁷⁾ as can be seen in Table 5.3. In the month that the act was passed almost £½m was applied for. Two months later it was over £1m. In the face of this deluge the Treasury attempted to limit authorisation to schemes in areas where destitution was established. This led to two-thirds of applications being rejected.⁽²⁸⁾

The numbers actually employed as the works grew slowly through April to peak at a daily average of 17,617 in the first week of August. The works were most pronounced in an arc of counties from Mayo to Kerry, with Clare significantly higher than all others. (7.3% of the 1841 rural population was employed on the roads in July, 1846.⁽²⁹⁾)

Table 5.3

Public works under 1 Vict. c.21

Period	£ 000's		Daily average employed
	Applied for	Recommended	
Up to 31st March	478	70	
" " 30th April	785	118	3289
" " 31st May	1,055	243	5284 (first week of May)
" " 30th June	1,187	350	20577
" " 31st July	1,293	458	62267
" " 31st August	1,372	477	66880

Source: Correspondence (BOW), PP.1846, vol 37: employment P317, 332, 351; applications P300-1, 316-7, 324-5, 338-40, 354-6.

Correspondence, from July, 1846 to January, 1847, (BOW), PP.1847, vol 50, P80, 79.

Relief under 9 Vict. c.1 was formally terminated by a Treasury Minute of 31st August, 1846.⁽³⁰⁾ By this time the Board of Works had examined and reported on 3,989 schemes.⁽³¹⁾ Because the element of the government grant was not present, there is less evidence concerning 9 Vict.c.2. However, the £100,000 limit contained in the act was soon exhausted and by 1st August, there were £30,000 more in presentments. The Lord Lieutenant was authorised to grant this amount provided distress was proved.⁽³²⁾ The liabilities of counties under the act (£68,000 in November, 1849) would suggest that the bulk of this was taken up.⁽³³⁾

We may now turn to the operation of the constraints within the system of relief works. The first level was the vetting of the application by Board of Works officials and the Treasury. While straightforward it had the disadvantage of introducing a lag between the occurrence of the distress and relief measures for it. The scale of distress was obviously crucial. As long as there was a breathing space between information being received about the likelihood of distress and its actual onset, then the lag caused by the process of approval was not of major concern. However, if distress was both widespread and immediate not only would the lag be the cause of death but it would be lengthened as more pressure would be put on the approval system. In the season 1845-46 this was largely avoided only because the scale of distress was within the capacity of the system. Local committees were in addition able to cover the lag themselves.

Given that relief works were vetted and only started in areas of distress, the next objective of the government was to ensure that only those in distress actually got onto the relief schemes. The disadvantage of 9 Vict. c.2 in this respect was that contractors were employed and thus there was no obligation on them to employ the distressed. However, in many cases local relief committees took on these contracts and saw to this. (34)

In the case of 9 Vict. c.1, it was the responsibility of the relief committees to vet the circumstances of those who applied for relief and to issue tickets only to those who would otherwise be unable to provide food for their families. As soon as the relief work got off the ground there were complaints that the committees were not

sufficiently discriminating in the issuing of tickets.⁽³⁵⁾ This led to a Treasury Minute in July which instructed inspecting officers to check those on the works and to strike off any who had some means of subsistence.⁽³⁶⁾ This development foreshadowed greater involvement of central government in the relief scheme.

The second device to limit the appeal of relief works to those not in distress was the setting of the wage rate below the average for the locality.⁽³⁷⁾ The obvious flaw of this system was that the pre-Famine wage rate was a purely nominal, accounting rate. Depending on how close to physical subsistence labourers were, the increased cost of subsistence due to the blight would trigger off an increase in money wages. Thus if a man on relief works was to gain subsistence, the wage rule was implausible. The objective of the wage rule, to prevent labour being drawn from agriculture, has to be set against the background of farmers shedding labour due to its increased cost. This economising of labour would increase the seasonal fluctuation in labour demand. Labourers would be unwilling to leave works in order to satisfy a short period demand from farmers lest they had difficulty in regaining their places.⁽³⁸⁾ Equally the small farmers would find the public works indispensable to give their families subsistence until their crops were ready. In this manner, the public works would have increased the labour employed in agriculture as the earnings of one member of the household from the works would allow the continued cultivation of smallholdings.

Larger farmers would have found it more difficult to hire casual labour, though it must be noted that this labour would have been much more expensive in any case. It is impossible to abstract the

effect of the public works from the impact of the blight, though it is likely that they diverted a considerable amount of labour from employment in agriculture.

Overall, the ending of seasonal migration and the difficulty the Shannon works had in recruiting men suggest that the public works policy did not strictly enforce minimum subsistence payment.⁽³⁹⁾ (Though both these could be explained for other reasons. Migrants would be anxious about their families and would prefer to stay at home even if this entailed a lower level of consumption. If the Shannon works kept fixed money wages, these might not cover a family's subsistence.) Since strict enforcement of subsistence earnings would entail differential wage payments based on family circumstances, it is unlikely that it would be practical managerially in any case, much less so if there was any urgency.

(iii) Distribution of Indian corn.

The distribution of the food contained in government depots was primarily in the hands of the relief committees. The finance they required to purchase this food was provided by local subscription to which the Lord Lieutenant also contributed. During the spring and early summer this was usually two-thirds of local subscription. Later on, and in distressed regions, the donation equalled the subscription.⁽⁴⁰⁾ In the period from 25th March to 7th August, subscriptions totalled £100,607 and donations £67,738.⁽⁴¹⁾

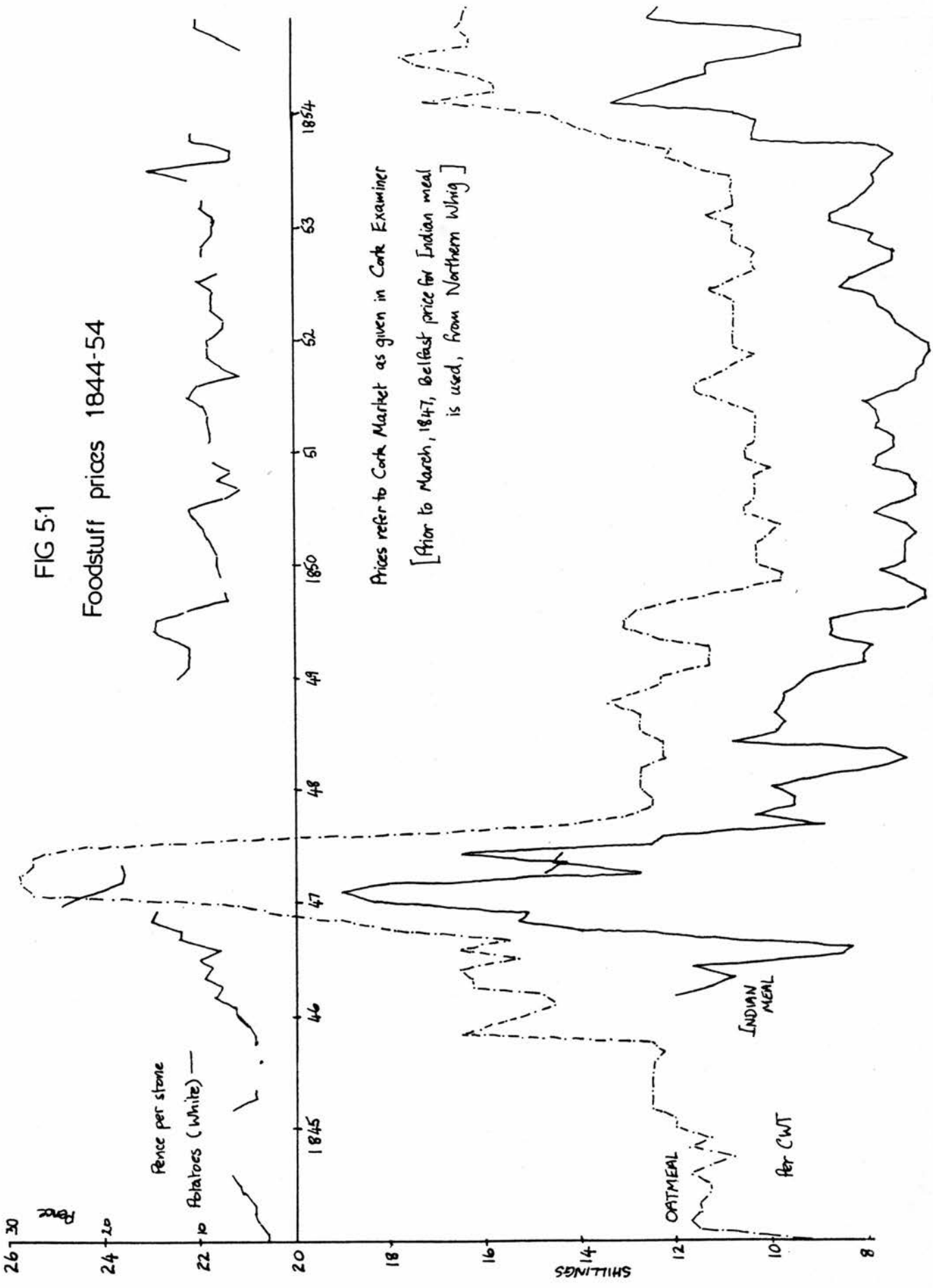
In areas where relief committees were inadequate, sub-depots were opened, controlled by the coastguard or the police. In all there were 105 of these.⁽⁴²⁾

The policy for the sale of food was straightforward. There was only to be a sale in the case of distress and at a price "a little under the market."⁽⁴³⁾ In the west many sub-depots had been opened precisely because of the lack of a distribution network and thus the policy was not applicable. Information concerning the degree of distress came from the local relief committees - the applicants. As one officer said, "it is seldom in my power to judge." Thus distribution depended on local initiative rather than central control.⁽⁴⁴⁾ In practice committees often distributed food gratuitously, especially if there was a delay in establishing public works.⁽⁴⁵⁾

The sale of Indian corn from government depots was not seen as primarily providing subsistence to the distressed but rather to moderate market prices. Trevelyan was concerned lest this interference reduced the incentive of traders to import foodstuffs.⁽⁴⁶⁾ As Fig 5.1 indicates, the price of Indian corn fell from £9.5 per ton at the end of May, 1846, to £6.9 in mid July. With the return of the blight it rose sharply again. The influence the sale of Indian corn from government depots had upon its price is impossible to say. Naturally the dealers complained⁽⁴⁷⁾ and this is evidence of success for the policy.

In April it was getting into "pretty general use" according to the Newtownards Board of Guardians and was keeping down the price of oatmeal.⁽⁴⁸⁾ There was interest expressed in the private trade in Indian corn early in 1846 and a market price was quoted in the Northern Whig from March.⁽⁴⁹⁾ Perhaps we may conclude that the

FIG 5.1
Foodstuff prices 1844-54



Prices refer to Cork Market as given in Cork Examiner
[Prior to March, 1847, Belfast price for Indian meal
is used, from Northern Wharf]

Pence per stone
Potatoes (White) —

OATMEAL
INDIAN MEAL
Per CWT

26
24
22
20

SHILLINGS

1845 46 47 48 49 1850 51 52 53 1854

distribution policy was broadly successful within its limited objectives.

Indian corn was not highly regarded as a food. The inmates of the Mallow workhouse, when first served with it, "not only refused to eat it, but rose en masse, denouncing all who had any hand in its introduction."⁽⁵⁰⁾ This in itself is an eloquent judgement on the level of distress in the 1845-46 season.

Conclusion.

The distress in the season 1845-46 was adequately contained by the government's measures. As the head of the Board of Works put it, "it seems that the situation required simply the traditional policies plus small incidental assistance in the worst affected localities."⁽⁵¹⁾ A slightly exaggerated account of popular feeling was given in a letter to Trevelyan in June - there was a "transition from indifference, mistrust, and hostility, to the unanimous and spontaneous expression of confidence and satisfaction."⁽⁵²⁾

The feeling of satisfaction in both these letters is understandable given that starvation was averted.

However, there was some disquiet, especially in Trevelyan's mind, concerning the operation of the constraints contained in the relief scheme. These centred on local agencies. Trevelyan considered that a basic flaw of the relief acts was the advantage given to local interests by 9 Vict. c.1 in the payment by grant of half the cost of the works. He proposed that future works would be formulated in sessions which had the same provisions as the former grand jury

system.⁽⁵³⁾ In addition, by making the whole charge fall upon the county, further economies were anticipated.

His proposal that baronial sessions should be called by the Lord Lieutenant only in distressed areas foreshadowed an extension of central government control. This had already been seen in regard to the use of inspecting officers to check the relief lists which had been compiled by relief committees. Their laxity was evident in the underutilisation of workhouses in this relief season. This generosity concerned Trevelyan and made him suspicious of local agencies.

Although the scale of the problem in the season 1845-46 was much smaller than that of the following year, it is worth analysing the situation at some length since this provides the framework for the later relief measures. These attempted to deal with a much more serious situation along similar lines. It is only fair to note that the relief in 1845-46 did demonstrate the need for a viable system of constraints. Unfortunately it was this aspect of the operation which came to dominate the thinking behind the relief system.

REFERENCES TO CHAPTER V.

- (1) Woodham-Smith, C., *The great hunger: Ireland 1845-49*, London, 1970, P35.
- (2) e.g. NW 16/9/1845.
- (3) *ibid.*, 1/8/1845.
- (4) Bourke, P.M.A., *The potato, blight, weather, and the Irish famine*, *op cit.*, Part IIa, P161-2; Large, E.C., *The advance of the fungi*, London, 1940, P40; O'Neill, T.P., "The scientific investigation of the failure of the potato crop in Ireland, 1845-46", *Irish Historical Studies*, vol V, 1946-7, P132.
- (5) Large, E.C., *op.cit.*, P15.
- (6) O'Neill, T.P., "The scientific investigation of the failure of the potato crop in Ireland, 1845-46", *op.cit.*, P127.
- (7) Correspondence, (Commissariat), PP.1846, vol 37, P36.
- (8) O'Neill, T.P., "The scientific investigation of the failure of the potato crop in Ireland, 1845-46", *op.cit.*, P127.
- (9) reported in NW 14/10/1845.
- (10) Woodham-Smith, C., *op.cit.*, P64.
- (11) O'Neill, T.P., "Clare and Irish poverty, 1815-1851", *Studia Hibernica*, No.14, 1974, P15-17.
- (12) Thirteenth annual report of the poor law commissioners, PP.1847, vol XXVIII, P22.
- (13) Nicholls, G., *A history of the Irish poor law, in connection with the condition of the people*, London, 1856, P166.
- (14) O'Neill, T.P., "The organisation and administration of relief, 1845-52", *The Great Famine*, P213.
- (15) Correspondence, (Commissariat), PP.1846, vol 37, P230-1.
- (16) O'Neill, T.P., *The Great Famine*, P216.
- (17) Woodham-Smith, C., *op.cit.*, P48.
- (18) A statement "of the total expenditure for purposes relief in Ireland since November 1845...", PP.1846, vol 37, P477.
- (19) Correspondence, (Commissariat), PP.1846, vol 37, P108.
- (20) Correspondence, (Board of Works), PP.1846, vol 37, P329.
- (21) *Poor Laws*, Q2474.

- (22) Consolidated Annuity, Q2995, 7, 3001, 3, 5-6.
- (23) *ibid.*, Appendix X, P593-4.
- (24) Correspondence, (Board of Works, PP.1846, vol 37, P293.
- (25) *ibid.*, P326.
- (26) Copies or extracts of correspondence relating to the state of union workhouses in Ireland, PP.1847, vol 55, P2.
- (27) Correspondence, (Board of Works), PP.1846, vol 37, P293, also P318, 304.
- (28) Consolidated Annuity, P674-5.
- (29) Correspondence, (Board of Works), PP.1846, vol 37, P356.
- (30) Correspondence, July, 1846 to January, 1847, (Board of Works), PP.1847, vol 50, P67; 4th September for 1 Vict.c.21.
- (31) Correspondence, *ibid.*, P75.
- (32) Consolidated Annuity, P675.
- (33) Statement "of the liabilities of each county, county of a city, and county of a town, and barony in Ireland, to Her Majesty's Exchequer, on the 20th day of November 1849, in respect of advances from the consolidated fund...", PP.1850, vol 51.
- (34) O'Neill, T.P., The Great Famine, P219.
- (35) Correspondence, (Board of Works), PP.1846, vol 37, P322,333,351.
- (36) *ibid.*, P342.
- (37) *ibid.*, P326.
- (38) O'Neill, T.P., The Great Famine, P220.
- (39) Correspondence, (Board of Works), PP.1846, vol 37, P341.
- (40) O'Neill, T.P., The Great Famine, P217.
- (41) Correspondence, (Commissariat), PP.1846, vol 37, P247.
- (42) O'Neill, T.P., The Great Famine, P216.
- (43) Correspondence, (Commissariat), PP.1846, vol 37, P108, 152.
- (44) *ibid.*, P152-3.
- (45) O'Neill, T.P., The Great Famine, P217-8.
- (46) Correspondence, (Commissariat), PP.1846, vol 37, P101.

- (47) *ibid.*, P153.
- (48) NW, 16/4/1846.
- (49) *ibid.*, 7/2/1846.
- (50) CE, 27/4/1846.
- (51) Griffiths, A.R.G., "The Irish Board of Works in the famine years", *The Historical Journal*, vol 13, 1970, P637.
- (52) Correspondence, (Commissariat), PP.1846, vol 37, P175.
- (53) Consolodated Annuity, P674-81.

CHAPTER VITHE BRITISH RELIEF SCHEME2. CHAOS

"I am quite unable to chronicle the many scenes of misery which are daily reported as having taken place. I am perfectly horror-struck at their perusal; and have neither spirit nor nerve to detail them. Man appears to have no sympathy with his fellow. On God alone must be our dependence - for on human aid we cannot depend."

Correspondent of Cork Examiner.

Situation.

Peel's government fell at the end of June, 1846, and was replaced by an administration under Lord John Russell. The character of the new government was established quickly by its chancellor, Charles Wood. A note from Trevelyan on 21st July further tightened access to relief works by instructing inspecting officers to let only those remain who had no means of subsistence.⁽¹⁾ This was reinforced on 8th August by an order for the gradual closing down of works whether they were complete or not. (This was attacked by Lord Monteaule as a breach of faith with the local taxpayers as they would have to pay for any additional work to complete them.⁽²⁾)

However the first three weeks of July had seen the blight return and make really rapid progress. The crop was far from maturity and the early attack meant that it was the foliage that was blasted. Inevitably the yield was derisory - estimated between 5 and 10% of an average crop.⁽³⁾ In Trench's words, "the luxuriant stalks soon withered, the leaves decayed, the disease extended to the tubers, and the stench from the rotting ... became almost intolerable."⁽⁴⁾ For many it was disaster. "Blank stolid dismay, a sort of stupor, fell upon the people, contrasting remarkably with the fierce energy put forth a year before. It was no uncommon sight to see the cottier and his little family seated on the garden fence gazing all day long in moody silence at the blighted plot that had been their last hope."⁽⁵⁾

The price of foodstuffs, which had been falling from May and June, began in August their steady and inexorable climb towards the Famine

peak of early in 1847. (See Fig.5.1)

Instead of closing down relief works there was a need for a massive extension.

The relief system.

(i) administration.

The activities of Peel's relief commission had been concluded on 15th August. It was not re-established chiefly due to the reduced role the government sought in the distribution of food and its general dissatisfaction with the behaviour of the relief committees, which were headed by the commission.

The relief committees were now put under the control of the commissariat department. The country as a whole was divided into nine districts, each of which was to be supervised by an inspecting officer. The reduced role of the committees was demonstrated in a number of ways. A Treasury Minute of 31st August ordered that their correspondence and accounts should be open to government inspection. Furthermore, instead of relief committees giving tickets to people for employment on public works, they were to provide Board of Works officers with lists of people requiring relief, in order of need.⁽⁶⁾ This was later made more explicit when it was stated that only those "having no other resource or means of acquiring subsistence than employment on Public Works" were to be put on the lists.⁽⁷⁾

The composition of the committees was also altered. Firstly their areas of responsibility were altered to be within the boundaries of the barony or half barony in which relief works were required.⁽⁸⁾

Each district was to consist of at least two parishes. More significantly, although the lieutenants of counties had authority to add local government officials and others to the committees, they rarely did so.⁽⁹⁾ This led to many of the local Catholic clergy being excluded and there was some loss of vitality. The inspecting officers were, on the other hand, to be ex officio members. Thus administration reflected the increased involvement of central government.

Committees still had responsibilities in the distribution of food though these were also reduced. They were to sell food only to those persons without other means of procuring it. The price was to be at the prevailing market price.⁽¹⁰⁾ Gratuitous relief was to be given only to the infirm and unemployable and this only when the local workhouse was full.⁽¹¹⁾

(ii) distribution of food.

At the same time as central government increased its role in relief administration, it reduced its involvement in the importation and distribution of food. The chancellor explicitly stated that the government would not import food due to threats from the merchant community who maintained they would not participate in the trade if the government intervened.⁽¹²⁾ Although they trembled before merchants, the government realised that for large areas of Ireland a retail network simply did not exist. The government undertook to open depots on the western seaboard from Derry to Cork. Beyond that the chancellor resolutely refused to go. The depots were not allowed to open if there were any food supplies in the locality. Permission to open was granted but grudgingly.

The price policy followed by the commissariat officers in charge of the depots was based on Trevelyan's philosophy - "In a time of general scarcity like the present, high prices must prevail. They are our only safeguard against rapid consumption; our only means of drawing increased supplies; the only thing, in short, which stands between us and absolute famine."⁽¹³⁾ He was concerned that the depots should not undercut retailers and let the prevailing market price set the depot price. The upshot of the policy was that at the end of the year the depots were retailing Indian meal at roughly 50% above cost.⁽¹⁴⁾

The government was eventually forced to import Indian corn directly for its western depots though its earlier policy of non intervention meant that it went to the American market too late in the year. 1846 had been a year of general European scarcity and trading was brisk. By leaving its decision to purchase so late, the British government had to wait for the 1846 harvest. Indian corn required several months preparation for export with the result that it was after Christmas before the supplies could arrive.⁽¹⁵⁾

(iii) measures.

Lord John Russell considered the major duty of the government was the provision of employment and to this end the Labour Rate Act (9 and 10 Vict. c107) received the Royal Assent on 28th August. This act authorised the Lord Lieutenant to call presentment sessions on any private representation of the existence of distress in any area. The local initiative which was the foundation of previous public works acts was dispensed with. Given the Lord Lieutenant's proclamation in any barony, magistrates and rate-payers were required

to assemble and hold extraordinary relief sessions.

The Lord Lieutenant's authority to call presentment sessions was intended by the government as the first line of constraint on relief expenditure. This is clearly brought out in Trevelyan's memorandum of 1st August which was presented to the new administration as a guide to their deliberations on the Irish relief situation.⁽¹⁶⁾

By leaving the sessions to the discretion of the Lord Lieutenant it was hoped that irresponsible exaggeration on the part of landowners who wished to acquire improvements at reduced cost would be neutralized.

9 and 10 Vict. c107 did not take up one suggestion of Trevelyan, though ironically it was to do so de facto. This was to exclude from the act any work on new roads or any improvements of estates. The thinking behind this was that "the paramount object is to impose some effectual limits on what threatens to become a gigantic system of permanently supporting one portion of the community at the expense of the remainder."⁽¹⁷⁾ By making the works of no direct benefit to any individual, then the sessions would be conducted objectively for the public good as well as minimising cost.

Although Trevelyan's suggestion did not appear in the act, another did. This was the form of taxation which would cover the relief expenditure. Instead of being paid as a county assessment, i.e. by the occupiers of the land, it was to be levied like the poor-rate with occupier and proprietor sharing the liability. The element of grant from the Treasury which was present in former legislation was excluded and the whole of the expenditure was to be borne by the

locality. Thus future taxation was in theory to press economy upon the proposers of relief works. Such was the theory.

Operation.

(i) workhouses.

From late August the numbers in the workhouses climbed steadily to reach a peak of 115,000 late in February 1847. In a similar period the mortality rate rose from 3 per 1,000 to a peak of 25 in April. The dilemma for the poor law authorities may be appreciated by considering the utilisation of workhouses in November, 1846, long before total numbers reached their peak. (See Table 5.1).

Already a large number of workhouses were overcrowded. Much worse was to follow.

Before dealing with the workhouse developments in more detail it is worth pausing to consider some basic features of the Famine diseases which decimated the Irish population - these were typhus, relapsing fever, dysentery and scurvy.⁽¹⁸⁾ The organisms that cause typhus attack mainly the small blood vessels of the body, particularly in the brain and skin. A louse on the infected individual's body swallows the typhus organisms along with the individual's blood. They multiply in the louse and are eventually excreted by it. Alternatively the louse may be crushed by its host's scratching. This also provides an avenue for the organisms to penetrate another individual if the louse changes its host.

Although relapsing fever is due to a different organism, its mode of transmission is similar to typhus. As a rule typhus is the more fatal disease. Hygiene is an important consideration in dysentery

as well. After being swallowed the bacilli multiply and attack the intestinal wall. The excreta of sufferers is highly infectious. While it is impossible to allocate proportions of fatalities to each disease, it is easy to imagine how in crowded workhouses or temporary fever hospitals the conditions for rapid development of epidemic diseases were most conducive.

There does not seem to be a direct link between undernutrition and susceptibility to infection - so no such connection is seen in those suffering from anorexia nervosa, for instance.⁽¹⁹⁾ The most likely link is that the lack of nourishment leads to neglect of personal hygiene, which for an underdeveloped economy is not likely to be high in any case. The utilisation of any commodity which is at all edible will inevitably lead to stomach upsets which will weaken the sufferer further and increase the likelihood of dysentery. The apathy of the sufferer, poor sanitation, communal living, the passing on of clothes from the dead without washing, all combine to give the basis for severe epidemics.

It is worth emphasising the psychological aspect of apathy. There were two dominant impressions of the famine situation in the Western Netherlands in 1945* that remained in the mind of S. J. Drummond, one of the relief organisers: "the immense importance of the psychological aspect of inanition and the comparative simplicity of the nutritional and biochemical problem."⁽²⁰⁾ The "comparative simplicity" referred to was the prompt placing of the sufferer on a diet of high energy value with high protein content.⁽²¹⁾

* This was caused by Nazi retaliation to a railway strike in Holland in September, 1944, called to hinder German troop movements after the Arnhem landings.

It was not lack of knowledge which prevented this straightforward remedy in Ireland in 1847 and thereafter (after all it does concur with common sense). Rather it was a matter of cost. The food supplies were in existence, but only at a price could they be procured. Irish exports of food continued as the highest price was to be found outside Ireland. Whether or not these exports were sufficient in themselves to have prevented famine or at least tide the populace over until cheaper Indian corn imports could arrive is irrelevant. If the demand existed in Ireland, the very market mechanism which led to food being exported would have led to its importation. Given the political institutions of Ireland at this time the only feasible source of purchasing power was central government. Such a course struck the government as abhorrent and it preferred mass starvation.

The apathy of the starving struck some of the relief organisers. There is an incredible section in the report of one inspecting officer concerning Donegal. He says that the "very small farmers here have spent the last three months in search of tickets for employment, and very few they have got, nor can they be induced to till their own farm, although loitering about idle, but perhaps weak with hunger."⁽²²⁾ This report brings out well the philosophy of the official relief system. The use of the word "loitering" has clear overtones of moral disapproval, entirely consistent with the strict Malthusian interpretation that the poor were the agents of their own misery. As an afterthought, "perhaps", they may be starving and with this, perhaps, a begrudging attempt, though not obligation to provide relief. Certainly no high protein diet. Undoubtedly the scale of the disaster would have overwhelmed many

individuals of average moral stature. Their response would be to mechanically carry out their instructions, believing that by doing so, their efforts, though apparently brutal, could by being part of a system, apparently coherent and attempting to relieve distress, serve to reduce the suffering that engulfed them. What else could they do?

The government's philosophy concerning relief and in particular where the financial liability lay is clearly brought out in an exchange of letters between Sir George Grey, the Home Secretary and Twisleton, the Poor Law Commissioner. The subject was the refusal by some workhouses of further admissions (they were full or in severe financial difficulty). In the case of Ballina Union some of those refused subsequently died of starvation. Grey had received a memorandum which noted the overcrowding. The Poor Law Act did allow for the Commissioners to hire or purchase buildings to be used as workhouses, but only up to £400. Expenditure beyond this required approval by a majority of the board of guardians. In the memorandum it was considered that great difficulties in collecting rates made it impractical to extend workhouse accommodation and thus their liabilities without external aid.⁽²³⁾

Grey's comments on this deserve to be quoted at length as they are a clear enunciation of the government's philosophy. He said,

"I am unable to acquiesce in the propriety of abstaining under such circumstances from an attempt to put in force those powers which the Legislature has provided for cases of extraordinary pressure, and I feel that a very heavy responsibility rests on those who, from declining to exercise those powers, refuse to persons without any

other means of support, that relief which ought to be afforded them. If on the allegation, that great difficulty exists in collecting the rate at present outstanding, and that the collection of any new rate, except from the better class of rate-payers is next to impossible, "external aid," by which I presume is meant aid from the public treasury, is to be afforded to the Board of Guardians, I fear the inevitable result would be, that the alleged difficulty or impossibility would become general if not universal, and the Boards of Guardians would at once throw upon the Government the responsibility which by law attaches to themselves. I entertain, therefore the strongest objection to any grant from the Public Treasury, in aid of or as a substitute for the rate for the relief of the poor. Whatever aid the Government may give, should, in my opinion, be distinct from and independent of the funds administered under the Poor Law, and should be applied to the relief of those cases which cannot be provided for under the Poor Relief Act when brought into the fullest operation. Many persons liable to be rated are, if my information is correct, at the present time placing their money in the Savings' Banks, and by their refusal to employ any labourers in the cultivation of their land, are increasing the existing distress. To acquiesce in their exemption from the burden, legally and morally attaching to them, would I think, be most objectionable in principle and most injurious in its effect." (24)

Twisleton's reply was spirited. He maintained that if a poor law union had no funds and was unable to collect them then the guardians would ask the government for aid. If this was not forthcoming they would close the establishment. In a situation of a workhouse being full and financially strained, responsibility for deaths from starvation outside the workhouse did not rest with the board of

guardians or the Commissioners but rather the local relief committees.

Furthermore, Twisleton had reported to the government that workhouses were full from 19th October. The use of s.35 was mentioned by the government for the first time on 12th December, and "the idea of laying stress upon the provisions of that section seems to have been an afterthought."⁽²⁵⁾ The provision of extra accommodation would take time and the guardians could frustrate the operation.

The crux of the dispute was the ability of the unions to raise rates. The government considered that the guardians were being irresponsible. They had the legal means to compel rate payment and thus should cover their expenditure. The position of the guardians was one of desperation. They saw the chaos of the workhouses and the ravages of starvation and disease. As landlords, agents or farmers they were conscious of the difficulties that rate payers were experiencing. Moreover, repeated rate collection would fall mainly on the solvent. Those who had been pauperised by the blight could not pay. There were great difficulties in establishing who was the immediate lessor with the result that there was considerable time and effort in establishing who was liable to be rated.

Senior, as Assistant Commissioner in Ulster, considered that it required six months to collect a rate. The only practical time was in the winter when the farmer had disposed of his crops and had cash. To strike a new rate in January would bring about collection in the spring when farmers were making heavy outlays. He considered it "absolutely impossible" to collect a rate in the summer.⁽²⁶⁾

Moreover, he thought that in Ulster, a relatively prosperous agricultural area, few unions could realistically raise more than at present in rates. For the south and west, which would have been hit much harder by the blight, the financial position of unions would preclude any additional heavy expenditure.

The position of local guardians was thus unenviable. The only remedy proposed by the government was the ruthless collection of more rates.⁽²⁷⁾ Resolutions by boards of guardians that their funds were exhausted met with a grim response. The home secretary "could on no account acquiesce in the abandonment of all attempts to collect the rate from parties whose inability to pay has not been clearly ascertained."⁽²⁸⁾

As the crisis developed the Irish administration expressed its disquiet. Towards the end of January the Lord Lieutenant wanted the British government to note that 93 out of 120 workhouses held more inmates than their accommodation was designed for - "the greater number of Boards of Guardians in Ireland will, if unaided, be compelled at no distant period to close their operations."⁽²⁹⁾

In reply the home secretary still reiterated the importance that the board of guardians "exercise all those powers which the law has placed in their hands for compelling the payment of rates from parties liable by law to the payment of them."⁽³⁰⁾

However, the scale of the problem led to a more flexible response eventually. The Treasury would now advance money for the construction of additional workhouse accommodation. The Lord Lieutenant could send supplies of food, clothing and bedding direct to unions in

distress. A Treasury minute of 16th February announced that the commissariat was directed to send supplies to distressed unions. The cost was to be the first charge on the rates. The commissariat was also to receive supplies of military clothing to be sent, at no charge, to distressed unions. The Public Works Loans Commissioner could be approached by unions for additional workhouse construction.⁽³¹⁾

For some time before this it had been clear, even to the government, that the relief system had broken down and a decisive switch in policy was being formulated. This was to centre on outdoor relief to the destitute. The basic principle of the poor law, that willingness to enter the workhouse was in itself a test of destitution was overturned. Central instead of local government accepted de facto its responsibility for relief.

The idea of soup kitchens had been raised late in December. Ironically the Poor Law Commissioners considered its operation by boards of guardians to be illegal though they thought that relief committees should undertake relief in this form. As a sidelight to the commissioners' view of the guardians it is interesting to note they said that guardians objected to having to go to the workhouse once a week and therefore considered that they would not be prepared to undertake daily supervision of soup kitchens in their electoral divisions.⁽³²⁾ Perhaps there is no better observation than this to capture the state of workhouse relief in the winter of 1846-47.

(ii) relief works.

The initial government desire to reduce the level of public works was reversed in the face of the renewed failure of the potato. First it was directed that no works should be stopped in areas where there was distress and little agricultural employment.⁽³³⁾ Then the numbers of those on the relief works grew sharply from October when there were 30,000 employed under the Labour Rate Act to a peak of 710,000 in March. (See 5.2). With numbers on this scale the pressures on the system of constraints was enormous. There were three levels of constraint and we examine each in turn.

(a) presentment sessions: The major restraint upon the extent of works presented was to be the knowledge that the county was eventually to bear the entire cost. Those who assembled at sessions from September should, according to government plans, have discounted the future tax liability of any works proposed, leading to a curb on any generosity. The devastation caused by the blight swept aside any constraint in the Lord Lieutenant's discretion to call sessions. By January, sessions had been held in 285 of Ireland's 316 baronies.⁽³⁴⁾

The sessions themselves rapidly degenerated into disorder and provided no control on the works at all. Applications were generally written in the court itself with no map or estimate.⁽³⁵⁾ Magistrates often transmitted these directly to the Board of Works without any attempt to vet them. The reason for this was simple. As one witness put it, the sessions usually "commenced in an orderly manner but towards the end of the meeting, generally, it was a scene of uproar and riot."⁽³⁶⁾ As those seeking relief employment would gather round the sessions, it took a brave man to stand up and criticise the extent

of works proposed. At the very least he would be heckled. As it was the military were often called out. In the face of this determination the magistrates merely abdicated responsibility and passed the presentment on to the Board of Works.

In addition to the physical threat against trying to restrain presentments, and possibly to some extent due to it, there developed a feeling that, although the act maintained that the county was liable for the entire expense of the works, this would be waived eventually by the government - "it was no matter what you put on, for you would never be asked to pay for it."⁽³⁷⁾ The government was clearly exasperated by such behaviour though it was unable to do much about it. There was an obvious parallel with the attempt to suppress the agrarian societies. Little wonder then that the presentment sessions became "worse than useless."⁽³⁸⁾

(b) relief lists: Once the works were approved it was hoped that access to them would be strictly limited to those genuinely in need. An immediate area of dispute, and a legitimate one, would be the definition of "genuine". The work of one Board of Works official was brought to a "standstill" because sympathetic relief committees sent him lists of thousands of names.⁽³⁹⁾ It was Trevelyan's opinion that the committees "signally failed in the proper execution of their duty."⁽⁴⁰⁾ Landlords competed to get their tenants on the lists and farmers discharged labourers onto them.

Routh pressed committees to revise their lists and to strike off any who had land with a poor law valuation greater than £6.⁽⁴¹⁾ However, it rapidly became apparent that the committees were

unwilling to act as a constraint at all. The head of the Board of Works even considered that all connection with them should be halted. A "crying abuse" existed whereby people who held land got onto the works.⁽⁴²⁾ The result of this situation was that the central government agencies assumed direct responsibility.

The inspecting officers of the Board of Works and Commissariat ruthlessly examined the lists provided by the relief committees and compared them with information given by the clerk of the poor law union. In addition the constabulary were consulted and "any other independent testimony" that they were able to procure.⁽⁴³⁾

Proceeding in such a fashion Captain Wynne struck 3,000 off the relief lists in Clare and thought that another 4,000 should go.⁽⁴⁴⁾ Naturally such exercises caused "great and general discontent" among the small farmers, who would have been the class most affected.⁽⁴⁵⁾ The inspection of the relief lists became the "most important" duty of the inspecting officers and they became the major instrument of regulation in the Board of Works administration.⁽⁴⁶⁾

The inspecting officers had an unenviable job. With suffering on a vast scale all around them it was their task to decide who was to be admitted to the public works. Of those who were ineligible it was true that many were holding land. Unfortunately this was no guarantee of survival. As local bodies became less influential, the inspecting officers effecting executed the relief programme. Given that someone had to do the job, it can at least be said that they did it "free from local bias and intimidation."⁽⁴⁷⁾

(c) task work: The final constraint for those individuals that managed to get onto the works was the need for physical exertion and the knowledge that he would be better off working for a farmer. A Treasury minute at the beginning of the operation established that payment should be in proportion to work done and that wages thus earned should be 2d per day less than the average for the locality concerned.

The latter provision led to a rate of wages of 8d per day, though even in September it was noted that "all of the better classes" were paying more due to the increased cost of provisions.⁽⁴⁸⁾ By October, the price of foodstuffs had risen so much that earnings for the "industrious" man had to be between 1s. and 1/6d per day.⁽⁴⁹⁾ (Day work was also given to the infirm.) The imposition of task work was very unpopular, leading to overseers being beaten and the military called.⁽⁵⁰⁾ Board of Works officers were vulnerable to the wrath of the crowd as well. Jones' response to such attacks was to close down the works concerned.⁽⁵¹⁾

With such difficulties it was not until November that Jones could inform Trevelyan that the task work system was "coming more into play."⁽⁵²⁾ However, the system could not be implemented as its architects had envisaged for two principal reasons. It relied on accurate and honest supervision and this was not possible given the vast scale and rapid expansion of the works. There was intimidation and the "most part of stewards and check clerks are afraid to do their duty - afraid even secretly to report against the labourers under their charge, lest if any notice should be taken of it, they should be exposed to the violence of the people."⁽⁵³⁾

Overseers also favoured workers from their own localities.⁽⁵⁴⁾

Secondly, as the physical condition of those employed on the works degenerated, it was clear that the demands of task work had to be reduced if they were not to be too active agents in mortality. Thus "instead of fitting the wages to the task, we were obliged to fit the task to the wages, and both to the condition of the people, who grew weaker and weaker, while the prices were still rising; we were obliged to fix a rate of wages, such as would give even to starving people a sufficient sum to subsist upon; the whole conditions of every part of the machinery were reversed."⁽⁵⁵⁾

The declining physical capacity of those most in need of relief led, under the task work regime, to a situation which was a cruel mockery of the circumstances. Gangs made up of reasonably fit men would refuse to have any weak, starving people put in with them. Being able they not only survived but in addition earned a high wage. (The inspecting officer in charge ended this.⁽⁵⁶⁾) It was not, however, until the end of February that Jones wrote that the system, "or the one nominally so styled, must soon be exploded."⁽⁵⁷⁾

By November it was realised that the system of public works had broken down in many places.⁽⁵⁸⁾ There were still four months of bitter winter to go before an alternative was implemented. The system developed a dynamic of its own, such that even when its futility was commonly agreed, it proved impossible to halt in the short run. In many ways the works scheme symbolised the government's approach to the crisis. In trying desperately to minimise the cost of the operation they forgot its objective. The constraints they

devised accentuated the problem. Yet it was only fearful mortality that changed the approach. This seemed to cause, instead of regret, a sense of resentment of those who suffered.

(iii) law and order.

It might seem somewhat incongruous to treat this subject as part of the relief system. However, the administration of the law was part of the institutional structure of the country and as such was directly involved in the events of the Famine period. The onset of the winter of 1846-47 saw many incidents where the distressed attempted to acquire food directly. There were many reports of bakeries being rifled, of women and children carrying off sacks of meal from carts, of livestock being stolen. In Fermanagh there was a "nightly slaughter of cattle and the perpetration of petty outrages. Scarcely a night passes that we do not hear of some respectable individual or other being made the loser."⁽⁵⁹⁾

The philosophy behind the strict enforcement of the rights of property was put forward well in a letter to the Northern Whig. The author wrote: "Large profits are our only guarantee for the continued, the steady, and abundant supply of provisions ... let scenes of violence, and anarchy be begun - let attacks be made upon provisions, in ship, in store, or in transit - and business is at once suspended, importation is at an end in a moment, and the great national calamity so aggravated that it must end in the utter starvation of tens of thousands."⁽⁶⁰⁾ As it turned out, although large profits were made, the result was unaltered. It is interesting to note that this letter was written at the end of December, when the disaster would have been self-evident. Still,

it would have found a ready listener in Trevelyan and the rest of the government.

Alarm grew at the riots and disorders. This may be gauged by a near hysterical report which appeared in the Cork Examiner on 28th September, 1846, concerning Youghal - "an immense number of people from both sides of the Blackwater came here this morning with clubs, determined to sack and pillage the town." The government's reply was usually swift. In response to bread riots in Mallow a party of the 55th regiment was drawn up and a magistrate "pointed out in forceful language the results which would arise from any attempt to invade the rights of property."⁽⁶¹⁾

The courts were inundated with petty crime charges. In January, 1847, the quarter sessions were "the heaviest ever remembered."⁽⁶²⁾ The total convictions at assizes and quarter sessions in Clare rose from 7,101 in 1845 to 15,233 in 1847.⁽⁶³⁾ The system was labelled "turnip justice" by one correspondent who wrote that sessions in distressed districts "abound in instances of trumpery crimes, for which multitudes have been swept into confinement. Lately at Bandon it was piteable to see broken, desperate men brought a long way, for carrying off a few mouthfuls of pig-food, or some enormity of equal moment."⁽⁶⁴⁾

This aspect of government action did receive local support. In fact the rights of property were enforced most strictly by farmers. They guarded their fields and there were cases of them murdering turnip stealers. Against this, the sentences for the graver crimes of sheep or cattle stealing passed by the courts, of seven or more years

transportation to a penal colony, seems moderate.⁽⁶⁵⁾
 (Neave, when travelling in Connemara was shown the ruined cabin whose occupant was beaten to death by neighbours for sheep stealing.⁽⁶⁶⁾)
 The situation was best summed up by a Clonmel reporter: "I am quite unable to chronicle the many scenes of misery which are daily reported as having taken place. I am perfectly horror-struck at their perusal, and have neither spirit nor nerve to detail them. Man appears to have no sympathy with his fellow. On God alone must be our dependence - for on human aid we cannot depend."⁽⁶⁷⁾

Conclusion.

The attempt to relieve distress by public works ended in complete failure. As regards the works themselves, a government report admitted the "uselessness of a great proportion of the works executed, their incompleteness, and the enormous waste of labour and capital which they have produced."⁽⁶⁸⁾ The high price of foodstuffs and the weakened state of the workers meant that the effort was costly, the rapid expansion of works and employment outstripped the capacity of the Board of Works to supervise and direct the schemes. (At the peak of operations the Board was receiving 5-6,000 letters daily.⁽⁶⁹⁾)

The winter of 1846-7 was a cruel one, as if the elements themselves combined in ghastly mockery of the British relief system. Snow fell early in November, frost was continuous, gales were common. February was the worst month.⁽⁷⁰⁾ Those on the works were usually clad in rags and the weather meant many of the infirm and women died

of exposure.⁽⁷¹⁾ Despite the bad weather of February, work was still required to be done, even among snowdrifts, as the government could not decide what to do.⁽⁷²⁾

The works in the west must have revealed the ultimate example of how inept the system was. Count Stzelecki, the British Association representative, noted that the Commissariat had located its depot in Belmullet, in the western extremity of the barony. It was necessary for those on the works in the north, east and south of the barony to walk 20-30 miles to purchase meal. Inevitably the effort, made worse by the weather, contributed to the physical wearing down of the men concerned.⁽⁷³⁾ In another case, half the men employed had nothing to eat at the dinner break.⁽⁷⁴⁾

The works were criticised for diverting labour from agriculture. It is impossible to answer this directly. However, the winter months are not peak ones in the agricultural year and thus labourers would most likely have not been employed. Once on the works it is unlikely that labourers would risk leaving them for a few days work with a farmer in case he could not get back onto them. Farmers anyway would be trying to sharply reduce the amount of labour used in production and thus if supply was reduced at all by the works, the consequence is likely to have been minimal. Simultaneous with the criticism that works were taking labour away from agriculture was the criticism that labourers were being discharged by farmers onto the works.

Another factor against considering the works as reducing labour supply to agriculture is that only one member of each family initially was

to get onto them. In practice two or even more were taken on since with large families 8d. per day was totally inadequate.⁽⁷⁵⁾ Even when payment was increased, the fact that the inspecting officers allowed more to be taken on would seem to indicate there were few employment opportunities outside the works. Physical incapacity, rather than the bounty of the public works, reduced the supply of labour to agriculture.

REFERENCES TO CHAPTER VI.

- (1) Correspondence, (Commissariat), PP1846, Vol 37, P212.
- (2) O'Neill, T.P., The Great Famine, P221.
- (3) Bourke, P.M.A., The potato, blight, weather, and the Irish famine, op.cit., P148, 167.
- (4) Trench, W.S., Realities of Irish life, op.cit., P48.
- (5) Sullivan, A.M., New Ireland, (2 Vols), London, 1877, Vol 1, P125.
- (6) Correspondence, from July, 1846, to January, 1847, (BoW), PP1847, Vol 50, P67-70.
- (7) *ibid.*, P106.
- (8) *ibid.*, P104.
- (9) O'Neill, T.P., The Great Famine, P226.
- (10) Correspondence, (BoW), PP1847, Vol 50, P69.
- (11) O'Neill, T.P., op.cit., P227.
- (12) Hansard, 3rd series, LXXVIII, Vols 778-9.
- (13) Correspondence, from July, 1846, to January, 1847, (Commissariat), PP1847, Vol 51, P245.
- (14) O'Neill, T.P., op.cit., P225-6.
- (15) Woodham-Smith, C., The Great Hunger, op.cit., P115-6.
- (16) Consolodated Annuity, Appendix W.
- (17) *ibid.*, P676.
- (18) This is based on MacArthur, W.P., "Medical history of the Famine", The Great Famine, P263-315.
- (19) Keys, A., et al, The biology of human starvation, op.cit., Vol II, P1009-10.
- (20) *ibid.*, Pxiii.
- (21) General State Printing Office, Malnutrition and starvation in western Netherlands, September 1944 - July 1945, The Hague, 1948, P166.
- (22) Correspondence, from January to March, 1847, (BoW), PP1847, Vol 52, P238.

- (23) Copies or extracts of correspondence relating to the state of union workhouses in Ireland, PP1847, Vol 55, P12.
- (24) *ibid.*, P12-13.
- (25) *ibid.*, P13-14.
- (26) *ibid.*, P15.
- (27) see *ibid.*, P26-43.
- (28) *ibid.*, P28.
- (29) *ibid.*, P54.
- (30) *ibid.*, P55-56.
- (31) *ibid.*, second series, P77-8.
- (32) *ibid.*, first series, P20-1.
- (33) Correspondence, from July, 1846, to January, 1847, (BoW), PP1847, Vol 50, P77.
- (34) Consolodated Annuity, P683.
- (35) *ibid.*, Q1794, 1776.
- (36) *ibid.*, Q533; see also Q1798, 712-6, 2289.
- (37) *ibid.*, Q534; see also Q809, 1300.
- (38) *ibid.*, Q2276.
- (39) Correspondence (BoW), PP1847, Vol 52, P8-9.
- (40) Consolodated Annuity, P684; also Correspondence, (BoW), PP1847, Vol 50, P326-7.
- (41) Correspondence, (Commissariat), PP1847, Vol 51, P325.
- (42) Correspondence, (BoW), PP1847, Vol 50, P289-290.
- (43) Consolodated Annuity, P684.
- (44) Correspondence, (BoW), PP1847, Vol 50, P291.
- (45) *ibid.*, P323.
- (46) Correspondence, (Commissariat), PP1847, Vol 51, P350; Correspondence, (BoW), PP1847, Vol 50, P404.
- (47) Consolodated Annuity, Q2258.
- (48) Correspondence, (BoW), PP1847, Vol 50, P74.
- (49) *ibid.*, P108.

- (50) Consolodated Annuity, Q3826-36, 1801, 1519-21.
- (51) Correspondence, (BoW), PP1847, Vol 50, P156.
- (52) *ibid.*, P175.
- (53) *ibid.*, P314; Consolodated Annuity, Q1516.
- (54) Consolodated Annuity, Q1193, 1198.
- (55) *ibid.*, Q2176; also Q2232, 2326.
- (56) *ibid.*, Q2387.
- (57) Correspondence, (BoW), PP1847, Vol 52, P170.
- (58) Griffiths, A.R.G., *op.cit.*, P647.
- (59) N.W. 11/12/1847; see also 20/10/1846, 3/11/1846, 1/12/1846, 12/12/1846, 22/12/1846, 29/12/1846; 23/2/1847.
C.E. 10/9/1846, 28/9/1846, 30/9/1846, 9/10/1846, 12/10/1846, 14/10/1846.
TV: 28/10/1846, 13/1/1847, 27/1/1847.
Correspondence, (BoW), PP1847, Vol 50, P320.
- (60) NW 31/12/1846.
- (61) TV 28/10/1846.
- (62) TV 27/1/1847.
- (63) Poor Laws, Q5311.
- (64) CE 5/11/1847.
- (65) Donnelly, J.S., *op.cit.*, P88-9, 86.
- (66) Neave, D., *Four days in Connemara*, London, 1852, P108.
- (67) CE 11/1/1847.
- (68) Consolodated Annuity, Report, Pxviii-xxfi; there are numerous examples in the Evidence.
- (69) *ibid.*, Q2278.
- (70) Woodham-Smith, C., *op.cit.*, P137-8, 185; also *Society of Friends*, *op.cit.*, P148-9.
- (71) Consolodated Annuity, Q730-1, 2327-8.
- (72) O'Neill, T.P., *op.cit.*, P229-30.
- (73) Report of the British Association for the relief of the extreme distress in Ireland and Scotland, London, 1849, P22.
- (74) Daunt, W.J. O'Neill, *A life spent for Ireland: Selection from the journals of W.J.O'Neill Daunt*; edited by his daughter, London, 1896 rep. 1872, P58.
- (75) Consolodated Annuity, Q2330, 3436, 3819, 3763, 4041.

CHAPTER VIITHE BRITISH RELIEF SCHEME3. THE NEW ORDER

"It is said that the law of nature is that those persons should die; they have not the means there to subsist, and it is the will of nature that they should die, and that you should let them alone; there is thus a sort of philosophical colour given to the theory or idea that a person who permits the destitute Irish to die from want of food is acting in conformity with the system of nature."

E.T.B. Twisleton.

Situation

The winter of 1846-47 was horrifying. The British relief system simply broke down under the pressure of want and the striving for economy. Several excerpts from the contemporary accounts are reproduced below to give a glimpse of the situation, the reality behind the graphs of mortality, workhouse numbers and employment on public works.

The father of Catherine Sheehan (2 years old) had been employed on the public works for about six weeks at 9d. per day wages. This only provided him with the food to carry on and the remainder of the family received nothing. According to the post mortem Catherine's body "had all the appearance of a skeleton over which the skin had been tightly drawn; the child indicated itself as healthy naturally, but the stomach was empty, save some fluid, and having the appearance of having taken any food save oar-weed."⁽¹⁾

The inadequacy of the public works was the reason for the scene outside the poor house in Carrick-on-Shannon witnessed early in December by a Quaker: "poor wretches in the last stage of famine imploring to be received into the house; women who had six or seven children begging that even two or three of them might be taken in, as their husbands were earning but 8d. per day ... Some of these children were worn to skeletons, their features sharpened with hunger, and their limbs wasted almost to the bone ... some of those who were rejected were so far spent, that it is doubtful if they would all reach their homes alive."⁽²⁾ Given the conditions inside the workhouses⁽³⁾ it was a true measure of distress to apply for entry.

Such incidents can be multiplied many times over,⁽⁴⁾ as the Famine brought forth its harvest. The dangers of repetition were expressed well by one newspaper correspondent:

"The accounts of distress and death from hunger are far too numerous for us to record; and their dreary monotonous similarity of detail would rather tend to blunt the sensibilities of benevolence, than promote feelings of charitable sympathy."⁽⁵⁾

By the middle of January it was clear to the heads of the relief operation that it had failed and some alternative strategy would be required.⁽⁶⁾ We may leave this section with one report from an inspecting officer, concerning Clare Abbey parish, which sums up the position;

"Although a man not easily moved, I confess myself unmanned by the extent and intensity of suffering I witnessed, more especially amongst the women and little children, crowds of whom were to be seen scattered over the turnip fields, like a flock of famishing crows, devouring the raw turnips, mothers half naked, shivering in the snow and sleet, uttering exclamations of despair, whilst their children were screaming with hunger; I am a match for any thing else I may meet with here, but this I cannot stand."

He continued,

"Without food we cannot last many days longer; the Public Works must fail in keeping the population alive. What is to become of the thousands to whose cases the Relief Works are totally inapplicable. The Relief Committees have not a shilling; they cannot, or will not, pay even for stationary or

postage; I am obliged to pay these expenses;
therefore nothing is to be expected from them.

The poor house is full, and police are stationed
at the doors to keep the numerous applicants out;
therefore no relief can be expected from that
quarter.

What then is to be done?" (7)

Measures

(i) The major response of the government was the passing of 10 and 11 Vict. c.7 which became law on 26th February. This was known as the Soup Kitchen Act as this was to be the main method of dispensing aid. This constituted a major reversal of policy - outdoor relief was to be given to the destitute. (Soup kitchens had been operated by the Society of Friends from early November.)

The idea of soup kitchens won grudging recognition from the official relief authorities. Despite initial favour from the Home Secretary, it was considered by the Poor Law Commission to be illegal under 1 and 2 Vict. c.56. Instead they suggested that the local relief committees should develop them.⁽⁸⁾ The Commissariat also suggested this late in December after having agreed to establish them in the south-west and west.⁽⁹⁾ They considered it would have the effect "of feeding the people at a lower price and economising ... meal."⁽¹⁰⁾

10 and 11 Vict. c.7 established a relief commission to superintend the act. Their chief function was the supervision of government funds allocated to the project - this was initially £300,000 though

it was subsequently increased. The funds were to be advanced to relief committees who were operating the soup kitchens through the board of guardians of the local union.

Constraints: These operated on three levels. The major one was to be administrative and was based upon the finance committee of the poor law union. This was supposed to consist of local magistrates, guardians, clergy and the three highest rate payers.⁽¹¹⁾ The most important member was the inspecting officer of the union who was to be drawn from the Commissariat or the Board of Works. The finance committee was to vet lists of applicants supplied by relief committees who were now based on the electoral divisions of the union.

The local committees were to draw up lists of people requiring relief, divided into four categories - the destitute helpless, the destitute able-bodied, sub-divided into those who held land and those who did not, and the able-bodied receiving wages insufficient for their support. Gratuitous relief was to be given to all but the last category who could purchase it at cost. Holders of land could get relief provided they continued to crop their holding.⁽¹²⁾

Based on the lists compiled by the relief committees, estimates were forwarded to the finance committee of the cost for the coming fortnight. The inspecting officer vetted it, signed it and sent it to the Relief Commission. On their recommendation the Lord Lieutenant issued a warrant for the required amount. Both the Commission and the treasurers of the unions had accounts with the Bank of Ireland for this object and the warrant transferred the requisite credit. The funds could only be withdrawn upon the signature of two members

of the finance committee, one of whom had to be the inspecting officer.⁽¹³⁾ Once again he was to be the lynch pin of the relief administration.

If this system did not deter the spendthrift, then the financial penalty to the union was to be the next line of defence. The subscriptions of the relief committee together with the grant from the government were only to be the initial funds for the soup kitchen operation. Thereafter a rate would be struck for the union and on this as credit, money would be advanced by the commission. (SXVI) This was to be emphasised to the board of guardians by the inspecting officer.⁽¹⁴⁾

The final defence against glutting the Irish peasantry was to be the product of the soup kitchens themselves - the "cooked food test." As Trevelyan put it, "a pound of wet Indian meal is no great inducement to anybody."⁽¹⁵⁾

(ii) In June, the poor law was amended by 10 and 11 Vict. c.31. Its object was to make the system more flexible and to provide a longer term solution to the threat of recurring famine. Firstly, it permitted guardians to elect to relieve the infirm, widows etc. outside the workhouse (SI). The major provision, however, was contained in section two: if there was no room in the workhouse, the poor law commissioners could authorise the guardians of a union to administer outdoor relief to those requiring it within the union's boundaries. There was a sting in the tail. By SX, no one with more than a quarter acre of land could, after 1st November, be

deemed destitute. (Gregory clause). That this section was carried as an amendment tabled by an Irish MP speaks volumes of the equivocal attitude to relief even in Ireland.

Constraints: The distribution of outdoor relief to those other than covered in section one of the act required authorisation from the commission. After two months this would have to be reviewed.

Apart from this the main constraint upon the boards of guardians would be the liability to the rates of any relief granted. The Soup Kitchen Act was framed in catastrophic circumstances and these required special financial arrangements. In less extreme situations outdoor relief, like the maintenance of the workhouses, would fall upon the rates. These restrictions on the supply of relief were matched on the demand side by the necessity of those receiving relief to work for it.

Operation

(i) Soup Kitchen Act (Temporary Relief Act)

Although the act became law at the end of February it took several months for the operation to gain momentum. This was due to several factors. Relief committees were reconstituted on the basis of electoral divisions. This was the third change during the crisis. The new system was administratively cumbersome - by mid April the commission had actually distributed fourteen tons of paper in regulations, forms and instructions.⁽¹⁶⁾ However, by mid May 1248 of the 2049 electoral divisions in the country were operating under the commission. A month later the number increased to 1677, of which 1479 had received loans or grants.⁽¹⁷⁾ The commission itself

attributed part of the delay to the "great disinclination" which had been gradually formed against an extensive out-door relief scheme.⁽¹⁸⁾

On the positive side, the commission's activities were aided by the fall in food prices, as can be seen from Fig. 5.1. The peak price for Indian corn at Belfast was reduced at the end of February when it was just over £18. per ton. By the beginning of April it was £12-15-0. After the slow start, the commission's activities accelerated towards the summer. Over 0.826m. rations were distributed on 8th May, the overwhelming majority of which were gratuitous (94%). By mid July there were 2.423m. rations distributed.⁽¹⁹⁾ (see Fig.5.2)

Although employment on the Public Works reached a peak in the first week of March they had considerable momentum of their own and the reduction was considerably more gradual than envisaged by the government. Works could not be closed until the temporary relief scheme had been organised so in the spring two distinct relief systems were in operation.⁽²⁰⁾

Even though the commission withheld funds from unions that refused to strike a rate for the temporary relief system scarcely any money was repaid during its operation.⁽²¹⁾ This would have placed greater emphasis on the role of the relief and finance committees in reducing expenditure. As might have been anticipated the only individual who generally strove to limit relief was the inspecting officer. Committee members sometimes put themselves on the lists and in some districts those receiving rations outnumbered the population according to the 1841 Census. Some committees were strict but often it was the inspecting officer who took the odium for striking individuals off the relief lists.⁽²²⁾

With over 3 million rations being distributed in July it is clear that a very substantial proportion of the population was receiving relief in the summer of 1847.⁽²³⁾ Despite the government's intentions, it had instituted a large scale system of de facto gratuitous relief. The relief commission had advanced almost £1½ million of which only small amounts had been repaid by the time the operation was closed. In fact a rate of 3s in the pound was considered the maximum that could be struck for repayments under the temporary relief act.⁽²⁴⁾

(ii) Relief under the amended Poor Law

Three trends are evident in the course of relief under the amended poor law. Outdoor relief, though much less than under the temporary relief act, was substantial in 1848 and 1849. In both of these years the peak was reached in early July when there were respectively 833,889 and 784,367 relieved outside the workhouse. This gradual reduction was greatly accelerated in 1850 when the peak, which occurred in February was only 148,909. After 1850 outdoor relief was minimal.

Alongside the reduction in outdoor relief, there occurred a progressive increase in the workhouse population. From a summer peak of 10,867 in late May, 1847, numbers increased in the next four years with 264,048 being the seasonal peak in June, 1850. The overall peak in workhouse numbers for the Famine period occurred in June, 1851, with a total of 265,170.

This increase in workhouse population was facilitated by a major expansion in accommodation. From an original figure of 100,000, workhouse capacity was expanded to 150,000 1847-48 and by mid 1849 was 250,000.⁽²⁵⁾

The trend in the workhouse mortality rates mirrored that in outdoor relief. The Famine peak occurred in April 1847 when 25 inmates died weekly per 1,000 of the workhouse population. The peaks in the next two years, at 11.8 and 12.4 respectively in January and May were substantial though greatly reduced. The peak in 1850 was 5.5.

It would perhaps be apposite here to note some of the possible deficiencies of the statistics quoted above. According to one magistrate, on 5th August, 1848, in Scariff Union, there were 388 persons less in the workhouse than were on the books and 120 in the house who were not on the books.⁽²⁶⁾ Names of people who had died or who had emigrated appeared on the relief lists; families developed imaginary members; servant boys in employment were listed as destitute.⁽²⁷⁾ Given the chaotic conditions that existed during the Famine it is inevitable that the statistical returns provided were inexact. However, the poor law commission's continuous pressure for precedural correctness together with the activities of the inspectors in the field would probably keep error down to tolerable levels.

The rapid termination of outdoor relief was probably due to misgivings about the operation of the constraints in the scheme. The point at issue was well made by Senior:

"The state of the labouring population, even in the best districts in Ireland, is one of extreme poverty; not one in which destitution is common, but in which there is general poverty It is, therefore, almost impossible to draw the line. If you offer the workhouse to a hundred persons you will find that, probably, not five will accept it; but if it were full, all the 95 would apply at once for out-door relief, which you would not be justified in refusing." (28)

An example of this occurred in North Dublin Union. There were 20,000 on the relief lists in one electoral division during the operation of the temporary relief act. When these operations were terminated on 15th August an extra 400 places were provided in the workhouse. By threatening to take those applying for relief into the workhouse the relief lists were reduced by 17,000. (29) The extent to which this is a reflection on the conditions of those applying for relief or the condition of the workhouse must be left as an open question.

In addition to the difficulties in deterring those applying for relief who the authorities considered legitimate, there were the problems in investigating the conditions of applicants. The Gregory clause was circumvented by feigning the sub-letting of excess land to friends or relatives. Also the tenant could formally surrender his holding though continue to cultivate it providing the lessor concurred. (30)

Although one priest refused the sacraments to those who fraudulently got onto the relief lists and a guardian maintained that there was "to a certain degree" a stigma in receiving food, (31) the authorities

intended the main deterrent to be labour. Initially there was to be 8 hours work in the stone depot though on 9th April, 1847, this was extended to 10 hours. The theory was that the recipient was to give "a large amount of time, if not of labour, in return for a small amount of relief."⁽³²⁾

Reservations about the efficiency of controls on out-door relief led in practice to the return to the workhouse test of destitution.

This led to a major expansion in workhouse accommodation and an increase in 1848 of the number of unions from 130 to 163.⁽³³⁾

With the amendment of the poor law the unions were thrown on their own resources for there was no Treasury advance (except for workhouse construction) as there was with the temporary relief act. Poor Law expenditure was to be met from the rates. With the poorer unions, whose expenditure was proportionally heavy and ability to raise rates correspondingly weak, this was impossible. Additional rates would have merely increased destitution and emigration.

To deal with this situation the government passed the Rate in Aid Act, 12 and 13 Vict. c.24, in May 1849. This permitted a rate to be struck on property throughout Ireland in aid of those distressed unions who necessarily had expenditure greater than revenue. In June 1849 the commission issued a general order to raise £323,000. A further levy was raised in December, 1850.⁽³⁴⁾ A year after the Rate in Aid Act a further act, 13 and 14 Vict. c.14, was passed which permitted the Treasury to advance up to £300,000 to distressed unions. This was distributed in the following year.⁽³⁵⁾

The poor law commission had the power to dissolve the boards of guardians if they considered them negligent. By 1849, 39 boards had been dissolved and vice guardians placed in charge.⁽³⁶⁾ Given their position, it is easy to imagine how boards could be demoralised. The following description of the Ballina board gives an idea of the situation generally:

"The Guardians are perfectly paralysed; many of them are, comparatively speaking, in great want, their properties lying waste, and likely to remain so next year; with whole tracks of country similarly circumstanced, the prospect before them is not cheering. There appears to be no limit to all this relief ..."⁽³⁷⁾

Conclusion.

The extensive system of out-door relief through the temporary relief act would have effectively subsidised the cost of labour. It permitted many holdings to be cultivated which otherwise would have been abandoned. It was precisely this success that led the authorities to be more strict in the future. This was achieved by the gradual return to the workhouse test of destitution. In turn this required a major expansion in workhouse accommodation.

The amended poor law gave the Irish government further influence over local government. By 1849 the new commission directly administered almost a quarter of the poor law unions. This power of dissolution meant, in the words of a report commissioned by the Treasury, that "it becomes necessary to pass in review, regularly and promptly, all the acts and proceedings of every union board, as recorded on

the minutes of their weekly meetings, and to warn the guardians, not only of every departure from the objects of the Poor Law, but even of every improper act in its administration."⁽³⁸⁾ The Famine thus led to an increase in the authority of central government.

It is unfortunate that our objectives in analysing the relief system do not allow us to give full recognition to the activities of private charities. However, the total expenditure of the Society of Friends was under £200,000.⁽³⁹⁾ In terms of the total relief expenditure, though not in terms of human endeavour, this was minor. Their example was one of the few bright lights on a horrific landscape. The British Association, with expenditure of £225,000 was different in that it channelled relief mainly through the official system.⁽⁴⁰⁾

REFERENCES TO CHAPTER VII.

- (1) C.E. 8/1/1847.
- (2) Society of Friends, *op.cit.*, P145-6.
- (3) *ibid.*, P150-1; O'Neill, T.P., *The Great Famine*, P245-6.
- (4) e.g. C.E. 11/1/1847; O'Neill, T.P., *op.cit.*, P232-4.
- (5) N.W. 11/3/1847.
- (6) Jones to Trevelyan, *Correspondence*, from July 1846 to January 1847, (BoW), PP1847, Vol 50, P485-6; also Trevelyan to Jones, 14/1/1847, quoted O'Neill, T.P., *op.cit.*, P235.
- (7) *Correspondence*, from July 1846 to January 1847, (BoW), *op.cit.*, P435.
- (8) Copies or extracts of correspondence relating to the state of union workhouses in Ireland, PP1847, Vol 55, P18-25.
- (9) *Correspondence*, from July 1846 to January 1847, (Commissariat), PP1847, Vol 51, P490, 427.
- (10) *ibid.*, P437.
- (11) *Consolidated Annuity*, Q1076.
- (12) *Correspondence*, from January to March 1847, (Commissariat), PP1847, Vol 52, P105-109.
- (13) *Relief Commissions*, (6), P11.
- (14) *Correspondence*, from January to March 1847, (Commissariat), *op.cit.*, P109.
- (15) *Consolidated Annuity*, Q1097.
- (16) O'Neill, T.P., *op.cit.*, P238.
- (17) *Relief Commissioners*, (2), P3; (3), P3.
- (18) *ibid.*, (2), P3.
- (19) *ibid.*, (2), P26; (4), P3.
- (20) *Consolidated Annuity*, Report, PXii.
- (21) *Relief Commissioners*, Supplementary Appendix to Seventh Report, P9-10.
- (22) *ibid.*, P4; O'Neill, T.P., *op.cit.*, P240.

- (23) Relief Commissioners, (5), P3.
- (24) Consolodated Annuity, Report PXi; Q3703.
- (25) Poor Law Commissioners, (2), PP1849, Vol 25, P13.
- (26) Poor Laws, Q11827; also Q10802.
- (27) *ibid.*, Q1497-9.
- (28) *ibid.*, Q2165.
- (29) Poor Law Commissioners, (1), PP1847-48, Vol 33, P63.
- (30) *ibid.*, P13.
- (31) Poor Laws, Q1335; Consolodated Annuity, Q3423.
- (32) Poor Law Commissioners, (1), *op.cit.*, P12; circular P36.
- (33) Poor Law Commissioners, (4), PP1851, Vol 26, P11.
- (34) Poor Law Commissioners, (2), *op.cit.*, P84; (4),
op.cit., P11.
- (35) *ibid.*, (4), P197-8.
- (36) Poor Law Commissioners, (1), *op.cit.*, P9-10;
(2), *op.cit.*, P15.
- (37) Papers relating to proceeding for the relief of the
distress, and state of the unions and workhouses,
in Ireland, (5th series - 1848), PP1847-48, Vol 55, P72.
- (38) A copy "of the Report of Messrs. Bromley and Stephenson
to the Lords of the Treasury, dated the 4th day of
March 1854, relative to the Poor Law Commission,
&c. (Ireland), P5.
- (39) Society of Friends, *op.cit.*, P481.
- (40) Papers relating to proceedings for the relief of
distress, and state of the unions and workhouses,
in Ireland, (4th series - 1847), PP1847-48, Vol 54,
P1-6; Poor Law Commissioners, (2), *op.cit.*, P7;
(3), PP1850, vol 27, P5.

CHAPTER VIIIRECOVERY

"The Irish Famine of 1846 killed more than 1,000,000 people, but it killed poor devils only. To the wealth of the country it did not the slightest damage."

Karl Marx.

(1) The economic model.

1847 was both the darkest year of the Famine and the first year of the recovery. Any analysis of the recovery period requires a measure of the performance of the rural economy (similar to national income in macroeconomics.) Unfortunately we have no reliable estimate of consumption since a substantial proportion of it was subsistence production. However, our previous elaboration of the model of peasant production would suggest that the role played by the budget constraint could provide a key to a suitable measure.

The budget constraint represents the outlay the peasant makes on crop production and livestock. This may be termed his wealth given that his income in excess of this is consumed. If we take the aggregate value of livestock in the rural economy and add to this the total cost of production of the crops planted, adjusting both for price changes, we would have a measure of the real wealth of the rural economy.

We would imagine that the economy would move towards an equilibrium through competitive forces such that any particular level of wealth would be associated with a specific anticipated income. Moreover an eventual steady state would be reached where the wage rate and rent level would be static.

This notion of the steady state is useful as it helps to define the period of recovery. We take this to be 1847-54 on the assumption that during this period the supply of labour was infinitely elastic at the wage associated with the physical

subsistence minimum. 1854 was taken as the end of the recovery period as there is evidence then that nominal wages at least were beginning to increase quite sharply. Not only did the day rate increase⁽¹⁾ but also it was especially noted that an able-bodied labourer could command continuous employment at the new rate.⁽²⁾ The steep rise in the cost of rural labour was according to Crotty, one of the major factors that Irish agriculture had to adjust to in the second half of the nineteenth century.⁽³⁾ We date the beginning of this to be the mid-1850's.

The ratio of anticipated income to wealth in a steady-state peasant economy would not be constant but would vary with the level of wealth considered. Poorer peasants may be considered bad risks by landlords and a rent premium demanded; they could have less aversion to risk than their richer brothers. Thus aggregate anticipated income would depend on the distribution of wealth.

However, in the recovery period the rural economy was not in a steady state. While the richer peasants may have been content with their anticipated income many at the other end of the scale would be attempting to increase their income over time by accumulating more wealth. The extent to which this accumulation was possible would depend crucially on how close to the physical minimum their anticipated income was. Many peasants who would have to reduce their consumption to the physical minimum in order to accumulate at all would probably prefer to emigrate with their existing resources rather than risk pauperisation by any future failure, total or partial.

In order to clarify the process of accumulation it is useful to revert to the concept of the production surplus - that which is to be distributed between rent, investment in the coming cycle and consumption in excess of the physical minimum. It is obvious that the level of rent would be a major determinant of the rate of accumulation. In addition crop yields would directly influence the magnitude of the production surplus. Finally taxation would operate upon the surplus in the same way as rents.

We would thus expect the forces which constrain the rate of accumulation for the individual peasant, namely rents, yields and taxes, to operate in a similar fashion in the rural economy taken as an aggregate. We now turn to how we may quantify these variables.

(2) The variables.

(a) agricultural wealth.

This has been taken as the real value of livestock plus the real cost of production of crops. The basis of livestock value has been taken from the 1841 Census. From this we have the following:-⁽⁴⁾

horses and mules	£8.	sheep	£1.1
asses	£1.	pigs	£1.25
cattle	£6.5	poultry	£0.025

The prices of horses, mules, asses and poultry were taken to be constant. 1853 has been taken as a base year (= 100) mainly because of the importance of cattle in total livestock value. In that year prices were similar to 1841. Annual fluctuations in stock prices were determined by using Barrington's index⁽⁵⁾ and the Ballinasloe price series,⁽⁶⁾ which was standardised on 1853 using the 3rd class stock series.

The indices were combined giving a weight of 4 to the Ballinasloe heifer series, taken as a proxy for milch cattle, a weight of 1 each to the Ballinasloe oxen series and Barrington's 2-3 year store series, and 2 to Barrington's 1-2 year store series. Overall this gives 2:1:1, milch: stores greater than 2 years: stores 1-2 which is in rough proportion to the 1854 position (this is the first year that milch cattle were separately enumerated).

The sheep price index was derived by averaging the Ballinasloe series for 3rd class widders and ewes. Since no pig series exists we used Barrington's index for pork. We thus derive the following

indices:

	cattle	sheep	pigs
1847	124	92	122
1848	125	89	94
1849	97	72	72
1850	85	86	75
1851	90	98	77
1852	81	96	74
1853	100	100	100
1854	124	99	102

These indices were combined with the 1841 values to give livestock prices. These prices were then used to determine the nominal aggregate value of livestock in each county in Ireland for the period 1847-54. Livestock figures are given in the Agricultural Returns.

The costs of production of the principal tillage crops were based upon Griffith's instructions to valuers.⁽⁷⁾ Griffith's costs were adjusted by reducing them in proportion to the ratio of his expected yields to the actual average yields of 1847-56.*

This gives the following costs:

cereals	£2.5	flax	£7.5
potatoes	£7.0	hay	£1.6

We centre these costs on 1853 and assume that they fluctuated directly with labour costs. To construct an index of labour costs

* This approach, I believe, was first suggested by Dr. W.E. Vaughan.

we have taken the cost of a particular basket of goods over the period. Although there is considerable evidence concerning working class diets in the reports of the poor law commissioners, it is not presented systematically and is thus extremely difficult to manage.⁽⁸⁾ Instead the researches of the medical officer of the Privy Council have been utilised.⁽⁹⁾ This gives a detailed average weekly diet which has been simplified to:-

Indian meal	11 lbs.
potatoes	6 lbs.
oatmeal	3.5 lbs.

To compute the cost of the basket Cork market prices were used, as recorded in the Cork Examiner. The prices of the three commodities in the first week of April and September were averaged since these times would have been peaks in labour demand. The resulting wage index was:-

1847	171	1851	92
1848	119	1852	95
1849	98	1853	100
1850	89	1854	134

The annual crop acreages for each county, given in the Agricultural Returns, multiplied by the relevant cost of production, and the wage index will give the nominal value of the crops. When this is added to the livestock value we get nominal agricultural wealth. To get real wealth we deflate the nominal quantity by the price index formed by dividing 1853 quantities multiplied by current prices by 1853 quantities multiplied by 1853 prices. (The crop quantity was the 1853 total for crop acreages multiplied by the cost of

production. The wage index was thus considered as a price.)

The price index thus formed was:-

1847	141	1851	92
1848	117	1852	90
1849	96	1853	100
1850	88	1854	124

The resulting series for real agricultural wealth derived from the above method is obviously not precise, though most economic aggregates suffer from this deficiency. The major weakness in the wealth series is probably the relation between the tillage and livestock aggregates. Fortunately both aggregates tend to move in the same direction in our period.

The wealth series ignores the role played by the accumulated stock of nutrients in the soil, though it is unclear even in theory what the relationship between the two should be. It is worth noting the point though because there is significant evidence to suggest that the nutrient stock was depleted over the period.⁽¹⁰⁾

Lastly, the labour expended on livestock is not accounted for in the series. This would be most marked in the case of dairy farming where labour input was considerable. However in this case output would be generated fairly quickly and thus would provide an income stream over the production cycle. This we assume cancels out the stream of wage payments.

(b) yields.

We have taken these to be approximated by the potato yield as given in the Agricultural Returns.

(c) taxation.

There were two forms of taxation on the rural economy, the county assessment and the poor law rate. Since we are using the county as our cross section unit it is necessary to first aggregate poor rate payments onto county units. The following statements of poor rate collection were used:

Year to September	Source
1847	Poor Law Commissioners, (1), PP1847-48, Vol 33, P136-141.
1848) 1849)	Statistical statement of expenses, collection of poor rate, and numbers relieved for each poor law union in Ireland, PP1850, Vol 50.
1851) 1852) 1853)	Return "showing, 1. The amount of poor rate collected in the several unions in Ireland, for the years ending the 29th day of September 1851, 1852, and 1853 respectively," PP1854-55, Vol 46.

There is no poor rate figure for 1850 so the union expenditure for that year was taken, as given in Poor Law Commissioners, (4), PP1851, Vol 26, P161-65 from which was deducted payments to the union under 13 Vict. cap.14 given in the same report P197-8.

For the period 1847-49 rates were divided on a county basis in proportion to the poor law valuation as contained in the Agricultural Returns, 1847. For 1850-53, due to the change in union boundaries, the division was in proportion to the tenement valuation contained in Returns "as respects those unions in Ireland which extend into two or more counties," PP1872, Vol 51.

To the poor rate paid per county we have added the county presentments given in, Abstract of the accounts of presentments made by the grand juries of the several counties, cities and towns in Ireland. These were published annually.⁽¹¹⁾ This is an overestimate for the county rate since not all the rate was collected. Unfortunately the shortfall was published for only three years and since the proportion uncollected varied sharply this was omitted in the taxation calculation.

The addition of county and poor rates gives the gross tax liability of the county. This has been reduced to a percentage figure by dividing by the townland valuation⁽¹²⁾ so that the results would not be biased by variations in urbanisation between counties.

Although the resulting variable gives the mean tax rate for the county there is no account taken of its variance, which was likely to be considerable. Union rates were levied on electoral divisions and thus by county aggregation we ignore considerable variation. In addition, by expressing the tax as a percentage of the valuation we do not take into account changes in taxable capacity over the period. Land formerly cultivated fell into waste throwing a greater liability onto those areas still in cultivation; areas whose productivity was closely linked to potato cultivation were disproportionately assessed after the blight.⁽¹³⁾ Holdings that were abandoned presented the authorities with considerable problems. In theory the immediate lessor was liable for the rate but there was great difficulty in determining who he was.⁽¹⁴⁾ The rates due became the first charge to an incoming tenant,⁽¹⁵⁾ but in the interval this would leave the other holdings bearing a

proportionately increased rate. Lastly, the chaotic conditions of the time probably led to rate collection being somewhat arbitrary.

(d) rents.

As there are no comprehensive statistics of rent payments these have been proxied by the extent of unutilised land in the county. The available land has been taken as the extent of grassland and crops in 1851, the first year when grassland was measured. By using this constant figure we remove any discrepancy due to land reverting to waste or being reclassified as waste.⁽¹⁶⁾

Although the crop acreages are given in the Agricultural Returns, we require some measure of grassland utilisation in order to calculate the extent of excess land. To do this we have taken the stock to grass ratio of 1858 as representing optimal utilisation. Stock has been aggregated into livestock units (based on Ministry of Agriculture figures⁽¹⁷⁾). The following units have been employed:-

<u>Horses</u>	Livestock units	<u>Cattle</u>	Livestock units
Above 2 years	1.0	Milch	1.0
1 - 2	0.6	Above 2 years	0.8
Less than 1	0.4	1 - 2	0.6
<u>Mules</u>	0.6	Less than 1	0.4
<u>Asses</u>	0.2		
<u>Pigs</u>		<u>Sheep</u>	
Above 1 year	0.1	Ewes, tups, wethers	0.1
		Less than 1	0.05

Thus for every year 1847-54, the county aggregate livestock figures were calculated and the utilisation of grassland was estimated from using the 1858 grassland to stock ratio. This, together with the crop acreage, was subtracted from the 1851 total to give excess land.

(3) Estimation

The general model tested was

$$Y_{it} = \alpha_0 + \alpha_1 Y_{it-1} + \alpha_2 X_{it-1}^1 + \alpha_3 X_{it-1}^2 + \alpha_4 X_{it-1}^3$$

$$i = 1, 2, \dots, 30 ; t = 2, 3, \dots, 8$$

where Y_{it} is real wealth in county i for year t

X_{it-1}^1 is yields " " " " " " $t - 1$

X_{it-1}^2 is the taxation rate " " " " $t - 1$

X_{it-1}^3 is the excess land " " " " $t - 1$

When tested for the time series of individual counties very high values of R^2 were obtained though most of this was attributed to the lagged dependent variable. Pooling of the results was invalidated by the F test which was significant. However, the pooled results did indicate some serial correlation^[18]. Since $\alpha_1 \approx 1$ it was decided to test $\Delta Y_{it} = Y_{it} - Y_{it-1}$ as the dependent variable.

Only one regression permitted pooling. This was

$$\Delta Y_t = \alpha_1 + \alpha_4 X_{t-1}^3$$

where Y , X^3 are now 210×1 vectors. This gave

$$\Delta Y_t = 6335 + 0.6146 X_{t-1}^3$$

$$(0.99) \quad (8.64)$$

$$R^2 = 0.264$$

$$F = 74.66$$

$$\text{Durbin-Watson} = 2.294$$

Dummy variables for the time periods were then added. This gave

$$\Delta Y_t = 79570 D_1 - 30460 D_2 + 26140 D_3 - 4033 D_4$$

$$(6.86) \quad (2.75) \quad (2.36) \quad (0.38)$$

$$- 16440 D_5 + 24770 D_6 + 1308 D_7 + 0.535 X_{t-1}^3$$

$$(1.57) \quad (2.39) \quad (0.13) \quad (8.34)$$

$$R^2 = 0.626$$

$$F = 42.33$$

$$\text{Durbin-Watson} = 2.059$$

Writing Z for the 210×30 matrix of observations on X_{it-1}^3 with each vector on the diagonal and zeros elsewhere; RSS for residual sum of squares; U for unrestricted and D^T for the matrix of dummies we can summarise the analysis of covariance as follows:-

Analysis of Covariance

Source	Sum of Squares	d.f.	Mean square
Z	URSS = 55.48×10^{10}	150	0.37×10^{10}
$X_1 D^T$	$RSS(X_1 D^T) = 58.73 \times 10^{10}$	201	0.29×10^{10}
X	$RSS(X) = 81.97 \times 10^{10}$	208	0.39×10^{10}

F Tests.

$$(1) \text{ Test of overall homogeneity} = \frac{(RSS(X) - URSS)/58}{URSS/150}$$

$$= 1.234$$

This is insignificant at the $F_{.05} (58,150)$ level

$$(2) \text{ Test of homogeneity of slope coefficients} = \frac{(RSS(X_1 D^T) - URSS)/51}{URSS/150}$$

$$= 0.172$$

This is insignificant at the $F_{.05} (51,150)$ level

$$(3) \text{ Test of differential intercepts} = \frac{(RSS(X) - RSS(X_1 D^T))/7}{RSS(X_1 D^T)/201}$$

$$= 11.362$$

This is significant at the $F_{.001} (7,201)$ level

Log transforms of the variables fail to increase the performance of the regression. Cross section dummies gave a significant result at the 5% level on the test of the homogeneity of the slope coefficients.

(4) Conclusion

Although all the variables constructed gave significant results on either individual cross section or county time series, the excess land variable was the only one which permitted pooling. This would suggest that important variables had been omitted or the proxies used were inadequate.

We have neglected the role of expectations entirely, and in addition have not taken the labour market into account. Unfortunately the time data does not permit any lag structure to be investigated for the period of greatest interest.

Given these restrictions, together with the rough measures used for the variables, the results are quite encouraging. The role of the rent level supports O'Grada⁽¹⁹⁾ and agrees with some contemporary comment⁽¹²⁰⁾.

Perhaps it is apposite to end this section with a quotation from Osborne on the nature of some of the agricultural production which the statistics indicate: "In a great part of the country through which I travelled, nothing can be worse than the appearance of a great proportion of the land said to be under cultivation; where four or five holdings have been thrown into one, a great deal of what I saw was the tillage of men without knowledge or capital; there was a good deal of potato, some little oats, scarce any trunips, and very little wheat. The crops were foul and poor; a good deal of land was waste; there was all the marks of former tillage of some sort; but the surface of a great deal of the ground was a mass of weeds, thistles, etc."⁽²¹⁾ With this perspective our results appear even more encouraging.

REFERENCES TO CHAPTER VIII.

- (1) Poor Law Commissioners, (6), PP1852-53, Vol 50, P151-6;
(7), PP1854, Vol 29, P9 though note P33.
- (2) *ibid.*, (8) PP1854-5, Vol 24, P11; (9), PP1856; Vol 28, P45.
- (3) Crotty, R.D., *op.cit.*, P67-8.
- (4) 1841 Census, P454.
- (5) Barrington, T. "A review of Irish agricultural prices",
JSSISI, Vol 15, 1927, P249.
- (6) contained in, Report on wholesale and retail prices in the
United Kingdom 1902, with comparative statistical tables
for a series of years, PP1903, Vol 68; cattle P110,
sheep P114.
- (7) Griffith, R., General valuation of Ireland; Instructions
to valuers and surveyors, P28.
- (8) Poor Law Commissioners, (13), PP1860, Vol 37, P28-81.
- (9) Sixth report of the medical officer of the Privy Council,
1863, PP1864, Vol 28, P282-91.
- (10) Poor Law Commissioners, (1), *op.cit.*, P119, 120;
Consolidated Annuity, Q491; Osborne, S.G., Gleanings in
the west of Ireland, London, 1850, P46; Barrington, T.,
"The yields of Irish tillage crops since the year 1847",
Department of Agriculture and Technical Instruction of
Ireland, Journal, Vol 21, 1921.
- (11) 1846, 47 PP1847-48, Vol 57.
1848 PP1849, Vol 49.
1849 PP1850, Vol 51.
1850, 51 PP1852, Vol 47.
1852 PP1852-53, Vol 94.
1853 PP1854, Vol 58.
- (12) This is given in, Returns relating to tenement valuation,
Ireland, PP1854-55, Vol 47; for those counties not covered
by the townland valuation the tenement was used as given
in General Valuation, PP1868-69, Vol 9, P242.
- (13) Poor Laws, Q296, Q397.
- (14) Poor Laws, Q806, 1205, 2029, 2056, 2804, 8331.
- (15) Poor Laws, Q104, 1205, 2804; Consolidated Annuity, Q492, 1991.
- (16) On grassland classification generally see Larcom Papers,
MS7602 memo on agricultural statistics and MS7744,
letter of 3/5/1853.
- (17) Ministry of Agriculture, Fisheries and Food, The farm as a
business, London, 1973, P29.

- (18) Using procedure put forward by Durbin, J, "Testing for serial correlation in least-squares regression when some of the regressors are lagged dependent variables", Econometrica, Vol 38, 1970.
- (19) O'Grada, C., "Agricultural head rents, pre-Famine and post-Famine", Economic and Social Review, Vol 5, 1974,P389.
- (20) Larcom Papers, Ms7562, Condition of Ireland in 1851, P19; Poor Laws, Q2210.
- (21) Osborne, S.G., op.cit., P222.

CHAPTER IXCONCLUSION

The response of the Irish rural economy to the blight was dramatic. Livestock were substituted for men. It has been estimated that 0.8m people perished due to famine conditions in the period 1846-51.⁽¹⁾ A similar number emigrated. Given that Ireland's population at the onset of the blight was roughly 8½m, this amounted to a huge loss of human resources. Yet despite this livestock numbers sharply increased overall.

To understand this development requires an analysis of the functioning of a peasant economy. The poverty of the Irish was a common theme in the writings of the many travellers who visited the country. The low wage rate was most evident in the labour input to tillage crops, which was considerable. It took the form of heavy manuring - literally anything that would increase the fertility of the soil was husbanded and applied. It was precisely because wages were low that this was rational.

However, human physiology sets a floor to the real wage rate. The blight robbed the economy of its basic foodstuff. The potato was the staple diet precisely because it was cheap. Once it was removed from the market it was necessary for labourers to purchase more expensive foodstuffs if they were to be fit to work. Thus one effect of the blight was to increase the cost of labour.

The other principle effect of the blight was on the income of the peasant. The poorer peasants in pre-Famine Ireland tended to occupy poor soils and to cultivate them intensively. The better off peasants produced relatively more livestock and livestock products. Thus the loss of income due to the destruction of the potato crop

was proportionately greater for the poorer peasant. Indeed a substantial farmer could even have benefited overall with the high prices.

However, the high cost of labour consequent to the blight affected the whole of the rural economy and led to a switch in production towards commodities that did not require high labour inputs. Grass was preferred to tillage; cereals were preferred to roots. But to expand livestock on a holding required resources.

The more substantial farmers could afford this, though many only with difficulty. Many below them possessed some resources but to employ them in production would likely have given them only a low level of consumption. Such individuals would find emigration attractive and also they could afford it. Thus the exodus to the New World.

Those without resources were thrown upon the welfare provisions of the state. The government was horrified at the vision of it becoming the provider for millions of destitute Irish and ruthlessly set about restricting aid. Only when the public works scheme was about to disintegrate and when the workhouses were houses of death did the government relent and institute a system of gratuitous relief.

By consistently attempting to make relief a local charge the government placed additional burdens on precisely those areas least able to meet them. The process was only halted by the provision of external finance.

Landlords were caught and squeezed between two opposing forces. On the one hand they were obliged to obtain rent if only to pay rates. Certainly they could clear their estates of smallholders to reduce their rate obligations but if they pressed the more substantial tenant they would merely stimulate emigration. Thus clearing estates of smallholders proceeded alongside a reduction in the rent level which permitted a more rapid accumulation of livestock.

The poor perished because they were too expensive and were consumed by the beasts of the field.

REFERENCES TO CHAPTER IX.

- (1) Cousens, S.H., "Regional death rates in Ireland during the Great Famine", from 1846 to 1851. *Population Studies*, Vol 14, 1960-61, P56.

MATHEMATICAL APPENDICES

MATHEMATICAL APPENDIX I

We have considered the economic problem facing the peasant as being the allocation of his income over time between consumption and investment so that he maximises the discounted sum of his consumption. The process lasts at most for N stages (years) since we assume the discount factor then is zero. Initial income is given, so the first decision the peasant takes is the proportion of this he consumes directly. The rest he invests and we assume a profit function, $f(\)$, exists which converts this investment into income one stage or year hence, at which time the peasant must make a similar decision between consumption and investment.

Let x_i = peasant's income at stage i

u_i = proportion of income invested at stage i

Now $x_0 = \bar{x}_0$ and $e^{-\delta N} = 0$

We have constrained u_i to lie between zero and one, so

$$0 \leq u_i \leq 1$$

If the peasant invests nothing, i.e. if $u_i = 0$ then the peasant's income in the following year, x_{i+1} , does not equal zero. We have assumed that the peasant household supplies one unit of labour irrespective of whether it is utilised on the domestic holding or not. If the peasant does not enter production on his own account then his income in the following year is equal to the wage rate, w . (We assume consumption and production occur only at the decision times). Thus if $u_i = 0$ then $x_{i+1} = w$, i.e. $f(0) = w$. It follows from this that the income of the peasant must always be at least equal to the wage rate, i.e.

$$x_i \geq w$$

Thus we may state the problem fully as

$$(1) \quad J = \max \sum_{i=0}^{N-1} e^{-\delta i} x_i (1 - u_i) \quad \text{for } j = 0, 1, \dots, N - 1$$

$$\text{S.T.} \quad x_{j+1} = f(x_j, u_j)$$

$$x_j \geq w$$

$$u_j \geq 0$$

$$u_j \leq 1$$

For clarity we will solve the problem with only the strict equality as a constraint, i.e.

$$(2) \quad J = \max \sum_{i=0}^{N-1} e^{-\delta i} x_i (1 - u_i)$$

$$\text{S.T.} \quad x_{j+1} = f(x_j, u_j) \quad \text{for } j = 0, 1, \dots, N - 1$$

Define L as

$$(3) \dagger \quad L(x, u, y) = J + y' [f(x, u) - x]$$

$$\text{where } x = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_N \end{bmatrix}$$

$$f(x, v) = \begin{bmatrix} f(x_0, u_0) - \\ f(x_1, u_1) \\ \vdots \\ f(x_{N-1}, u_{N-1}) \end{bmatrix}$$

and

$$Y = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_N \end{bmatrix}, \text{ a vector of Lagrangian multipliers.}$$

† This presentation follows Pindyck, R. S., Optimal planning for economic stabilization, Amsterdam, 1973, Chpt. 2, P. 11-23.

Thus

$$L = \sum_{i=0}^{N-1} e^{-\delta i} x_i (1 - u_i) + [y_1, y_2, \dots, y_n] \begin{bmatrix} f(x_0 u_0) - x_1 \\ f(x_1 u_1) - x_2 \\ \vdots \\ f(x_{N-1} u_{N-1}) - x_N \end{bmatrix}$$

For maximisation we have

$$(4) \quad \frac{\partial L}{\partial x_j} (x^*, u^*, y^*) = e^{-\delta j} (1 - u_j) - y_j + y_{j+1} f_{x_j} = 0$$

for $j = 0, 1, \dots, N - 1$

$$\text{where } f_{x_j} = \frac{\partial f}{\partial x_j} (x_j u_j)$$

$$(5) \quad \frac{\partial L}{\partial u_j} (x^*, u^*, y^*) = -e^{-\delta j} x_j + y_{j+1} f_{u_j} = 0$$

$$(6) \quad \frac{\partial L}{\partial y_j} (x^*, u^*, y^*) = f(x_{j-1} u_{j-1}) - x_j = 0$$

$$\text{Since } f_{u_j} = x_j f_{x_j u_j}$$

from (5) we have

$$(7) \quad -e^{-\delta j} x_j + y_{j+1} x_j f_{u_j x_j} = 0$$

Since, in general, $x_j \neq 0$

$$(8) \quad y_{j+1} = e^{-\delta j} f_{u_j x_j}^{-1}$$

Substituting this into (4) gives, for $j = 1, \dots, N - 1$

$$(9) \quad e^{-\delta j} (1 - u_j) - e^{-\delta(j-1)} f_{u_{j-1} x_{j-1}}^{-1} + e^{-\delta j} f_{u_j x_j}^{-1} f_{x_j} = 0$$

(10) $\Rightarrow f_{u_{j-1}x_{j-1}} = e^\delta$

Let $i = 1,$

(11) Then $f_{u_0x_0} = e^\delta$

The conditions (10) are sufficient for a local maximum if the last N leading principal minors of the bordered Hessian matrix, A , alternate in sign, the sign of the first being $(-1)^{N+1}$, where

(12)

$$A = \begin{array}{c|cccc} \begin{array}{c} * \\ \hline 0 \dots \dots \dots 0 \\ \vdots \\ 0 \dots \dots \dots 0 \end{array} & \begin{array}{c} f_{x_0} \\ 0 \\ \vdots \\ 0 \end{array} & \begin{array}{c} f_{u_0} \\ 0 \\ \vdots \\ 0 \end{array} & \begin{array}{c} -1 \\ f_{x_1} \\ \vdots \\ 0 \end{array} & \begin{array}{c} 0 \dots \dots \dots 0 \\ f_{u_1} \dots \dots \dots 0 \\ \vdots \\ 0 \dots f_{x_{N-1}} \quad f_{u_{N-1}} \end{array} \\ \hline \begin{array}{c} f_{x_0} \\ f_{u_0} \\ \vdots \\ 0 \end{array} & \begin{array}{c} 0 \dots \dots \dots 0 \\ 0 \dots \dots \dots 0 \\ \vdots \\ 0 \dots \dots \dots f_{u_{N-1}} \end{array} & \begin{array}{c} \frac{\partial^2 L}{\partial x_1^2} \\ \frac{\partial^2 L}{\partial u_1 \partial x_1} \\ \vdots \\ \frac{\partial^2 L}{\partial u_{N-1} \partial x_1} \end{array} & \begin{array}{c} \frac{\partial^2 L}{\partial x_1 \partial u_1} \\ \frac{\partial^2 L}{\partial u_1^2} \dots \dots \dots \\ \vdots \\ \frac{\partial^2 L}{\partial u_{N-1} \partial u_1} \end{array} & \begin{array}{c} \frac{\partial^2 L}{\partial x_1 \partial x_2} \\ \frac{\partial^2 L}{\partial x_1 u_2} \dots \dots \dots \\ \vdots \\ \frac{\partial^2 L}{\partial u_{N-1}^2} \end{array} & \begin{array}{c} \frac{\partial^2 L}{\partial x_1 \partial u_{N-1}} \\ \frac{\partial^2 L}{\partial u_1 \partial u_{N-1}} \\ \vdots \\ \frac{\partial^2 L}{\partial u_{N-1}^2} \end{array} \end{array}$$

and is evaluated at (x^*, u^*) .

* See Intriligator, M. D., Mathematical optimisation and economic theory, Englewood Cliffs, N. J., U.S., Chpt 3, P. 20-38.

Now let us consider the general model:

$$(1) \quad J = \sum_{i=0}^{N-1} e^{-\delta i} x_i (1 - u_i)$$

$$\text{S.T. } x_{j+1} = f(x_j, u_j)$$

$$x_j \geq w$$

$$u_j \geq 0 \quad \text{for } j = 0, 1, \dots, N-1$$

$$u_j \leq 1$$

Define L as

$$(13) \quad L(x, u, y, z) = J + y' [f(x, u) - x] + z' [k - ux]$$

where

$$z = \begin{bmatrix} \begin{bmatrix} z_{11} \\ z_{12} \end{bmatrix} \\ z_2 \\ \vdots \\ z_n \end{bmatrix} \quad k - ux = \begin{bmatrix} 1 - u_0 \\ -w + x_0 \\ \hline 1 - u_1 \\ -w + x_1 \\ \hline \vdots \\ -w + x_{N-1} \end{bmatrix}$$

For maximisation, we have, by the Kuhn-Tucker Theorem,

$$(14) \quad \frac{\partial L}{\partial x_j}(x^*, u^*, y^*, z^*) = \frac{\partial J}{\partial x_j} - y_j + y_{j+1} f_{x_j} + \lambda_{j+1, z} \leq 0$$

$$(15) \quad \frac{\partial L}{\partial x_j}(x^*, u^*, y^*, z^*) x_j^* = \left(\frac{\partial J}{\partial x_j} - y_j + y_{j+1} f_{x_j} + \lambda_{j+1, z} \right) x_j^* = 0$$

$$(16) \quad x_j^* \geq 0$$

$$(17) \quad \frac{\partial L}{\partial u_j} (x^*, u^*, y^*, z^*) = \frac{\partial J}{\partial u_j} + y_{j+1} f_{u_j} - 3_{j+1,1} \leq 0$$

$$(18) \quad \frac{\partial L}{\partial u_j} (x^*, u^*, y^*, z^*) \cdot u_j^* = \left(\frac{\partial J}{\partial u_j} + y_{j+1} f_{u_j} - 3_{j+1,1} \right) u_j^* = 0$$

$$(19) \quad u_j^* \geq 0$$

$$(20) \quad \frac{\partial L}{\partial y_j} (x^*, u^*, y^*, z^*) = f(x_{j-1}, u_{j-1}) - x_j = 0$$

$$(21) \quad \frac{\partial L}{\partial 3_{j+1,1}} (x^*, u^*, y^*, z^*) = 1 - u_j \geq 0$$

$$(22) \quad \frac{\partial L}{\partial 3_{j+1,1}} (x^*, u^*, y^*, z^*) \cdot 3_{j+1,1}^* = (1 - u_j) 3_{j+1,1}^* = 0$$

$$(23) \quad 3_{j+1,1}^* \geq 0$$

$$(24) \quad \frac{\partial L}{\partial 3_{j+1,2}} (x^*, u^*, y^*, z^*) = -w + x_j \geq 0$$

$$(25) \quad \frac{\partial L}{\partial 3_{j+1,2}} (x^*, u^*, y^*, z^*) \cdot 3_{j+1,2}^* = (-w + x_j) 3_{j+1,2}^* = 0$$

$$(26) \quad 3_{j+1,2}^* \geq 0$$

For $j = 0, 1, \dots, N - 1$

These conditions are necessary and sufficient for a local maximum if J is concave and the constraint functions are convex, provided that there is some point in the opportunity set which satisfies all the inequality constraints as strict inequalities. Now a function is concave if

$$(27) \quad f[\theta x + (1 - \theta) x^0] \geq \theta f(x) + (1 - \theta) f(x^0) \quad (0 \leq \theta \leq 1)$$

$$\text{Consider for } J \text{ with } x = \begin{bmatrix} x' \\ u' \end{bmatrix}, x^0 = \begin{bmatrix} x'' \\ u'' \end{bmatrix}$$

$$J(\theta x + (1 - \theta) x^0)$$

$$= \sum_{i=0}^{N-1} e^{-\delta i} (1 - \theta u'_i) \theta x'_i + \sum_{i=0}^{N-1} e^{-\delta i} (1 - [1 - \theta] u''_i) (1 - \theta) x''_i$$

$$(28) \quad = \theta \sum_{i=0}^{N-1} e^{-\delta i} (1 - \theta u'_i) x'_i + (1 - \theta) \sum_{i=0}^{N-1} e^{-\delta i} x''_i (1 - (1 - \theta) u''_i)$$

Let us consider the first expression. Since $0 \leq \theta \leq 1$, $0 \leq u'_i \leq 1$,

$(1 - \theta u'_i) \geq (1 - u'_i)$ and thus

$$(29) \quad \theta \sum_{i=0}^{N-1} e^{-\delta i} (1 - \theta u'_i) x'_i \geq \theta \sum_{i=0}^{N-1} e^{-\delta i} (1 - u'_i) x'_i$$

$$(30) \quad \text{Similarly } [1 - (1 - \theta) u''_i] \geq 1 - u''_i$$

(31) Thus $J(\theta x + (1 - \theta) x^0) \geq \theta J(x) + (1 - \theta) J(x^0)$ and therefore J is concave

The second set of constraints are linear and thus are either convex or concave. Convexity for the first set of constraints would imply

$$(32) \quad f_{x''_i} (x'_i - x''_i) \geq f(x'_i) - f(x''_i)$$

for some constant u_i and

$$(33) \quad f_{u''_i} (u'_i - u''_i) \geq f(u'_i) - f(u''_i)$$

for some constant x_i , $i = 0, 1, \dots, N - 1$.

Therefore for convexity it would be sufficient if the profit function had positive marginal returns for investment together with diminishing productivity. This would give a constrained maximum. We may note that these conditions are stronger than in our solution to the problem without inequality constraints as those conditions implied diminishing productivity only in the neighbourhood of the (local) maximum.

Unfortunately conditions (14) - (26) do not lend themselves to the straightforward interpretation that the problem with inequality constraints had. It would therefore appear that in order to get a result that would be readily interpreted we would have to make assumptions that would violate the spirit of the model since we would expect many peasants to be in the position that they could not reach the position with $f_{x_0 u_0} = e^\delta$ without investing more than they possessed, i.e. they would require $u_0 > 1$.

MATHEMATICAL APPENDIX II

In the previous appendix, we saw how the peasant would allocate his income in order to maximise consumption over time. Given the amount to be invested, we now seek the combination of inputs and outputs that will maximise profits, Π . Profits are constrained by the investment budget, b , and the production function, $F(q,x,r) \leq 0$

Let q be a $n \times 1$ vector of outputs

- r " " " " " " " " equivalent inputs
- x " " $m \times 1$ " " " " factors
- p " " $n \times 1$ " " " " input prices
- p^* " " " " " " " " expected output prices
- w " " $m \times 1$ " " " " factor wages

Thus the problem is to

(1) $\max \Pi \quad \Pi = p^*.q - w'.x - p'.r$
 Subject to $F(q,x,r) \leq 0$
 $w'.x + p'.r \leq b$
 $q \geq 0, x \geq 0, r \geq 0$

We form the Lagrangian, L , where

(2) $L = L(q,x,r,y) = \Pi + y_1 [-F(q,x,r)] + y_2 [b - w'.x - p'.r]$
 and $y = \begin{bmatrix} y_1 \\ y_2 \end{bmatrix}$

Then, by the Kuhn-Tucker Theorem we have

$$(3) \quad \frac{\partial L}{\partial q} (q^*, x^*, r^*, y^*) = \frac{\partial \Pi}{\partial q} (q^*, x^*, r^*) - y^*_1 \frac{\partial F}{\partial q} (q^*, x^*, r^*) \leq 0$$

$$(4) \quad \frac{\partial L}{\partial q} (q^*, x^*, r^*, y^*) q^* = \left[\frac{\partial \Pi}{\partial q} - y^*_1 \frac{\partial F}{\partial q} \right] q^* = 0$$

$$(5) \quad q^* \geq 0$$

$$(6) \quad \frac{\partial L}{\partial r} (q^*, x^*, r^*, y^*) = \frac{\partial \Pi}{\partial r} - y^*_1 \frac{\partial F}{\partial r} + y^*_2 \frac{\partial}{\partial r} (b - w' \cdot x - p' \cdot r) \leq 0$$

$$(7) \quad \frac{\partial L}{\partial r} (q^*, x^*, r^*, y^*) r^* = \left[\frac{\partial \Pi}{\partial r} - y^*_1 \frac{\partial F}{\partial r} + y^*_2 \frac{\partial}{\partial r} (b - w' \cdot x - p' \cdot r) \right] r^* = 0$$

$$(8) \quad r^* \geq 0$$

$$(9) \quad \frac{\partial L}{\partial x} (q^*, x^*, r^*, y^*) = \frac{\partial \Pi}{\partial x} - y^*_1 \frac{\partial F}{\partial x} + y_2 \frac{\partial}{\partial x} (b - w' \cdot x - p' \cdot r) \leq 0$$

$$(10) \quad \frac{\partial L}{\partial x} (q^*, x^*, r^*, y^*) \cdot x^* = \left[\frac{\partial \Pi}{\partial x} - y^*_1 \frac{\partial F}{\partial x} + y_2 \frac{\partial}{\partial x} (b - w' \cdot x - p' \cdot r) \right] x^* = 0$$

$$(11) \quad x^* \geq 0$$

That is, for $j = 1, 2, \dots, n$

$$(12) \quad \frac{\partial L}{\partial q_j} = p_j^* - y^*_1 \frac{\partial F}{\partial q_j} \leq 0$$

$$(13) \quad \frac{\partial L}{\partial q_j} \cdot q_j = q_j [p_j^* - y^*_1 \frac{\partial F}{\partial q_j}] = 0$$

$$(14) \quad q_j \geq 0$$

This will give the complementary slackness conditions

$$(15) \quad p_j^* - y_1^* \frac{\partial F}{\partial q_j} \leq 0 \text{ but } = 0 \text{ if } q_j^* > 0$$

$$(16) \quad q_j^* \geq 0 \text{ but } = 0 \text{ if } p_j^* - y_1^* \frac{\partial F}{\partial q_j} < 0$$

$$(17) \quad F(q, x, r) \leq 0 \text{ but } = 0 \text{ if } y_1^* > 0$$

$$(18) \quad y_1^* \geq 0 \text{ but } = 0 \text{ if } F(q, x, r) < 0$$

For r_i we have

$$(19) \quad \frac{\partial L}{\partial r_i} = -p_i - y_1^* \frac{\partial F}{\partial r_i} - y_2^* p_i \leq 0$$

$$(20) \quad \frac{\partial L}{\partial r_i} \cdot r_i = r_i [p_i (1 + y_2^*) + y_1^* \frac{\partial F}{\partial r_i}] = 0$$

$$(21) \quad r_i \geq 0 \quad \text{for } i = 1, 2, \dots, n$$

In addition to complementary slackness conditions similar to q_j 's we have

$$(22) \quad b \geq w'.x + p'.r \text{ but } = b \text{ if } y_2^* > 0$$

$$(23) \quad y_2^* \geq 0 \text{ but } = 0 \text{ if } b > w'.x + p'.r$$

For factors, the conditions are the same as for inputs.

These conditions are necessary and sufficient for a (strict) local maximum if the objective function is (strictly) concave and the constraint functions are convex, with the additional provision that there is a vector $[q^0, x^0, r^0]'$ such that

$$(24) \quad [q^0, x^0, r^0]' \geq 0, \quad b > w' \cdot x^0 + p' \cdot r^0, \quad F(q^0, x^0, r^0) < 0$$

Thus $F(q, x, r)$ must be convex.

Let us assume that the solution to the problem is such that $y_1^*, y_2^* > 0$, that is, investment is constrained by the budget. Then the complementary slackness conditions give

$$(25) \quad \begin{aligned} b &= w' \cdot x + p' \cdot r \\ F(q, x, r) &= 0 \\ p_j^* - y_1^* F_{q_j} &= 0 & j = 1, 2, \dots, n \\ p_i (1 + y_2^*) + y_1^* F_{r_i} &= 0 & i = 1, 2, \dots, n \\ w_k (1 + y_2^*) + y_1^* F_{x_k} &= 0 & k = 1, 2, \dots, m \end{aligned}$$

Assume $p_j^* = f(p_j)^{+ [1]}$ and let p_s increase by a small amount.

+ with $\partial f / \partial p_j > 0$

[1] If we use the expectations model of M. Nerlove, the dynamics of supply, Baltimore, 1958, then we have

$$\begin{aligned} p_{t+1}^* &= \sum_{\lambda=0}^{t+1} \beta(1-\beta)^{t+1-\lambda} \cdot p_{\lambda-1} \\ &= \beta p_t + \sum_{\lambda=0}^t \beta(1-\beta)^{t+1-\lambda} \cdot p_{\lambda-1} \end{aligned}$$

Then $\frac{\partial p_j^*}{\partial p_j} = \beta$, the coefficient of expectations.

We will have the system of equations in Table MA2.1, writing

$$F_{q_j} \text{ for } \frac{\partial F}{\partial q_j} (q, r, x)$$

$$\text{and } F_{q_j q_i} \text{ for } \frac{\partial^2 F}{\partial q_j \partial q_i} (q, r, x)$$

Let the matrix of coefficients be X and the unknowns a vector u where

$$u = \left[\frac{\partial y_2}{\partial p_s}, \frac{\partial y_1}{\partial p_s}, \frac{\partial q_1}{\partial p_s}, \frac{\partial q_2}{\partial p_s}, \dots, \frac{\partial r_1}{\partial p_s}, \dots, \frac{\partial x_1}{\partial p_s}, \dots, \frac{\partial x_m}{\partial p_s} \right]'$$

Then we have

$$X \cdot U = C = \left[\frac{\partial b}{\partial p_s} - r_s, 0, 0, \dots, \frac{\partial p_s^*}{\partial p_s}, 0, \dots, -(1 + y_2), \dots, 0 \right]'$$

where U is a $(2n + m + 2) \times 1$ column vector

X " " $(2n + m + 2) \times (2n + m + 2)$, square matrix

C " " $(2n + m + 2) \times 1$ column vector

By Cramer's Rule, assuming $|X| \neq 0$

$$(26) \quad \frac{\partial r_s}{\partial p_s} = \frac{\left(\frac{\partial b}{\partial p_s} - r_s \right) |X_{1, n+s}| + \frac{\partial p_s^*}{\partial p_s} |X_{s, n+s}| - (1 + y_2) |X_{n+s, n+s}|}{|X|}$$

where $|X_{j,i}|$ is the cofactor of $\frac{\partial q_j}{\partial p_i}$ in $|X|$, if $j \leq n$, $2n \geq i > n$, etc

And

$$(27) \quad |X| \frac{\partial r_j}{\partial p_s} = \left(\frac{\partial b}{\partial p_s} - r_s \right) |X_{1, n+j}| + \frac{\partial p_s^*}{\partial p_s} |X_{s, n+j}| - (1 + y_2) |X_{n+s, n+j}|$$

$$(28) \quad |X| \frac{\partial x_i}{\partial p_s} = \left(\frac{\partial b}{\partial p_s} - r_s \right) |X_{1,2n+i}| + \frac{\partial p_s^*}{\partial p_s} |X_{s,2n+i}| - (1 + y_2) |X_{n+s,2n+i}|$$

$$(29) \quad |X| \frac{\partial q_k}{\partial p_s} = \left(\frac{\partial b}{\partial p_s} - r_s \right) |X_{1,k}| + \frac{\partial p_s^*}{\partial p_s} |X_{s,k}| - (1 + y_2) |X_{n+s,k}|$$

with $n \geq j > 0$, $m \geq i > 0$, $n \geq k > 0$.

Now let us consider again the equilibrium conditions

$$(25) \quad b = w' \cdot x + p' \cdot r$$

$$F(q, x, r) = 0$$

$$p_j^* - y_1 F_{q_j} = 0 \quad j = 1, 2, \dots, n$$

$$p_i(1 - y_2) + y_1 F_{r_i} = 0 \quad i = 1, 2, \dots, n$$

$$w_k(1 + y_2) + y_1 F_{x_k} = 0 \quad k = 1, 2, \dots, m$$

Assume that there is a small increase in the budget constraint b . There will be a new vector of unknowns, v , where

$$v = \left[\frac{\partial y_2}{\partial b}, \frac{\partial y_1}{\partial b}, \frac{\partial q_1}{\partial b}, \frac{\partial q_2}{\partial b}, \dots, \frac{\partial r_1}{\partial b}, \dots, \frac{\partial x_1}{\partial b}, \dots, \frac{\partial x_m}{\partial b} \right]'$$

The constraint vector is now, $d = [1, 0, \dots, 0]'$, but the coefficient matrix is the same. We thus have

$$X \cdot v = d$$

From this we have

$$|X| \frac{\partial r_j}{\partial b} = |X_{1,n+j}| \text{ etc.}$$

We can now rewrite the partial differentials as

$$(30) \quad \frac{\partial r_j}{\partial p_s} = \left(\frac{\partial b}{\partial p_s} - r_s \right) \frac{\partial r_j}{\partial b} + \frac{\partial p_s^*}{\partial p_s} \frac{|X_{s,n+j}|}{|X|} - (1 + y_2) \frac{|X_{n+s,n+j}|}{|X|}$$

$$(31) \quad \frac{\partial x_i}{\partial p_s} = \left(\frac{\partial b}{\partial p_s} - r_s \right) \frac{\partial x_i}{\partial b} + \frac{\partial p_s^*}{\partial p_s} \frac{|X_{s,2n+i}|}{|X|} - (1 + y_2) \frac{|X_{n+s,2n+i}|}{|X|}$$

$$(32) \quad \frac{\partial q_k}{\partial p_s} = \left(\frac{\partial b}{\partial p_s} - r_s \right) \frac{\partial q_k}{\partial b} + \frac{\partial p_s^*}{\partial p_s} \frac{|X_{s,k}|}{|X|} - (1 + y_2) \frac{|X_{n+s,k}|}{|X|}$$

Let us consider $\partial r_j / \partial p_s$. The first term in equation (30) represents the effect on the demand for r_j of an increase in the price of r_s , operating through the budget constraint, b . We may thus call this the Budget Effect. The increase in the price of r_s will increase its expected price and thus we would expect more of it to be produced in the next cycle. The second term of (30) measures the effect of this change in the output mix on the demand for input r_j . We have called this the Output Substitution Effect.

Lastly, the increase in price of r_s will lead to attempts to substitute other inputs for it. The effect on the demand for r_j of this is given by the final term and is called the Input Substitution Effect.

We thus have

$$\frac{\partial r_j}{\partial p_s} = \underbrace{\left(\frac{\partial b}{\partial p_s} - r_s \right) \frac{\partial r_j}{\partial b}}_{\text{Budget Effect}} + \underbrace{\frac{\partial p_s^*}{\partial p_s} \frac{|X_{s,n+j}|}{|X|}}_{\text{Output Substitution Effect}} - \underbrace{(1 + y_2) \frac{|X_{n+s,n+j}|}{|X|}}_{\text{Input Substitution Effect}}$$

For any input j and output i , where $2n + m \geq j > n$, $n \geq i \geq 1$, if $|X_{j,i}| > 0$ we call them input-output complementary. Between any two inputs, k, ℓ , where $2n + m \geq k, \ell > n$, if $|X_{k,\ell}| > 0$ we call them input complementary.

Equations (3) - (11) give the conditions for the optimal production plan. From them we can generate the comparative static results (30) - (32). While these fit neatly into the Hicksian framework, the fact that production occurs after a lag in time, allowing an input to be also produced as an output one period hence, leads to a further effect having to be considered in addition to the familiar income and substitution effects of demand theory.

MATHEMATICAL APPENDIX III

The supply of labour hours

In general economic theory we consider the choice facing the worker to be one between work and leisure. While the latter is pleasurable, the former is not. However, the income yielded by work permits consumption of commodities, which does yield utility. If the individual decides to work for an additional period, he has weighed up the additional effort required and the sacrificed leisure against the extra consumption of commodities and has considered the operation worthwhile.

The peasant is in the same situation except he faces an additional consideration. More work requires more calories if he is to maintain his physical condition. Thus as well as having a limited number of hours to allocate between labour and leisure, he must also insure that he is capable of purchasing the calories required for his work.

Let q be a $(1 \times n)$ vector of physical quantities of commodities consumed and c a $(1 \times n)$ vector of calorific coefficients, where c_j is the calorific content of one unit of q_j ($j = 1, 2, \dots, n$). Let ℓ be the hours of leisure and k the total hours available for work; p is a vector of prices $(1 \times n)$, w the wage rate. a and b are constants, representing the calorific requirements of basal and work metabolism respectively. $G(\)$ is the utility function which the peasant wants to maximise. Thus we can express the problem as

$$(1) \quad \max G(q, \ell)$$

$$\text{Subject to } c' \cdot q \geq a + b(k - \ell)$$

$$(k - \ell)w \geq p \cdot q$$

$$(2) \quad \text{Let } L(q, \ell, y) = G(q, \ell) + y_1 [-a - b(k - \ell) + c' \cdot q] + y_2 [-p \cdot q + w(k - \ell)]$$

By the Kuhn-Tucker Theorem we have, for optimality,

$$(3) \quad \frac{\partial L}{\partial q_j}(q^*, \ell^*, y^*) = \frac{\partial G}{\partial q_j}(q^*, \ell) + y_1 c_j - y_2 p_j \leq 0$$

$$(4) \quad \frac{\partial L}{\partial q_j} \cdot q_j = \left[\frac{\partial G}{\partial q_j} + y_1 c_j - y_2 p_j \right] q_j = 0$$

$$(5) \quad q_j \geq 0 \quad \text{for } j = 1, 2, \dots, n$$

$$(6) \quad \frac{\partial L}{\partial \ell} = \frac{\partial G}{\partial \ell} + y_1 b - y_2 w \leq 0$$

$$(7) \quad \frac{\partial L}{\partial \ell} \cdot \ell = \left[\frac{\partial G}{\partial \ell} + y_1 b - y_2 w \right] \ell = 0$$

$$(8) \quad \ell \geq 0$$

$$(9) \quad \frac{\partial L}{\partial y_1} = -a - b(k - \ell) + c' \cdot q^* \geq 0$$

$$(10) \quad \frac{\partial L}{\partial y_1} \cdot y_1 = y_1 [-a - b(k - \ell) + c' \cdot q^*] = 0$$

$$(11) \quad y_1 \geq 0$$

$$(12) \quad \frac{\partial L}{\partial y_2} = -p' \cdot q^* + w(k - \ell) \geq 0$$

$$(13) \quad \frac{\partial L}{\partial y_2} \cdot y_2 = y_2 [-p' \cdot q^* + w(k - \ell)] = 0$$

$$(14) \quad y_2 \geq 0$$

(3) - (14) give conditions for a maximum provided $G(\)$ is concave and the constraints are convex.

We wish to examine the case where there is only one element of q^* positive, say q_i . The conditions for optimality now become

$$c_i q_i^* \geq a + b(k - \ell^*)$$

$$w(k - \ell^*) = p_i q_i^*$$

$$(15) \quad \frac{\partial G}{\partial q_i} + y_1 c_i - y_2 p_i = 0$$

$$\frac{\partial G}{\partial \ell} + y_1 b - y_2 w = 0$$

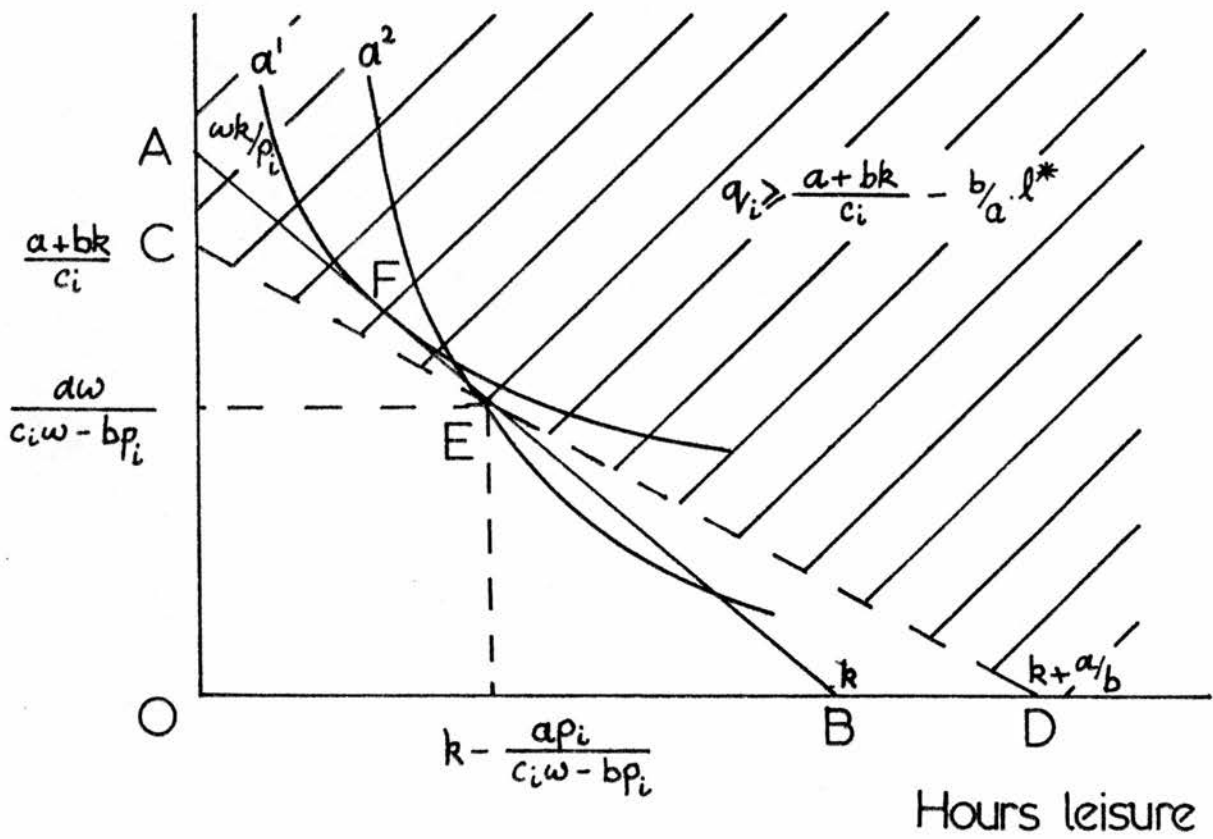
These conditions are displayed graphically below. The shaded area indicates where the calorific constraint is satisfied. To see where on AB the optimum point is located we must first examine the indifference curves for the utility function

$$(16) \quad G(q, \ell) = k \quad \text{as } k \text{ is varied}$$

We will have, in the situation where only $q_i > 0$

$$(17) \quad \frac{\partial G}{\partial q_i}(q, \ell) \cdot dq_i + \frac{\partial G}{\partial \ell}(q, \ell) \cdot d\ell = 0$$

Consumption
of q_j



Thus the slope will be

$$(18) \quad \frac{dq_i}{d\ell} = - \frac{\partial G / \partial \ell}{\partial G / \partial q_i} = - \frac{y_2 w - y_1 b}{y_2 p_i - y_1 c_i} \quad (\text{at optimum})$$

In the case of $y_1 = 0$, we will have

$$(19) \quad \frac{dq_i}{d\ell} = - \frac{w}{p_i}$$

that is, the indifference curve touches the budget constraint. This would be the case if the indifference curve was of form a^1 , which gives an optimum point at F.

If $y_1 > 0$, the solution is no longer tangential to the budget constraint. The slope of the indifference curve is now weighted by y_1 , b and c_i . This gives E as an optimum in the case of the curve a^2 .

The co-ordinates of E are given by the two constraints being solved as equalities, when

$$(20) \quad q_i^* = \frac{aw}{c_i w - bp_i}$$

$$\ell^* = k - \frac{ap_i}{c_i w - bp_i}$$

If the calorific constraint was not operative we would have the familiar result

$$(21) \quad \frac{dq_j}{dq_i} = - \frac{\partial G / \partial q_i}{\partial G / \partial q_j} = - \frac{p_i}{p_j} \quad \text{for } i, j = 1, 2, \dots, n$$

We can thus see from the above that the introduction of a calorific constant can lead to a significant modification of an individual's optimal behaviour. An increase in the price of q_i will shorten the length of OA and move the point E along the budget constraint towards the vertical axis. Thus the individual will work more hours. Of most interest is the situation where the wage rate is increased. If the calorific constraint was operative the result would be an increase in leisure hours. This might provide a rational basis for the high leisure preference considered to be common in less developed countries.

MATHEMATICAL APPENDIX IVThe aggregation problem

The essential characteristic of the general equilibrium approach which we are attempting to apply to a peasant economy is that variables which confront economic agents as parameters are themselves determined. We thus set out below one method of aggregation in order to complete the model. However this process is very useful in highlighting the strong assumptions which are necessary to do this.

Let us consider the anticipated profit function of a peasant at $t = 0$. We have

$$(1) \quad \Pi^0 = L^0(q^*, x^*, r^*, y^*)$$

Our first assumption is that all peasants behave identically and thus their production decisions are purely a consequence of the level of their initial resources. To be able to aggregate different physical commodities we assume that there is a q_i such that

$$(2) \quad \Pi^0 = f(q_i)$$

with

$$(3) \quad \frac{\partial \Pi^0}{\partial q_i} > 0$$

Then we may express q^* as a function of q_i^* , i.e.

$$(4) \quad q^* = k(q_i^*)$$

Although strong the assumption is not unreasonable in our situation since cattle could be used.

In the dynamic problem we had

$$(5) \quad x_1 = f(x_0, u_0)$$

However, this required that prices were parameters. The general profit function must therefore include the initial resources of the peasant prices, price expectations and wages. [π^0 and x_1 are now interchangeable; we shall use the latter]. Let us write the initial resources as q_{-1} .

Thus we have

$$(6) \quad x_1 = h(q_{-1}, p, p^*, w, u_0; q^*, x^*, r^*, y^*)$$

If we employ the Implicit Function Theorem on the equilibrium conditions (25) of Mathematical Appendix II we can reduce (6) to

$$(7) \quad x_1 = h(q_{-1}, p, p^*, w, u_0)$$

as long as the Jacobian of the conditions, A , where

(8)

$$A = \begin{bmatrix} 0 \dots 0 & p_1 \dots p_n & w_1 \dots w_m & 0 & 0 \\ F_{q_1} \dots F_{q_n} & F_{r_1} \dots F_{r_n} & F_{x_1} \dots F_{x_m} & 0 & 0 \\ -y_1^* F_{q_1 q_1} \dots -y_1^* F_{q_1 q_n} & -y_1^* F_{q_1 r_1} \dots -y_1^* F_{q_1 r_n} & -y_1^* F_{q_1 x_1} \dots -y_1^* F_{q_1 x_m} & -F_{q_1} & 0 \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ -y_1^* F_{q_n q_1} \dots -y_1^* F_{q_n q_n} & -y_1^* F_{q_n r_1} \dots -y_1^* F_{q_n r_n} & -y_1^* F_{q_n x_1} \dots -y_1^* F_{q_n x_m} & -F_{q_n} & 0 \\ y_1^* F_{r_1 q_1} \dots y_1^* F_{r_1 q_n} & y_1^* F_{r_1 r_1} \dots y_1^* F_{r_1 r_n} & y_1^* F_{r_1 x_1} \dots y_1^* F_{r_1 x_m} & F_{r_1} & p_1 \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ y_1^* F_{x_m q_1} \dots y_1^* F_{x_m q_n} & y_1^* F_{x_m r_1} \dots y_1^* F_{x_m r_n} & y_1^* F_{x_m x_1} \dots y_1^* F_{x_m x_m} & F_{x_m} & w_m \end{bmatrix}$$

is of full row rank

Now let the number of peasants who intend to produce q_i^* be $\phi(q_i^*)$. Then S_j , the aggregate supply of q_j^* put on the market will be given by

$$(9) \quad S_j = \int_0^\infty \phi(q_i^*) k_j(q_i^*) dq_i^*$$

for $j = 1, \dots, n$

Aggregate supply, S , is thus a $(n \times m) \times 1$ vector. The demand of a peasant who intends to produce q_i^* , for r_j when used as an input is given by (i) $d_{r_j}^{q_i^*}$, where

$$(10) \quad (i) d_{r_j}^{q_i^*} = d_{r_j}(p'q_{-1}; q_i^*, p, w)$$

The consumption demand for r_j by such a peasant will be given by the implicit solution of the budget constrained utility maximisation problem. We will have

$$(11) \quad (c)d_{r_j}^{q_i^*} = \phi_{r_j} ([p'q_{-1} \{1 - u_0\} + w]; p, w, q_i^*)$$

Aggregate demand for r_j , D_{r_j} , will be given by the sum of input and consumption demand over all peasants, i.e.

$$(12) \quad D_{r_j} = \int_0^{\infty} \phi(q_i^*) [d_{r_j}(p'q_{-1}; q_i^*, p_1 w) + \phi_{r_j} ([p'q_{-1} \{1 - u_0\} + w]; p, w, q_i^*)] d_{q_i^*}$$

Aggregate demand for factors will be given by a similar procedure. For equilibrium we have

$$(13) \quad S = D$$

If we use the solution of the dynamic problem in Mathematical Appendix I(2) we will have

$$(14) \quad f_{pq_{-1}u_0} = e^{\delta} \quad [as \ x_0 = pq_{-1}]$$

We now have $n + m + 1$ equations with $n + m + 1$ unknowns.

Note: From the standard interpretation of the Lagrangian multiplier we have

$$(15) \quad y_2^* = \frac{\partial L}{\partial b} (q^*, x^*, r^*, y^*) \quad [b = x_0 u_0]$$

This will give the increase in profits due to a small increase in the budget constraint. For the dynamic problem we have

$$(16) \quad \frac{\partial f}{\partial x_0 u_0} (x_0 u_0) = e^\delta$$

This expression gives us the increase in income for a small increase in the amount of investment. Thus at optimality we have

$$(17) \quad y_2^* = \frac{\partial L}{\partial b} = \frac{\partial f}{\partial x_0 u_0} = e^\delta$$

For the Lagrangian and income functions at optimality, the solution will be

$$(18) \quad L(q^*, x^*, r^*, y^*) = f(x_0 u_0) + k \quad \text{where } k \text{ is a constant}$$

But if $x, r = 0$, then $L = 0$ and $x_0 u_0 = 0$. Thus we also have $f(0) = 0$ and thus $k = 0$. We therefore have

$$(19) \quad L(q^*, x^*, r^*, y) \equiv f(x_0 u_0)$$

The income function is identical to the Lagrangian evaluated at optimal points.

APPENDIX ITHE IRISH VALUATIONS

Three major valuations stand apart from the welter of police, ecclesiastical and landlord valuations which were commissioned in the nineteenth century. The first of these was the Townland Valuation which began in Co. Derry in 1830. Its object was to provide a measure of the relative taxable capacity of each townland in Ireland. These were subsequently aggregated into baronies and counties and were utilised by the Grand Juries. Twenty-six counties were eventually covered before the valuation was superceded by the Tenement Valuation in 1852. The latter valuation was based on an earlier act by which all tenements in the various poor law unions were assessed for local rates. Henceforth these union valuations would be used to compute all county rates.

Both the townland and tenement valuations were supervised by Richard Griffith, a remarkable and distinguished public servant. The booklet of instructions he issued to his valuers is extremely detailed and reflected his passionate desire to achieve uniformity. Many factors were to be taken into account before the value was determined. The most important was the quality of the soil, together with an appreciation of the subsoil. In addition the valuator was to assess the local influence of the climate (particularly shelter from wind), the elevation of the land, the proximity to markets, limestone quarries, turbary or sources of manure, the quality of roads. Griffith's diligent supervision of the early valuating lends confidence to the results.

It was because valuers had to be trained in Griffith's methods that the valuation was conducted in a piecemeal fashion. The valuation of Derry was begun in 1830 while Clare was not started

until 13 years later. It was hoped that by valuing to a constant scale of prices which appeared in the act that any effect of the lag in time would be removed.

In contrast to these two valuations, the poor law valuation was executed in a couple of years. It was authorised by the poor law of 1838 and was substantially complete by the early 1840's. The result was heavily criticised for not being uniform and thus incapable of being used for county taxation or electoral franchise. This led to the introduction of the tenement valuation under Griffith. However, the poor law valuation still deserves the same attention as the above valuations, for criticisms concerning its uniformity were also raised with Griffith's work. Many of the aspects of the poor law valuation which received criticism, such as what constituted a "fair" or "reasonable" rent had also to be dealt with by Griffith, with results which were not totally convincing. This does not diminish the standing of Griffith's work, but rather highlights a central difficulty in valuation. Actual rents cannot be accepted as a basis for rating as the market is not efficient. Some tenements will be covered by leases and in other cases the landlord may be lax and allow the level of rent to remain stationary while the market moves upward. If actual rents were taken as the yardstick of value then such tenements would, in addition to being blessed with a low rental would pay proportionately less rates than identical tenements which had stricter landlords. This offends against fairness.

The difficulty of valuing, once actual letting value is abandoned, is to define the acceptable rent. Here one enters a minefield, since in addition to returns to land and labour, it was argued that

a return should also be provided for enterprise. Thus the whole question of tenant-right, which became a major issue in the early 1850's, is raised. Since the poor law valuation preceded the tenement it is interesting to see how the valuers dealt with these problems.

Although we violate chronology by dealing first with the poor law valuation, this approach is advantageous as the general problems of valuation are presented most clearly in this case. There were many valuers and their lack of co-ordination gives an initial picture of great diversity in method. Closer examination, however, reveals the general influences they were subject to and the similar ways they dealt with them. In fact, detailed analysis of the poor law valuation gives a sound framework within which Griffith's two valuations can be easily dealt with.

The Poor Law Valuation.

We analyse this valuation as follow:- firstly we review the instructions which were given to the valuers. Following this the quality of the valuers is examined and their approach to their job. Since the valuers were supervised by the board of guardians we look at this local government structure as well as the interests of the various classes in rural society towards the level of the valuation.

The act which established the Irish poor law ordered that the cost of its provisions was to be met by a rate levied on the annual

value of property in the poor law union. The annual value of a tenement was defined as "the rent at which one year with another the same might in their actual state be reasonably expected to let from year to year."⁽¹⁾ The heart of the matter was the interpretation of "reasonably".

The poor law commissioners were charged with executing the provisions of the act. The assistant secretary of this body issued several circulars to the boards of guardians to clarify the matter. The first was issued in March, 1839 (the act had become law in July, 1838). This stated that the commissioners could not accept the use of the actual rental as a measure of annual value "because it would not only produce inequalities affecting individual rate-payers in the same electoral division, but would also throw upon the occupiers of highly-rented properties an unfair share of the whole rate."⁽²⁾ This was reinforced by a second circular issued just over a month later which incidentally also gives some idea of what was meant by "highly rented". This circular stated that the valuator "should take the rent which would be given by a solvent tenant, making a fair and provident arrangement, and not the utmost rack-rent which a less provident person might be found to undertake, or which might be obtained by subdividing the land into small parcels for the purpose of acquiring an extravagant aggregate rental."

Rather than clarifying matters the circulars only seemed to have changed "reasonable" for "fair and provident" and to have introduced the notion of a "solvent" tenant. This meant that those investigating the valuation had to determine what every valuator took as the meaning of "solvent", since they naturally tended to

bring this up in evidence. Almost a year later a third circular was issued, possibly in response to concern about the course of the valuation. This stated that the legal value was "the net rent at which a tenement might be reasonably expected to let to a solvent tenant, the existing demand for such tenements must be taken into account." This directly contradicts the spirit of the second circular which implied that the existing level of rent on subdivided properties was "extravagant", due of course to the market demand.

It is impossible to assess the effect of the circulars on the local valuers. They were undoubtedly responsible for the vocabulary of the valuers in their evidence, particularly the use of "solvent". However, the meaning given to "solvent" varied from union to union, as did it for "fair". The use of value-charged words like "reasonable" had from the beginning set the environment. The expression "not the utmost rack-rent" clearly established some idea of equity. Such a notion would have been prevalent anyway, but the circular gave it official sanction.

The commission should not be criticised for this. It would have been unfair for a man living miserably on a few acres to pay proportionally more in rates than a prosperous neighbour. Where the commission failed was by neglecting to provide an alternative principle to accepting the status quo. Having examined their instructions it is opportune to move on to the men who were appointed as valuers.

This can be gathered from the partial picture that emerges from the local reports on the various unions drawn up by a parliamentary team investigating the possible use of the valuation for electoral franchise. The investigators visited 52 unions though detailed reports are presented only for 50. 22 of these valuers were connected with farming, 11 with surveying and 10 were civil engineers.⁽³⁾ In addition there were several agents and an architect. Some were recorded as being professional valuers though it is difficult to know how much weight this would carry. The letting of land by valuation was firmly established in the north of Ireland though this does not seem to have led to an independent valuing profession. (Griffith adopted his laborious training scheme at the beginning of the townland valuation due to his opinion that there were insufficient good valuers in Ireland for a rapid valuation.⁽⁴⁾) Rather it was conducted on a local basis with an individual capable of surveying. Since valuations would only be required infrequently such a local development would fit the pattern of demand.

The guardians were directed by the commission to make use of all existing surveys and valuations in order to reduce cost. These were generally tithe and police tax valuations. In every case the valuers rejected them due to their poor quality.

On the whole the valuers were men experienced in valuing and were usually well acquainted with local conditions. Some had worked on the Ordnance Survey and others on the townland valuation. Providing he had had prior experience, a substantial local farmer would seem to be a good choice as he would have considerable knowledge of the

union's agriculture and could converse freely with tenants. The surveyors and civil engineers would probably have been technically better qualified but it is doubtful whether this would have led to a more reliable valuation. While it is possible to construct an elaborate list of qualifications for valuing, it is necessary to stress that the poor law valuation was not undertaken as an example of technical excellence but was to be used to allocate a local tax of about 6d. in the pound. What was essential was that it could hold as a relative measure between tenements.

Certainly the desire to save on cost would have led to a reduction in the quality of the valuation but against this the commission intervened in cases where they considered the guardians' choice unsuitable.⁽⁵⁾ In conclusion, it would appear that the valuers were competent on the whole to assess the relative taxable capacity of tenements. The major criticism levelled against the poor law valuation was that comparisons between unions were impossible. For instance, R.A. Ferguson, an M.P. who had property in Ireland and had been a magistrate, considered that there was "great inequality in the manner of valuing the lands", that there was certainly "not any uniform principle, comparing one union with another."⁽⁶⁾ Although this is arguably not what was required of the poor law valuation, it provides a good point from which to examine the principles which the valuers considered they were

applying in their work.*

A cursory look at the evidence of the valuers would strongly support Ferguson's opinion, for the researcher is inundated with different tests of value. Uniformity appears to be totally lacking. However, a pattern gradually emerges - broadly speaking, there were two principal approaches. The first of these could be called the 'cost of production' approach and the other the 'comfortable tenant' one.

The former approach was probably modelled on Griffith's instructions. (The Banbridge valuator was explicit in this.) He considered that a well-tilled farm should be one-fifth in pasture, one-fifth in green crops, one-fifth white crops, one-fifth oats and one-fifth hay or clover.⁽⁸⁾ He allowed $\frac{3}{4}$ of the gross produce to go to the farmer to pay for seed, labour, cess and tithes - plus his own remuneration. The remaining $\frac{1}{4}$ would be the net annual value of the land. The Kilkeel valuator followed a similar pattern, while the Sligo valuator considered one-third of the produce to be a fair rent, with the remainder being halved between outlay and enterprise.

* It should not be thought that the poor law valuers were overly impressed with the official valuations. The North Dublin valuator thought that Griffith's valuation was "so unequal that there would be more appeals against it than against the poor law valuations, were it not for the circumstance that it is on so low a scale that it is far below everybody's rent, and therefore no individual has a case which appear to be sustainable when his valuation is to be compared with the letting value of his holding."⁽⁷⁾ The Lisburn valuator rejected Griffith's work as he "would not be able to sustain it in a court of justice." Though in both cases it could be maintained that the valuers had a pecuniary interest in valuating afresh, the reasons offered at least in the first case are plausible. The pecuniary motive cannot be emphasized as many valuers attempted to give up the job as they considered the pay poor.

The Castlerea valuator deducted $\frac{1}{2}$ of the net product as rent after the costs of production had been met. Thus the approach afforded a rich diversity in application.

The 'comfortable tenant' approach was more common and can be briefly summarised; the 'fair' rent was that which a 'solvent tenant' holding a specified amount of land could live 'comfortably' on. This would not be possible if he was paying a 'rack-rent'. It is illuminating to examine what was meant by each of these provisions in turn. The Bandon valuator considered a solvent tenant to be one "who has capital, and can afford to pay the rent, whether he makes any thing out of the land or not; and, if his crop failed two or three times, he would still be able to pay." To the Gort valuator he was "a person who has sufficient capital to stock and cultivate his farm to the best advantage,"⁽⁹⁾ which would appear to be much less stringent.

The quantity of land which was required, if obtained at a 'fair' rent, to live comfortably on varied from 40-50 acres in Scariff to 10-15 in Dundalk. Since the type of acre used was not generally given it is not possible to be precise about the spread in area, except to say that it was considerable. However, many of the valuers were precise about what they took by 'comfortable'. At Newtownlimavady it was a diet of "potatoes and stirabout and milk at breakfast; meat or fish at dinner, and potatoes and milk in the evening," though in Clonmel it was a sufficiency of bread and milk every day, and meat 2-3 times a week.⁽¹⁰⁾ A 'rack-rent' was one which "a man may pay by living miserably"⁽¹¹⁾ though most of

the valuers were content to define it as one where the tenant failed to live comfortably.

To conclude from the above that there was no uniform principle to the valuation would be incorrect for neither of the approaches constitutes a general principle. With regard to the first case it is impossible to lay down guidelines for a well-tilled farm which do not take into account the quality of land or the ownership of livestock. Obviously the proportion of net produce allocated to rent would vary with the intensity of cultivation - the Kilkeel valuator, for instance, considered $\frac{1}{4}$ of the gross product a fair rent for tillage, but two-thirds for grazing.⁽¹²⁾

Moreover, there was no theoretical justification for either of these figures. The effect of size on the intensity of cultivation was pointed out by the Bandon valuator who noted that smallholders could pay relatively more in rent due to their rearing of pigs. It is interesting to note the way the Banbridge valuator got around this. He maintained that a tenant holding 20 Irish acres at a reasonable rent could afford to have a diet similar to the Newtownlimavady case quoted above. This is still deficient as a general principle. The Limerick valuator, for instance, reckoned that 10 acres of average land at a fair rent would allow the tenant enough of potatoes and milk through the year, with a pig to kill for bacon. So all the Banbridge valuator had done was to link up the costs of production to a subjective notion of what was 'comfortable'.⁽¹³⁾

What makes the Limerick case interesting is that the valuator goes on to say that many tenants who occupied 30 acres did not have the

standard of consumption he wished to see those of 10 acres having. A similar admission was made by the Parsonstown valuator, while the standard employed in Newtownlimavady appears to be too high to have been the general case. No amount of questioning over the meaning of "solvent", "comfortable" or "fair" can avoid collapsing into tautology in an attempt to give the basis of any particular standard of consumption.

It is likely that such notions were introduced by the circulars from the commission office. When the valuers realised they were to be questioned closely by a parliamentary team they were probably obliged to adopt the phraseology of the circulars, and thereby were trapped on numerous occasions. Moreover the team wanted to ascertain whether the poor law valuation would be able to serve as the qualification for the electoral franchise. It was thus principally concerned with uniformity between unions and would be interested in an area not central to the valuers. The team's report brought a communication from the Lord Lieutenant to the commission office and to judge from the tone of their subsequent letter to the boards of guardians, this was the first criticism they had heard.⁽¹⁴⁾ Thus it would appear that the local bodies were generally content. Again it must be stressed that what was required by the unions was a measure of relative taxable capacity.

The valuers would have been able to estimate the productivity of the land and would have readily appreciated the level of technical skill in a locality. The difficulty arises when a hypothetical example is introduced - let us say the case of an area which is heavily subdivided by poor tenants that would be suitable for grazing.

Would it be valued at the lower tillage rate or at market value?

The analysis can proceed in two directions. The first of these is the abstract approach, where it is supposed that the valuator, taking account of the general technical level in the region, could form an estimate of the maximum net output of a particular holding. Once this is determined the question is how this product is divided between landlord and tenant. This can be presented in several forms.

The tenant's share could be regarded as a return for enterprise while the landlord's was purely a return for land. The tenant could be taken as the co-proprietor of the land and thus we enter the field of tenant-right. This notion was used by the Roscrea valuator even though this was distant from the northern counties where tenant-right was recognized.

However, any approach along these lines returns to the initial problem of uniformity, except that the question is changed from whether the valuation is uniform to how did the valuator divide net product between landlord and tenant. Moreover, there exists a natural tendency with this approach to force the valuator's evidence into a particular mould. The central difficulty with the abstract approach is its distance from the market and from this the tendency to circular theoretical reasoning.

The valutors were not sophisticated and neither were they overpaid. They wanted to produce a valuation which would satisfy all parties and thus which would be accepted quickly. A series of objections would take time and delay their final payment. To picture them as

working out any elaborate scheme of valuation is simply not realistic. According to the third general report on the valuation, the valuers in "applying 'fair-rent' as a standard, the rents of the proprietor in the district, whose rents are the lowest, often appear to have been looked to as the level to which the valuation should be reduced."⁽¹⁵⁾ This distinction between the relative and absolute level of valuation is useful. The relative level would account for how different tenements in the same union were valued while the absolute level would be the variation in value of hypothetically identical tenements in different unions. We deal with the absolute first in conjunction with a study of the poor-law administration. The relative level is brought into the concluding section.

The most readily available indicator of the absolute level of valuation is the difference between the valuation and the level of average rents. The term "average rent" crops up in the extensive comments by poor law officials on the valuations in the Returns of Parliamentary Electors.⁽¹⁶⁾ The officials were asked to note the relation between the valuation and average rents. The comment relating to Cootehill Union may serve as an illustration:

"The average rating value of this union I consider to be from 15 to 20 per cent below the rents that solvent tenants might be reasonably expected to pay for the land. With the rents on large properties in the union, that are considered as moderately set, the rating value is, in general, nearly equal; but it is from 20 to 30, and even from 40 to 50 per cent below the present letting of other properties."⁽¹⁷⁾

Although it was held that large landowners were more moderate than small proprietors, the difficulty is in establishing the amount of direct letting by large landowners in a locality. We do have

statistics on the poor-law valuation of estates in each union⁽¹⁸⁾ but these will not necessarily be correlated with the statistics of head landlords being tenants' immediate lessors. Unfortunately these statistics are not in existence.

The simplest way to define the average rent of a union is to say that it was the rent most probably that would have to be paid to acquire the representative holding (by size and quality of land) of the union, if it appeared on the market. We can thus average out the effect of market imperfections. Before examining the link between the poor law valuation and average rents it is useful to note the interests of the various classes in rural society with respect to the valuation.

Since the cost of poor relief was to be raised by a poundage rate, the level of valuation appears irrelevant - the lower the level of valuation the higher the rate with the total amount being raised being the same. The original act, however, had made provision for tenants valued at less than £5. to transfer their rate liability to the landlord, provided he assented. (In 1843 it was made compulsory for the immediate lessor to pay the rate on all property valued less than £4. This was due to the difficulty experienced in collecting rates on small properties.⁽¹⁹⁾) For those valued above £5. the landlord was liable to pay half the rate and the tenant the remainder. Thus the small tenant had an interest in a low valuation while the landlord was better off with a high one. The division of rural society into landlords, small tenants (those who were near the £5. mark or below it) and large tenants (those who could not be valued at less than £5. given any acceptable level of

valuation) is useful for the analysis of motives of groups vis-a-vis the valuation level.

The interests of small tenants are clear. The tax on land would be deducted from the gross returns accruing to the factor. Thus the net return due to landlord and tenant (in as much as he was receiving an economic rent) would fall. Since rents tend to be sticky it is likely, in the short-run, that the rate paid by the tenant would be paid from the economic rent he received. Thus his income would be reduced. The small tenant would avoid this.

Given that he had to pay the rate, the large tenant would appear to have no interest in its level. A deeper insight was, however, provided by the Rathdown valuator. He found that there was "a general feeling among every man when he went on his land to depress the value of his tenement, and every one gave reasons why it should be low; many of them afterwards explained why they wished to have it low. The motives were these: they said it would be the basis on which all future taxation would be levied; and, secondly, it would affect the minds of the landlords when reletting. Leases were of course expiring, some lands are let from year to year, and they thought the valuation would help them make a good bargain."⁽²⁰⁾ This development actually occurred with the tenement valuation so the point was a fair one.

On the other hand, the indifference of landlords to the level of valuation in Lismore would suggest they would not have been influenced by it.⁽²¹⁾ Such nonchalance is not convincing for several reasons. Most important would be their liability for rates

being increased by a low valuation. In addition, the repeal movement was stirring again in Ireland and landlords would not be willing for tenants to be able to demonstrate that they were paying double what was considered by parliament to be a "reasonable" rent.

Thus the large landlord would be content to have the valuation at the same level as his rents which would generally be below average rents. Only if the valuation went below this would they use their considerable influence to reverse the trend.

Before proceeding it is useful to see how the above pressures would act upon the valuation in practice. The valuers were appointed by the boards of guardians or their valuation committee. The extent of supervision naturally varied from union to union. The board was mainly composed of members elected by rate payers. The maximum property qualification for becoming a guardian was £30. though the commissioners considered £10. the most preferable figure.⁽²²⁾

The franchise was limited to those valued greater than £5. Beyond this there were graduated divisions until those valued greater than £200. could cast six votes. It is thus likely that substantial farmers and landlords, or their representatives, would have controlled the board.

In addition to the elected members of the board, up to one-third could be appointed ex officio - these were mainly local justices of the peace. In Naas, the ex officio guardians were for a high valuation but were outvoted by the elected members. In Balrothery on the other hand, "the fact is undisputed, that landlords and tenants, ex officio guardians and elected guardians, appear to sympathize in the most

perfect manner with rate-payers of all degrees in moderating the amount of the valuation of their own land."⁽²³⁾ This pressure for moderation seems to have been appreciated by the valuers who, it was alleged, "all feel that a low valuation is by far the most desirable, the easiest made, the quickest made, with least trouble to themselves, and that by making a low valuation they got their money at once."⁽²⁴⁾

Even so, it was probably not the boards which influenced the valuers the most. For one thing they did not elicit much enthusiasm from the rural population. Of the elections which took place in 99 unions, guardians were returned without contest in 25.⁽²⁵⁾ Rather it was the system laid down in the act for objections to be raised by tenants. The valuations were published before the rate was struck and meetings to discuss objections were held in every electoral division. This would give free play for the tenants to exert their influence. A lot of objections would generally lead to an across the board reduction in the valuation of tenements. In Banbridge the valuator struck 10% off all tenements due to this and an even larger reduction was forced in Scariff.

Such a development would not only tend to reduce differences between electoral divisions but also between unions as tenants were able to appreciate the valuations carried out around them. This was the most influential factor in enforcing some uniformity on the poor law valuation. An additional factor would be that the valuers themselves would be conscious of work done in neighbouring unions - this also played a part in the Scariff reduction.

The relation between the absolute level of valuation and the average rent level was determined by the resolution of contradictory interests between landlords and tenants. They all had an interest in a low valuation as this would have implied a lower county rate if the poor law valuation was eventually used for this purpose. However, on the landlord side this would have been dominated by their desire for a high valuation to reduce their rate obligations on small holdings. Too high a valuation might have been politically embarrassing, as could one which was very low.

The small tenants were the group with the greatest interest in a low valuation. Their influence, however, was limited to their power of disruption by appeal. To those who investigated the valuation, the result of the conflict of interest was that the valuator took as a standard the local proprietor "whose rents are the lowest."

If the absolute level of the valuation was determined by local interests, we are left with the question of how holdings of different sizes and qualities were valued relatively. For example, in 24 cases where the valuator are explicit in the matter, 14 valued small tenancies higher than large ones, 9 as if the small tenancies had been let in large holdings and 1 valued large holdings higher. However, this latter case related to the heavily subdivided Armagh union. Presumably the level of rent on the smaller tenancies could not be increased possibly because the landlords did not feel secure enough to evict or because of having on the average large landlords, they were too "liberal" to evict.

Rather than pursue any breakdown of the practice of valuers, it is more profitable to consider the general issue. An elaborate procedure, such as that adopted by Griffith in the Townland Valuation, would have required considerable effort, both in execution and in defence in front of objectors. Effort was one thing the valuers wanted to minimise and it is inevitable that to do this they took the market value of the holding concerned. By market value we mean the rent that the holding would be expected to get if it was auctioned to a tenant capable of extended tenure (i.e. not at a rack rent that could not be met.)

The valuator's task would have been to abstract such influences as leases, moderate landlords, absentees etc. and to have presented a valuation which would have reflected a more efficient land market. Thus we would not expect an exact correlation between the value and the rent but rather the variation between the two would reflect local market conditions. However, the trend should be close. (This is seen most clearly in the evidence from Fermoy union where a large number of observations were produced.)

In concluding this section, we may say that the poor law valuation used the market for valuing between holdings within any union. Once we move from the relative to the absolute level of the valuation we have to take into consideration local interests. These would have tended to depress the absolute level of the valuation.

The Townland Valuation.

It is much easier to deal with the townland valuation compared to the poor law one. The instructions to the valuers, the way they executed them, their calibre and the external pressures they operated under can be summed up in one man. John Richard Griffith (1784-1878) was a geologist and civil engineer of distinction. He produced the first geological map of Ireland in 1815 and in the period 1822-30 was responsible for the construction of 250 miles of roads in the south-west. He was involved in many aspects of public life from the Shannon improvement scheme and the erection of the National Gallery to the sanitation of the Royal Barracks in Dublin. However, he was best known in Ireland for his work on valuation - the tenement valuation is known as "Griffith's valuation". His association with valuation began in 1827 when he was appointed commissioner under the Irish valuation acts though three years previously he was involved in the boundary commission which was a natural preliminary measure. He continued as commissioner of valuation until relieved by Ball Greene in 1868.⁽²⁶⁾

The purpose of the townland valuation was to provide an equitable basis for the levy of county assessments. In the early 1830's these amounted to £860,000 with the major elements being roads, county administration and the police.⁽²⁷⁾ Griffith did not believe there were sufficient good valuers in Ireland for a general valuation to be carried out simultaneously.⁽²⁸⁾ He was thus forced to adopt a method that would not be affected by annual fluctuations in agricultural prices. (The townland valuation commenced in 1830 and did not finish until the Famine.) He achieved this by using a

constant scale of prices. The valuation was made "to the rate (the land) would reasonably let for on a lease of say 21 years to a solvent tenant, supposing that the standard prices contained in the act were the then market prices."⁽²⁹⁾

The instructions for the valuation were produced in a booklet and provide a very detailed account of Griffith's approach. Particular emphasis was put on the quality of land. The valuers were urged to examine the soils carefully "for if guided by the appearance of the crops, he may frequently put a high price on bad land, highly manured; this would be unjust, as it is the intrinsic and not the temporary value of the land which is to be ascertained."⁽³⁰⁾

Griffith favoured the close examination of soil and subsoil and was happier if his men erred on the side of enthusiasm: "you had better over examine a lot" he told one of them, "than trust too much to probabilities."⁽³¹⁾

The townland valuation did not have to deal with tenements and thus the complications evident in the poor law valuation concerning the level of consumption did not arise. Though field boundaries were introduced in 1839⁽³²⁾ this did not affect the mode of valuing. Thus there were no difficulties in employing a detailed costs of production analysis to estimate the land's value. From this was calculated the return per acre for the varying qualities of soil. The depth of detail may be appreciated from the inclusion of the cost of cooperage for butter, the amount of grass a cow was estimated to consume per day and the rate of weight increase sheep had on good pastures.

However, the most detailed instructions are worthless if there is no supervision of their execution. Griffith did not expect a slavish application of his instructions but instead were to give an appreciation of the problem. He admitted that the valuers "had their own system of valuing according to the scale they usually adopted."⁽³³⁾ In the first instance they "were directed to value as if they were employed by one of the principal landlords of the country to let the land, say on a lease of 21 years."⁽³⁴⁾

This ensured that the land was valued with a constant letting policy in mind and would be unaffected by the local variations in the average size of estates.

Although Griffith estimated that the valuation was generally equal to the rents of the great proprietors but were 20-40% below middle men and small proprietors, this does not affect the issue of uniformity. It only makes the townland valuation unsuited for an estimate of the Irish rental where variation in letting policy would be crucial.

Before dealing with Griffith's supervision of the valuation, it is first necessary to gauge the type of individual he employed. He was certainly particular. No one could be employed as a valuator unless he was also a land surveyor and draughtsman, in addition to being a valuator.⁽³⁵⁾ Once appointed he required the approval of Griffith in his choice of surveyor. Griffith expected dedication from his staff - if a man "appears to be suited to the very difficult task of valuing according to a fixed standard of prices, and still preserve the relative value of the different qualities of land ... in this case all his other business must be given up, and his whole time,

and thoughts devoted to the valuation."⁽³⁶⁾ The valuator had to be out in the field every day, no matter what the weather, "unless the ground be covered with snow."⁽³⁷⁾ Although it is unlikely that the valuers totally acquired Griffith's enthusiasm or obeyed his strictures to the letter, it is impossible not to feel the atmosphere of dedication which comes from reading Griffith's letters on the subject. No doubt many were caught up with it and this increased standards.

Several examples from the letter-books serve to illustrate the supervision which Griffith exercised on the practical side of the valuation. After there had been an objection to the allowance given by the local valuers for the effect of the climate on a mountain area, Griffith himself agreed to go to give the final opinion. This was over whether the reduction should be 5 or 10%.⁽³⁸⁾ In another case he advocated that particular attention be given to some low, flat and cold lands which he considered to have been valued too low - not only was the quality of the soil to be taken into account but also the herbage. Such land was natural meadow and produced a crop for the farmer at no expense.⁽³⁹⁾

Elsewhere he deducted 9d.-1/= in the pound from a locality because the market price of oats in Omagh is lower by $\frac{1}{4}$ - $\frac{1}{2}$ of that of Strabane.⁽⁴⁰⁾ In addition to such examples there was a regular stream of questions throughout the period concerning the interpretation of the act - if a landlord had let a house to two independent individuals, would this be considered one or two tenements? (Griffith agreed it depended upon the number of outside doors.)⁽⁴¹⁾

Certainly Griffith's supervision of the valuation was close and thus it is reasonable to assume that the principles embodied in his instructions were carried into effect. However, it should not be thought that there was no interaction between the local valuator and the commissioner. For instance, after setting down his ideas on the effect the steepness of the ground had on the annual value he invited the comments of the valuers and to judge by a letter he took them into account.⁽⁴²⁾

Once a primary valuation had been completed a check valuator was sent over the locality to give his assessment. If there was serious discrepancy either Griffith became involved personally or he sent an experienced man. Thus there was the minimal possible compromise of uniformity. The system did not totally revolve around the personality of Griffith but he was ever present, either giving the final word on a particular problem or reprimanding a member of staff for laxity. The former duties were particularly evident in the early period of the valuation as might be expected - as time progressed less personal involvement was required. Griffith's attitude is best caught in the following reprimand : "This is a painful letter for me to write" he told P. Daly "and you to receive, but you must feel I am only doing what my duty imperatively requires."⁽⁴³⁾

There was no contradiction in Griffith's directive to value as a large northern landowner would have and the costs of production approach contained in his booklet of instructions. Rather the latter would have provided a benchmark against which the changes in the letting policy of the landowners concerned, brought about by the change in agricultural prices, could be calibrated. The costs of

production estimated by Griffith were primarily a guide and not an absolute measure of the economic potential of different qualities of land. Griffith was explicit on this point when he was discussing his revision of the primary valuations: "if I go to the north, or the south, or the west", he told a select committee, "and I find the same quality of land differently farmed, I put a different value upon it in proportion to the value of the produce obtained."⁽⁴⁴⁾ In such situations the "high-rent value is rather the want of skill and industry on the part of the tenants than any want of value in the land", which, "if properly tilled, would be cheap at the present rent."⁽⁴⁵⁾

We may thus consider the townland valuation as a measure of the economic potential of land in a district if the prices contained in the act prevailed, if it was let at the level of northern landlords, adjusted for the pre-Famine distribution of technical efficiency. Since the valuation assumed a constant letting policy, we can take the valuation as a measure of the productive capacity of the soil, adjusted for local technical efficiency. Perhaps the terms productive capacity and economic potential should be more precisely defined. In general equilibrium we should expect the return to factors to tend toward their marginal products. However, in the short run we would not expect a competitive equilibrium to be established in an underdeveloped economy. In such circumstances it is reasonable to use the concept of a surplus generated by production. This would accrue to land and enterprise. Its division between landlord and tenant would depend on many factors. This division was not relevant to the townland valuation; rather it measured the overall magnitude of the surplus. (More precisely the townland valuation of land did

this. All houses valued less than £5. were exempted and those valued higher were assessed at two-thirds of the fair rent. The poor-law valuation rated all property.)

By valuing to a constant set of prices, any two townlands could be compared directly. The difficulty is that this comparison is only valid for the given set of prices. If relative prices change, let us say to favour dry cattle as opposed to tillage products, then the value of grazing land would be expected to rise relative to that of tillage. Given that the distribution of the various types of land would be different between townlands, the ratio of the valuations under one set of prices would not be an accurate statement of their relative potential under another.

Just how damaging this is to the utilisation of the valuation is essentially an empirical matter. As long as the change in relative prices is not dramatic it is likely that the ratio of townland valuations would be proportional to their relative economic potential. This might mean that non-linear relationships should be explored. However, farming units tend to produce several products, which means that most could participate in relative price changes. In the above example, smallholdings can benefit from a swing to store cattle by their production of calves. Thus we would expect that valuation to a constant set of prices would not give an unduly restricted result.

A comparison between the Poor Law and the Townland Valuation.

The most satisfactory way of analysing statistically the poor law valuation would be by using explanatory variables not related to the other valuations. Our interpretation of the poor law valuation suggests that it was proportional to average rents. The divergence from the rental was due to local factors such as the proportion of smallholders among tenants. However, if we are comparing unions then it is possible that there are factors which systematically affect the level of rents, quite apart from the valuations. Large landlords were thought to have relatively low rents and thus unions with a high proportion of large landlords would be expected to have a relatively low level of average rents. Also the Ulster Custom was thought to lead to a lower average rent level.

Thus in attempting to analyse the level of the poor law valuation relative to average rents we must consider two separate influences - those on the valuers (proxied by average holding size and population density) and those on the rent level. If we look at Regressions (1-3) on Table A-1-1 we see that the results are extremely poor. However, we do not have to reject our interpretation at once. The data concerning the relationship between the poor law valuation and the average rent level comprises of remarks made by local union officials and must be considered to be very rough.

If we suspect this data then we must establish another testable hypothesis concerning the poor law valuation. This we have achieved by employing the townland valuation, interpreted as giving a measure of the potential surplus generated by the factor land. Regression (4) indicates how closely the two valuations were linked. The fit is

improved by a small amount if we add a dummy variable for the Ulster counties and another as a proxy for estate size.

In order to remove the correlation between the two valuations in Regressions (6-7) we take their ratio. Although the R^2 values are low, the results are encouraging considering the imperfections of the data - for instance, through their treatment of houses the two valuations are not strictly comparable, estate valuation takes no account of middlemen. The improvement in R^2 from 0.161 to 0.178 due to the inclusion of the average holding variable gives some support, despite its low t-ratio, for the interpretation of the poor law valuation given above. This of course is conditional upon the interpretation given to the townland valuation. The most we can say of the statistical evidence in conclusion, is that it does not contradict our interpretation of the valuations.

Table A-1-1.

Let X_1 = Poor Law Valuation.

X_2 = Townland Valuation.

X_3 = % Poor Law Valuation was below average rents.

X_4 = Proportion of Poor Law Valuation accounted for by landlords with estates valued greater than £5,000.

X_5 = Average holding.

X_6 = Dummy variable for unions in Ulster.

X_7 = P.L.U. Area.

X_8 = 1841 Population.

$$(1) \quad X_3 = -14.87 + 5.05 X_1/X_7$$

(1.34)

$$R^2 = 0.03 \quad F \text{ test} = 1.8$$

$$(2) \quad X_3 = -6.88 + 12.19 X_2/X_7 - 19.03 X_8/X_7 + 2.83 X_6 - 0.19 X_5$$

(1.42) (1.04) (1.12) (1.00)

$$R^2 = 0.05 \quad F \text{ test} = 0.7$$

$$(3) \quad \log(100 - X_4) = 2.041 - 0.02 \log X_2$$

(1.07)

$$R^2 = 0.02 \quad F \text{ test} = 1.2$$

$$(4) \quad X_1 = 6,863 + 1.089 X_2$$

(20.71)

$$R^2 = 0.88 \quad F \text{ test} = 428.7 \quad \bar{R}^2 = 0.873$$

$$(5) \quad X_1 = -2,808 + 1.126 X_2 + 7,373 X_6 + 444.7 X_4$$

(22.43) (2.16) (3.03)

$$R^2 = 0.90 \quad F \text{ test} = 185.8 \quad \bar{R}^2 = 0.899$$

$$(6) \quad X_1/X_2 = 1.12 + 0.005 X_4 + 0.097 X_6$$

(2.45) (2.22)

$$R^2 = 0.19 \quad F \text{ test} = 6.95 \quad \bar{R}^2 = 0.161$$

$$(7) \quad X_1/X_2 = 1.04 + 0.003 X_5 + 0.004 X_4 + 0.122 X_6$$

(1.50) (2.25) (2.64)

$$R^2 = 0.22 \quad F \text{ test} = 5.49 \quad \bar{R}^2 = 0.178$$

Statistical sources:

for X_1, X_2, X_5, X_7, X_8 see Table 3-8.

X_4 calculated from Poor Laws Appendix H.

X_3 contained in Returns of parliamentary electors; also of tenements valued under the act 1 and 2 Vic. cap.56 for relief of the poor in Ireland, PP1844, Vol 43.

The Tenement Valuation.

The tenement valuation, brought in by 9 and 10 Vict. c.110, appears to have been a hybrid of the two earlier valuations. All tenements were to be valued according to the fair letting value though the scale of prices approach of the townland valuation was continued until 1850/51.⁽⁴⁶⁾ The tenement valuation was forced to be much more dependent on rents than the townland.⁽⁴⁷⁾ In fact, some of Griffith's problems are a carbon copy of difficulties that the poor law valuation had to face. Consider this example where Griffith is deliberating over the influence he should afford a large liberal landlord, the Duke of Devonshire, in a particular locality; "If I take the Duke's lettings as the criterion of rent value, the valuation will be 8s.4d. in the pound under the lettings of the several proprietors of the neighbouring district, the effect of doing so will be to saddle them with the greater part of the poor law rating and perhaps unjustly, while if we adjust the scale of value taken by the valuator it will show that the Duke of Devonshire is an excellent landlord who lets his land perhaps at an uncommonly low rate."⁽⁴⁸⁾ This is quite a remarkable throw back to the poor law valuation and illustrates again the difficulties the latter body had to deal with.

Griffith's admission that the "valuation by tenements according to the fair letting value is more difficult to effect by a valuator not locally acquainted with the district, than our original system of relative valuation"⁽⁴⁹⁾ is a partial vindication of the poor law valuation's employment of farmer and others with local knowledge.

The criticism levelled against the tenement valuation was of a different kind to that faced by the poor law valuation. In contrast to the latter, there was no real argument about the valuation between unions. Rather it was the relative valuation of different types of land within unions that was criticized; in particular poor tillage land was set high and good grazing low. Several other witnesses supported Lynam's position that taking "the same class of land, and comparing the different holdings in the same class, I think that the valuation is, perhaps, as relative and fair as anyone could reasonably expect; but if you take different classes of land the valuation is not relative."⁽⁵⁰⁾

The tenement valuation compounds the disadvantages of its predecessors. It was guided by the actual rental like the poor law valuation. In fact, when Griffith found, as he moved westwards, he was approaching too close to the level of rent, he struck 25% off the valuation of Roscommon.⁽⁵¹⁾ However, it is difficult to suggest a systematic relationship between the tenement valuation and the rent level since, unlike the poor law valuation it was executed over several decades, when the rent level was moving as were additional factors such as rates. Since it needed rents, the attributes of the constant scale of prices were lost to it.

Perhaps this point is the best place to conclude this section. It emphasises the central facet of the valuations. Although potentially most informative, their utilisation requires caution.

REFERENCES TO APPENDIX I.

- (1) 1 and 2 Vict. c.56 s LXIV.
- (2) Copies of all instructions issued by the Poor Law Commissioners to the valutors in Ireland, PP1841, Vol 21, P4,8,10.
- (3) Reports relative to the valuations for poor rates, and to the registered elective franchise, in Ireland, PP1841, Vols 22-23, (henceforth PLV Reports)
- (4) Report from the select committee on general valuation, &c. (Ireland), PP1868-9, Vol 9, Q1418 (henceforth 1868-9 Report).
- (5) PROI, 1A 50 20, Poor Law Commissioners Letter Books, letters of 4/7/1840 and 8/9/1841 concerning Swineford Union and 12/11/1840 concerning Ballina.
- (6) Report from the select committee on townland valuation of Ireland, PP1844, Vol 7, Q465, (henceforth 1844 Report).
- (7) PLV Reports, Vol 23, P361b, 17b.
- (8) *ibid.*, P4b.
- (9) *ibid.*, Vol 22, P78; Vol 23, P199b.
- (10) *ibid.*, Vol 22, P164, 138.
- (11) *ibid.*, P84.
- (12) *ibid.*, P195.
- (13) *ibid.*, Vol 23, P415b; Vol 22, P23.
- (14) Poor Law Commissioners Letter Book, letter of 3/3/1841.
- (15) PLV Reports, Vol 23, Pxxxii.
- (16) Returns of parliamentary electors; also of tenements valued under the act 1 and 2 Vict. cap.56 for relief of the poor in Ireland, PP1844, Vol 43.
- (17) *ibid.*, P80.
- (18) Reports from the select committee of the House of Lords appointed to inquire into the operation of the Irish Poor Law, PP1849, Vol 16, Appendix H.
- (19) Report from the select committee of the House of Lords appointed to inquire into the operation of the Irish Poor Law Acts relative to the rating of immediate lessors, PP1847-48, Vol 17, Q5.
- (20) PLV Reports, Vol 23, P242-243b.
- (21) *ibid.*, P314b.

- (22) Nicholls, G., A history of the Irish-Poor Law, London, 1856, P238.
- (23) PLV Reports, Vol 23, P275b; Vol 22, P3.
- (24) *ibid.*, Vol 23, P244b.
- (25) Nicholls, G., *op.cit.*,
- (26) Dictionary of National Biography.
- (27) Letter Book, Valuation Office, PROI OL2 (2), "General order" dated 22/3/1832.
- (28) 1868-9 Report, Q1418.
- (29) Letter Book, OL2 (7), 28/4/1841.
- (30) Griffith, R., General valuation of Ireland; Instructions to valuers and surveyors, P13-14.
- (31) Letter Book, OL2 (8), 29/11/1842.
- (32) 1844 Report, Q206.
- (33) *ibid.*, Q28.
- (34) *ibid.*, Q28.
- (35) Letter Book, OL2(3), 20/3/1834; there was a similar attention to the surveyor's qualification. In a letter to J.Kelly he notes "Mr Griffith wishes that no surveyor be employed in the county by any valuator until he first knows something of his qualifications", OL2(11), 20/1/1845.
- (36) Letter Book OL2(1), 12/9/1829.
- (37) Letter Book OL2(2), 29/6/1832.
- (38) *ibid.*, 24/9/1833.
- (39) *ibid.*, 1/12/1834.
- (40) *ibid.*, 18/6/1834.
- (41) *ibid.*, 14/6/1834.
- (42) *ibid.*, 1/12/1834; 18/2/1835.
- (43) OL2(11), 17/2/1845; also 24/3/1845, 5/4/1845, 25/4/1846.
- (44) 1844 Report, Q14b.
- (45) *ibid.*, Q133.
- (46) 1868-9 Report, Q1934.
- (47) *ibid.*, Q3821.

- (48) Letter Book, OL2(11), 7/9/1848.
- (49) *ibid.*, 6/5/1847; also 21/10/1844.
- (50) 1868-9 Report, Q2794; also Q2795-98; Q2253; Q4204.
- (51) Poor Laws, Q254; Q257; Q262.

BIBLIOGRAPHY.

(1) MANUSCRIPT MATERIAL.

National Library of Ireland. Larcom Papers.
Public Records Office (Dublin). Valuation Office Papers.

(2) NEWSPAPERS AND CONTEMPORARY JOURNALS.

Cork Examiner.
Northern Whig.
Purdon's Irish farmer's and gardener's almanack.
The Irish farmer's and gardener's magazine and register
of rural affairs.
The Irish farmers' Journal.
Thom's Irish almanac and official directory.
Tipperary Vindicator.

(3) GOVERNMENT PUBLICATIONS.

(a) Annual.

Agricultural Returns.
Reports of the commissioners for administering the laws for
the relief of the poor in Ireland.
Reports of the Poor Law Commissioners (Ireland).

(b) Other.

First report of His Majesty's commission of inquiry into the
condition of the poorer classes in Ireland, PP1835, Vol 32;
PP1836, Vol 30-34.
Reports relative to the valuations for poor rates, and to the
registered elective franchise, in Ireland, PP1841, Vols 22-23.
Copies of all instructions issued by the poor law commissioners
to the valuers in Ireland, explanatory of their duties,
and of the poor relief act, in regard to the making of
valuations by virtue thereof, PP1841, Vol 21.
Report of the commissioners appointed to take the census of
Ireland, for the year 1841, PP1843, Vol 24.
Report from the select committee on townland valuation of
Ireland, PP1844, Vol 7.
Report from Her Majesty's commissioners of inquiry into the
state of the law and practice in respect to the occupation
of land in Ireland, PP1845, Vols 19-22.
Correspondence explanatory of the measures adopted by Her
Majesty's government for the relief of distress arising
from the failure of the potato crop in Ireland, PP1846, Vol 37.
Reports of the board of public works in Ireland, relating to
measures adopted for the relief of distress, in March, April
and May, 1847, PP1847, Vol 17.
Correspondence from July, 1846, to January, 1847, relating to
the measures adopted for the relief of the distress in
Ireland, PP1847, Vols 50-51,53.

BIBLIOGRAPHY (Contd.)

- Correspondence, from January to March 1847, relating to the measures adopted for the relief of the distress in Ireland, PP1847, Vol 52.
- Copies or extracts of correspondence relating to the state of union workhouses in Ireland, PP1847, Vol 55.
- Reports of the relief commissioners; 1st to 4th, PP1847, Vol 17; 5th to 7th, PP1847/48, Vol 29.
- Papers relating to proceedings for the relief of the distress, and state of the unions and workhouses, in Ireland, PP1847/48, Vols 54-56.
- Reports from the select committee on poor laws (Ireland), PP1849, Vol 15.
- Papers relating to proceedings for the relief of the distress, and state of unions and workhouses, in Ireland, PP1849, Vol 48.
- Reports and returns relating to evictions in the Kilrush union, PP1849, Vol 49.
- Report from the select committee of the House of Lords on the Treasury minute, providing for the debts due from counties and unions in Ireland by the imposition of a consolidated annuity, PP1852, Vol 6.
- The census of Ireland for the year 1851, PP1856, Vol 31.
- Sixth report of the medical officer to the Privy Council, 1863, PP1864, Vol 28.
- Report from the select committee on general valuation, (Ireland), PP1868-69, Vol 9.

(4) CONTEMPORARY PRINTED MATERIAL.

- Balch, W.S., Ireland, as I saw it: the character, condition, and prospects of the people, New York, 1850.
- Barrington, R.M., The prices of some agricultural produce and the cost of farm labour for the past fifty years, JSSISI, Vol 9, 1886-87.
- Beaumont, G.de, Ireland: social, political, and religious, London, 1839.
- Bennet, W., Narrative of a recent journey of six weeks in Ireland, London, 1847.
- Bonn, M.J., Modern Ireland and her agrarian problem, Dublin, 1906.
- Caird, J., The plantation scheme; or, the west of Ireland as a field for investment, Edinburgh, 1850.
- Coyne, W.P., (ed), Ireland: industrial and agricultural, Dublin, 1902.
- Dill, E.M., The mystery solved; or, Ireland's miseries; the grand cause, and cure, Edinburgh, 1852.
- Doyle, M., A cyclopaedia of practical husbandry and rural affairs in general, London, 1844.
- Elly, S., Potatoes, pigs, and politics, the curse of Ireland, and the cause of England's embarrassments, London, n.d.
- Forbes, J., Memorandums of a tour in Ireland, London, 1853.
- Foster, T.C., Letters on the condition of the people of Ireland, London, 1846.

BIBLIOGRAPHY (Contd.)

- Griffith, R., General valuation of Ireland: Instructions to valuers and surveyors, Dublin, 1853.
- Hancock, W.N., Report on the supposed progressive decline of Irish prosperity, Dublin, 1863.
- Hill, Lord G., Facts from Gweedore, (facsimile reprint of 1887 edition with introduction by E.E. Evans) Belfast, 1971.
- Hussey, S.M., The reminiscences of an Irish land agent, London, 1904.
- Kane, R., The industrial resources of Ireland, Dublin, 1844.
- Kohl, J.G., Travels in Ireland, London, 1844.
- Lewis, G.C., Local disturbances in Ireland, Cork, 1877 (reprint of 1836).
- Locke, J., Ireland: observations on the people, the land, and the law, in 1851, Dublin, 1852.
- n.a. The farmer's guide, compiled for the use of the small farmers and cotter tenantry of Ireland, Dublin, 1842.
- n.a. The Irish farmer's and gardener's register, and manual of practical horticulture, floriculture etc., Dublin, 1844.
- n.a. Report of the British Association for the relief of the extreme distress in Ireland and Scotland, London, 1849.
- n.a. Help for Ireland, by an "Anglo-Irishman" of forty years' farming experience in Ireland, London, 1880.
- Nicholls, G., A history of the Irish poor law, in connection with the condition of the people, London, 1856.
- O'Rourke, J., The history of the great Irish famine of 1847, with notices of earlier Irish famines, Dublin, 1875.
- Osborne, S.G., Gleanings in the west of Ireland, London, 1850.
- Pim, J., The condition and prospects of Ireland and the evils arising from the present distribution of landed property: with suggestions for a remedy, Dublin, 1848.
- Rogers, J.W., The potato truck system of Ireland: the main cause of her periodic famines and of the non-payment of her rents, London, 1847.
- Rosse, Earl of, Letters on the state of Ireland, London, 1847.
- Scrope, G.P., The Irish difficulty; and how it must be met, London, 1849.
- Senior, N.W., Journals, conversations and essays relating to Ireland, London, 1868.
- Skilling, T., The science and practice of agriculture, Dublin, 1846.
- Society of Friends, Transactions of the central relief committee of the Society of Friends during the Famine, Dublin, 1852.
- Stark, A.G., The south of Ireland in 1850; being the journal of a tour in Leinster and Munster, Dublin, 1850.
- Sullivan, A.M., New Ireland, London, 1877.
- Thompson, H.S., Ireland in 1839 and 1869, London, 1870.
- Trench, W.S., Realities of Irish life, London, 1966 (first published 1868).
- Trevelyan, C., The Irish crisis, London, 1880.
- Tuke, J.H., A visit to Connaught in the autumn of 1847, London, 1848.
- Weld, I., Statistical survey of the county of Roscommon, Dublin, 1832.

BIBLIOGRAPHY (Contd.)

(5) ECONOMIC HISTORY - RECENT BOOKS.

- Arensberg, C.M., *The Irish countryman: an antropological study*, New York, 1950.
- Barrow, G.L., *The emergence of the Irish banking system, 1820-1845*, Dublin, 1975.
- Black, R.D.C., *Economic thought and the Irish question, 1817-1870*, Cambridge, 1960.
- Connolly, J., *Labour in Irish history*, Dublin, 1910.
- Crotty, R.D., *Irish agricultural production*, Dublin, 1966.
- Cullen, L.M., *An economic history of Ireland since 1660*, London, 1972.
- Cullen, L.M. and Smout, T.C.(ed), *Comparative aspects of Scottish and Irish economic and social history 1600-1900*, Edinburgh, 1977.
- Donnelly, J.S., *The land and people of nineteenth-century Cork: the rural economy and the land question*, London, 1975.
- Edwards, R.D. and Williams, T.D.(ed), *The Great Famine: studies in Irish history 1845-52*, Dublin, 1956.
- Evans, E.E., *Irish heritage; the landscape, the people, and their work*, Dundalk, 1942.
- Freeman, T.W., *Pre-Famine Ireland: a study in historical geography*, Manchester, 1957.
- Lynch, P. and Vaizey, J., *Guinness's brewery in the Irish economy, 1759-1876*, Cambridge, 1960.
- Maguire, W.A., *The Downshire estates in Ireland 1801-1845*, Oxford, 1972.
- O'Donovan, J., *The economic history of livestock in Ireland*, Dublin, 1940.
- Pomfret, J.E., *The struggle for land in Ireland, 1800-1923*, Princeton, 1930.
- Schrier, A., *Ireland and the American emigration 1850-1900*, Minneapolis, 1958.
- Solow, B.L., *The land question and the Irish economy, 1870-1903*, Cambridge, Mass., 1971.
- Stamp, J.C., *British incomes and property: the application of official statistics to economic problems*, London, 1916.

(6) ECONOMIC HISTORY - RECENT ARTICLES.

- Barrington, T., "The yields of Irish tillage food crops since the year 1847", *Dept. of Agriculture and Technical Instruction for Ireland, Journal*, Vol 21.
- Barrington, T., "A review of Irish agricultural prices", *JSSISI*, Vol 15, 1927.
- Bourke, P.M.A., "The extent of the potato crop in Ireland at the time of the Famine", *JSSISI*, Vol 19, 1959.
- Bourke, P.M.A., "The agricultural statistics of the 1841 census of Ireland: a critical review", *Economic History Review*, 2nd series, Vol 18, 1965.
- Bourke, P.M.A., "The use of the potato crop in pre-Famine Ireland", *JSSISI*, Vol 21, 1968.

BIBLIOGRAPHY (Contd.)

- Bourke, P.M.A., "The average yields of food crops in Ireland on the eve of the Great Famine", Dept. of Agriculture and Fisheries, Journal, Vol 66, 1969.
- Bourke, P.M.A., "The Irish grain trade, 1939-48", Irish Historical Studies, Vol 20, 1976-7.
- Burn, W.L., "Free trade in land: an aspect of the Irish question", Transactions of the Royal Historical Society, 4th series, Vol 31, 1949.
- Connell, K.H., "The colonisation of waste land in Ireland, 1780-1845", Economic History Review, 2nd series, Vol 3, 1950-51.
- Cousens, S.H., "The regional pattern of emigration during the Great Irish Famine, 1846-51", Institute of British Geographers, Transactions and Papers, 1960.
- Cousens, S.H., "Regional death rates in Ireland during the Great Famine, from 1846 to 1851", Population Studies, Vol 14, 1960-61.
- Cousens, S.H., "Emigration and demographic change in Ireland, 1851-1861", Economic History Review, 2nd series, Vol 14, 1961-1962.
- Griffiths, A.R.G., "The Irish board of works in the Famine years", The Historical Journal, Vol 13, 1970.
- Johnson, J.H., "Harvest migration from nineteenth century Ireland", Institute of British Geographers, Transactions, No 41, 1967.
- Lee, J., "Irish agriculture", Agricultural History Review, Vol 17, 1969.
- Lee, J., "The dual economy in Ireland, 1800-50", Historical Studies, Vol 7, 1971.
- Lee, J., "The Ribbonmen", in T.D. Williams, (ed), Secret Societies in Ireland, Dublin, 1973.
- Lyons, J., "The History of our dairying industry", Agricultural Ireland, Vol 16, 1959.
- O'Neill, T.P., "Food problems during the Great Irish Famine", Journal of the Royal Society of Antiquaries of Ireland, Vol 82, 1952.
- O'Neill, T.P., "Clare and Irish poverty, 1815-1851", Studia Hibernica, No 14, 1974.
- O'Grada, C., "Seasonal immigration and post-famine adjustment in the west of Ireland", Studia Hibernica, No 13, 1973.
- O'Grada, C., "The investment behaviour of Irish landlords 1850-75: some preliminary findings", Agricultural History Review, Vol 23, 1975.
- O'Grada, C., "Supply responsiveness in Irish agriculture in the nineteenth century", Economic History Review, 2nd series, Vol 28, 1975.
- O'Grada, C., "Agricultural head rents, pre-Famine and post-Famine", Economic and Social Review, Vol 5, 1974.
- Staehle, H., "Statistical notes on the economic history of Irish agriculture, 1847-1913", JSSISI, Vol 17, 1951.
- Walsh, T., Ryan, P.F., and Kilroy, J., "A half century of fertilizer and lime use in Ireland", JSSISI, Vol 19, 1957.

BIBLIOGRAPHY (Contd.)

(7) UNPUBLISHED THESES.

- Armstrong, D.L., "An economic history of agriculture in Northern Ireland, 1850-1900", Ph.D, Q.U.B.
- Bourke, P.M.A., "The potato, blight, weather, and the Irish Famine", Ph.D, University College Cork, 1967.
- Holt, J.H., "The Quakers in the Great Irish Famine", M.Litt, Dublin University (Trinity), 1969.
- Keep, G.R.C., "The Irish migration to North America in the second half of the nineteenth century", Ph.D, Dublin University, 1951.

(8) ECONOMICS.

- Alchian, A.A., "Information costs, pricing, and resource unemployment", in Phelps, E.S.(ed), Microeconomic Foundations of employment and inflation theory, London, 1971.
- Alchian, A.A. and Demsetz, H., "Production, information costs, and economic organisation", American Economic Review, Vol 62, 1972.
- Bellerby, J.R., "Distribution of farm income in the United Kingdom, 1867-1938", Journal of Proceedings of the Agricultural Economics Society, Vol 10, 1953.
- Henderson, J.M. and Quandt, R.E., Microeconomic theory, New York, 1971.
- Hicks, J.R., Value and capital: an enquiry into some fundamental principles of economic theory, London, 1939.
- Intriligator, M.D., Mathematical optimization and economic theory, New Jersey, 1971.
- Johnston, J., Econometric methods, New York, 1972.
- Maddala, G.S., Econometrics, Tokyo, 1977.
- Nerlove, M., The dynamics of supply: estimation of farmers' response to price, Baltimore, 1958.
- Pfouts, R.W., "The theory of cost and production in the multi-product firm", Econometrica, Vol 29, 1961.
- Robbins, L., "On the elasticity of demand for income in terms of effort", Economica, 1930.