

HARVEST TECHNOLOGY AND LABOUR SUPPLY IN BRITAIN, 1790-1870

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ABBREVIATIONS.

The following abbreviations have been used in the footnotes:-

1. Agricultural History Review, Ag. Hist. Rev.
2. Economic History Review, Ec. Hist. Rev.
3. Gardener's Chronicle and Agricultural Gazette, Agricultural Gazette.
4. Journal of the Bath and West of England Society and Southern Counties Association, J. Bath and West.
5. Journal of the Royal Agricultural Society of England, JRASE.
6. Journal of the Royal Statistical Society, J.R. Stat. Soc.
7. Journal of the Statistical Society, J. Stat. Soc.
8. Royal Commission on the Employment of Children, Young Persons and Women in Agriculture (1867), R.C. Employment (1867)
9. Transactions of the Highland and Agricultural Society, Trans. Highland Soc.

HARVEST TECHNOLOGY AND LABOUR SUPPLY IN BRITAIN, 1790-1870.

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ABSTRACT

This thesis tries to establish a functional relationship between the supply and supply price of labour, product-mix and choice of technology in British agriculture during the period 1700-1870. The desiderata, increased production and lower unit production costs were in many respects incompatible with those of full-employment and greater social welfare. Historians have been primarily concerned with just one aspect of this problem, namely structural unemployment during the winter months. This is to ignore that the chief limiting factor on increased production may often have been the capacity of the labour force during the summer work-bottlenecks. This thesis argues that over a large part of the proto-industrial period (1790-1870), British agriculture was afflicted by sometimes very serious labour shortages in the summer work peaks. It goes on to a detailed case-study of labour supply and technological change in the corn harvest, the farm operation which historically has always created the exceptional demand for labour, and in which labour shortages were soonest likely to develop. It demonstrates that initially, at least, and for some time after 1851, when reaping machinery became available, the majority of farmers obtained their labour and labour cost-savings not through mechanization but by a more intensive use of labour (the more

thorough exploitation of child and female labour, greater dependence on migrant harvesters and the introduction of piecework), and, when the supply of labour became inelastic, by the 'intermediate technology' of improved hand tools, in particular the substitution of the faster-working scythe and heavy hook for the traditional sickle and reap hook. The advantages of this strategy were that it conserved capital, that it did not disrupt other work schedules, and perhaps most important, that it averted unemployment over what for the majority of farm labourers and their families was the key earnings period of the year. It met the requirements for a technology which was discontinuous enough to guarantee production and flexible enough to guarantee employment. The conclusion is that there is a phase of economic development in which factor proportions render a scythe economically and socially more useful than a reaping machine.

CHAPTER I.

THE ROLE OF LABOUR AND TECHNOLOGY IN A DEVELOPING AGRICULTURE.

Interest in the contribution of agriculture to British economic growth has largely centred on the productivity breakthroughs of the seventeenth and eighteenth centuries. Subsequently, during the early (proto) industrial stage of economic growth, agriculture's product and factor-shedding contributions have been so much taken for granted that it could almost be concluded that after 1790 agriculture left the mainstream of economic history to become a discrete and closely defined area of study entrusted to a few specialist historians.⁽¹⁾

The onus of this thesis is not to depict agriculture as a 'leading sector' of proto-industrial economic growth. The aim will be, first, to establish a functional relationship between two key variables in agricultural production, namely labour supply and type of technology, and second, to discover how this helped or hindered agriculture fulfil its very important role as the developing economy's residual employer of labour. It is this residual employer role which has been consistently overlooked by economic and specialist labour historians. Yet, the common experience of all the advanced economies is that their rural populations expanded continuously throughout the proto-industrial period, and declined only at a relatively late stage of economic growth. In Britain, absolute decline set in only in the 1850's, that is some 60 years after the so-called 'take-off'. The failure of an industrial start

to bring about an immediate reduction in the size of farm populations has recently been brought home to many present day under-developed countries, and has required a radical revision of development strategy.

Arithmetically though, it can be demonstrated that in the early stages of economic growth, when the proportion of the population occupied in agriculture is around or above 50 per cent, urban employment cannot expand fast enough to take off the whole of the rural population increase. Thus it was that the British agricultural labour force grew by 25 per cent between 1800 and 1850, even though, over the same period, the proportion of the national workforce engaged in agriculture, forestry and fishing fell from 36 per cent to 22 per cent, and numbers employed in trade and manufacturing industry more than trebled.⁽²⁾

Why was it that employment opportunities outside agriculture did not expand fast enough to bring about a much earlier reduction in the size of the agricultural labour force? Partly, this is explained by the very rapid increase in the rate of population growth which occurred after 1750. But partly as well, it reflects the fact that during the early stages of industrialization the 'spread' effects of technological progress in creating new employment outside manufacturing industry are weak, while the 'backwash' effects in cutting back employment in traditional crafts and industries are strong. Thus over a large part of Britain rural populations were expanding at the same time as rural and cottage industries were declining, thereby transforming many mixed economies, offering a wide range of employment opportunities, into purely agricultural ones. The expansion and relocation of manufacturing industry in north Britain tended to isolate the rural labour surpluses of east

and south Britain from their chief source of alternative employment. As it was, jobs in the new industrial areas were filled either locally, or by cottiers and crofters from the congested and agriculturally uncompetitive upland zones of north and west Britain, who were often already highly mobile by virtue of their seasonal migrations in search of harvest work, and skilled in some branch of domestic industry.⁽³⁾ A further constraint on the mobility of male agricultural workers was that in many of the expanding industries, particularly textiles, the demand was more for child and female rather than male labour.⁽⁴⁾

The effects of the Settlement Laws in immobilising rural labour are often exaggerated.⁽⁵⁾ From what is known about rural migration in the late eighteenth century and during the Napoleonic War years, it would appear that given an expanding labour market, farm workers were extremely mobile. Rather, the more operative constraint was that significant expansion in those industries which could best provide farm workers with alternative employment - construction, mining, trade and transport - the great consumers of unskilled casual labour - began only relatively late on in the proto-industrial period, after 1835. It can further be concluded that in the early industrial economy, infrastructural and social overhead investment tended to lag behind investment in production, a suggestion which is at least partly borne out by the following breakdown of the Occupational Census Returns.

Estimated Industrial Distribution of the British Workforce, 1801-1871.

(in millions of persons)

	<u>Agriculture Forestry Fishing</u>	<u>Mining & Quarrying</u>	<u>Manufacturing</u>	<u>Building</u>	<u>Trade & Transport</u>	<u>Domestic & Personal</u>
1801	1.7		1.4		.5	.6
1811	1.8		1.7		.6	.7
1821	1.8		2.4		.8	.8
1831	1.9		3.0		.9	.9
1841	2.1	.2	2.7	.4	1.2	1.2
1851	2.0	.4	3.2	.5	1.5	1.3
1861	1.8	.5	3.6	.6	1.8	1.5
1871	1.7	.6	3.9	.8	2.4	1.8

Source. P. Deane and W.A. Cole, British Economic Growth, 1688-1959
(Cambridge, 2nd. edn, 1967), p.143.

Comparing the industrial distribution of the national workforce in the two periods 1801-41 and 1841-71, the most striking feature is the extremely rapid expansion in the latter period of workers employed in non-manufacturing industry. Of new employment created between 1801-41, 47 per cent was in manufacturing and only 29 per cent in trade, transport, mining and quarrying (and this on the generous assumption that numbers in mining, quarrying and building doubled between 1801 and 1841), while between 1841-71, the respective proportions were 32 per cent and 52 per cent. In the

categories, mining, quarrying, building trade, transport and domestic service, the average annual growth rate increased from an estimated 1.2 per cent in 1801-41 to 2.2 per cent in 1841-71. Correspondingly, the first reduction of the full-time agricultural labour force occurred in the early 1850's.

Agriculture's role in the developing economy was three-fold. First, it had to provide food and raw materials to the rapidly expanding urban and industrial sector and to shed labour at low opportunity cost. Second, it was important that increased productivity was secured by means which did not consume large doses of capital or involve large transfers of capital and income from other areas of the economy. And thirdly, it had to support a large, and for the greater part of the proto-industrial period, an expanding, rural population.

At first sight, the desiderata, increased production, low unit production costs and full employment, might appear incompatible, but it was a fact nonetheless that during the period 1750-1870, agriculture more or less satisfied all three requirements. Its product contribution was especially impressive. Between 1750 and 1800, at worst, production only just failed to keep pace with population growth. Between 1801/11 and 1861/71 real product increased by over 90 per cent and average real (per head of the occupied population in the sector) product by almost 80 per cent. Most remarkably, over the 40 years, 1821/31 - 1861/71, the growth in average real product seems actually to have exceeded that of most other industries. (6) In the light of these achievements the Classical Economists have most properly been derided as poor prophets. They

had envisaged a situation in which technological change could provide increasing returns in industry but not in agriculture. Thus, they were able to conceptualise a slowing down of economic growth as population increased and the supply of fertile land ran out. That agriculture did not run into diminishing average returns was a function, first, of the productive response of the less naturally fertile soils to larger inputs of capital and labour within the existing technology, and second, of the extent to which agriculture was able to adapt its production function to match very precisely changes in its factor endowment.

The chief characteristic feature of British agricultural production during the proto-industrial period was its sparing use of capital and intensive use of land and labour. Its technology mix was based on inexpensive, land-saving, labour-consuming biological inputs. No great use was made of off-farm fertilizers and feeding-stuffs or of labour-saving machinery until at least 1840. As late as 1870 roots and legumes were still the bases of high-output farming in Britain, and the majority of farm tasks were then still performed by labour-intensive methods. The bias, therefore, was towards products and processes amenable to an intensive use of agriculture's cheapest factor of production, namely, labour.

Thus it was that an expanding farm labour force was able to play a key role in both increased production and fixed capital (in land) formation. In view of labour's special contribution, it is surprising that so far no serious attempt has been made either to evaluate it, or to establish a functional relationship between labour supply and production techniques. Rather, agricultural historians have been primarily concerned with the farm workers' social condition and have tended to ignore the fact that the village was a highly

complex socio-economic unit, within which agriculture was both producer of food and residual employer of labour.

Historians are now generally agreed that the Agricultural Revolution had its roots in the seventeenth century and that by 1750 important gains in farm productivity had already been secured. Even so, it is quite clear that these earlier achievements served only as a launching pad for the much more vigorous phase of innovating activity which began after 1750, characterised by the more widespread adoption of root and fodder crops and large scale enclosure and reclamation.

The conventional model for explaining this upsurge of activity is one that stresses rising prices.⁽⁸⁾ This emphasis on demand factors tends, however, to ignore other important conjunctions related directly or indirectly to labour supply and demand. The first was that within rising prices, livestock prices tended to increase relatively faster than cereal prices, thus stimulating the development of land and labour intensive mixed farming. The second was that most of the reclaimable land was light land, the profitable cultivation of which was very much dependant on the use of labour-intensive root and fodder crops. And the third, and concomitantly, was that after 1750 the agricultural labour force increased, its supply became more elastic and its price relative to that of other factors of production fell. This is to say that after 1750 certain farming systems were able to use labour more intensively in both fixed capital formation (land reclamation and enclosure making) and in increased production (through land-saving technologies).

We would expect, therefore, a fairly close correlation between rural population growth, the supply price of labour, and choice of technology. Recent research has confirmed that after

almost a century of stagnation, or at best only very slow growth, population began to grow again from the 1740's. It has been estimated that the population of the 'agricultural' counties of England and Wales increased by 25 per cent between 1750 and 1800 and by a further 25 per cent between 1800 and 1850. (9)

The extreme labour-intensiveness of the new technologies can be easily demonstrated. In turnip cultivation, upwards of 20 worker-days per acre were required for the field operations alone. In turnip hoeing average daily work rates seldom exceeded 0.3 acres. In 'spade husbandry', a practice which gained considerable ground in the more labour-flush districts of southern Britain in the immediate post-Napoleonic War decades, 14-21 worker-days were expended per acre of arable land and up to 40 days per acre of old meadow land. In potato cultivation, 3 man days per acre were consumed in planting and 4-6 days in harvesting. In paring and burning, a method for converting old grassland to arable land and one closely associated with lightland reclamation, labour input often exceeded 15 man days per acre. (10)

Prior to 1750 it would appear that in most areas of Britain the supply of labour was too inelastic for it to be used intensively in crop production. To embrace the new land-saving technologies farmers required not only more labour per se, but also more female and child labour, whose price per unit of work output in the light repetitive tasks, such as weeding, hoeing, stone-picking and twitch-gathering, was lower than that of male labour. Between the Civil War and the 1770's there were persistent complaints both of physical shortages of labour and of the 'idleness' of the working population. In 1750 Josiah Tucker lamented how labourers became, 'more vicious, more indigent and

idle in proportion to the advance in wages', a sentiment which 20 years later was still being re-echoed by Arthur Young. Indeed, Physiocrats and Mercantilists were always drawing unfavourable comparisons between the European workman and his oriental counterpart, the diligent Chinese peasant, whom, they claimed, suffered 'not a weed upon the surface of the earth'.⁽¹¹⁾

Up to 1750 there may well have existed a real hostility on the part of some rural workers towards regular wage labour in agriculture. In the highly diversified pre-industrial economy, with its many small farms and cottier holdings and close physical integration of agriculture and cottage industry, self-employment may have enjoyed a higher status than wage-work, which was regarded perhaps as 'economic dependence on others', as tantamount to servility and 'loss of birthright'.⁽¹²⁾ Some may have resented a pattern of work discipline ruled by the clock rather than by the demands of the task and season.⁽¹³⁾ This did not mean that agriculture was necessarily denied the services of the cottier, village tradesman or cottage industrialist at its work peaks, but rather that the small man, once his subsistence level had been reached, may sometimes have preferred under-employment elsewhere to wage work in agriculture. The chief bone of contention was that the new technologies required, 'more constant labourers men who have no other means of support than their daily labour, men whom they [the farmers] can depend on'.⁽¹⁴⁾ This consideration underlay much of farmers' hostility towards cottage smallholdings and home industry which threatened to deprive agriculture of the elastic supply of labour necessary to meet the highly fluctuating demands of a complex and overlapping range of farm tasks.

The early eighteenth century farm labour market is still

very much an unknown quantity, but evidence suggests that it was tight. We know, for example, that between 1700 and 1750 real wages were much higher than in the seventeenth and the later eighteenth centuries.⁽¹⁵⁾ Especially indicative is that the basis of Jethro Tull's 'horse-hoeing husbandry' was the horse-hoe, a labour-saving device, rather than the hand-hoe. Tull claimed that 'plough servants first began to exalt dominion over their master', in the 1690's, and that he had then even considered putting the whole of his farm down to sanfoin because of the exorbitant price of labour, of which, 'a vast quantity is necessary to corn more than St. Foin.' By the 1720's the situation had deteriorated further to the point at which haymakers, who formerly had worked well into the evening, had 'taken upon them to make what hours they please in this matter; they have limited the hour of leaving work to six o'clock and I have seen them going home at four when they did not begin till nine or ten in the morning and rest a good part of the day besides'. Tull's 'drill' husbandry, and with it, the horse hoe, must be viewed, therefore, as his response to a deteriorating farm labour market. For as he explained, with the hand-hoe, 'the expense was great, and the operation not half performed, by the deceitfulness of the hoers, who left half the land unhoed, and covered it with the earth from the part they did hoe, and then the grass and weeds grow the faster'. 'Besides' he added, 'in this manner a great quantity of land could not be managed in the proper season'.⁽¹⁶⁾

Predictably, labour would have been scarcer on the light-lands, where the opportunities for land reclamation and root and fodder crop cultivation were greatest. The second half of the eighteenth century, however, went a long way to fulfilling Mercant-

ilist demands for faster population growth and a straightening out of labour's alleged 'backward-sloping' supply curve. By 1800, Young had become converted to the need for more employment to alleviate rural distress. He urged the adoption of more land-intensive methods not only to boost production but also because he believed, 'the want of labour is likely to become a very dangerous want, and one that should be instantly supplied'.⁽¹⁷⁾ A more proper distinction could now be drawn between 'voluntary' and 'enforced' idleness. Rapid population growth, larger families, the decay of rural cottage industry, enclosure, farm consolidation, and the forcing out of squatters and small farmers, had all contributed to a spectacular growth of the landless labourer class and made for a more perfect division of labour in the countryside. The rigidity of the British landholding structure and its strict adherence to the principle of primo-geniture acted against a possible 'European' solution to rural overpopulation, whereby holdings were subdivided and units of subsistence production multiplied. This meant that in Britain, the bulk of the rural population increase was thrown onto the farm labour market, and that unemployment ought theoretically to have been more frequently 'open' than 'disguised'.

From 1750, therefore, British arable farming, and particularly its lightland sector, was able to make greater use of land-saving root and fodder crops. Farm account and other evidence suggests that prior to 1750 the less labour-intensive grasses and legumes - clover, sanfoin and ryegrass - were more popular than the more labour-consuming turnip, which was regarded primarily as an ancilliary livestock feed, its total acreage even on the very largest farms seldom exceeding 15-20.⁽¹⁸⁾ Subsequently, the national turnip area began rapidly to expand while the position of

the root shift within lightland rotations became progressively more central, to occupy eventually between 15 and 25 per cent of the arable area.

Turnip-hoeing, because it was so labour-consuming, serves as a fairly reliable indicator of this drive to labour-intensiveness. Farmers knew only too well the close correlation between weed-control and crop yield, and as labour became more abundant they were able to increase the frequency of hoeing until by the 1820's they were hoeing two and three times during the growing season. Indicatively, in the 1760's, only in East Anglia, an area of already dense rural population and of growing industrial unemployment, was turnip hoeing regularly practiced.⁽¹⁹⁾ As late as 1783, Marshall complained that, outside East Anglia, it was still 'a mystery known only to gardeners and a few individuals, who though inexpert, have it in their power to make high prices'; but even here, turnip hoeing was at this stage still very much dependent on the casual labour of 'manufacturers' and other 'handicraftmen' who hoed most of the late sown crops'.⁽²⁰⁾

By 1800 most farmers were hoeing their turnips at least once, but because of the intervention of the Napoleonic Wars and their often highly disruptive effects on the farm labour market, complaints about shortages of turnip hoers continued until 1815.⁽²¹⁾ In Dorset, for example, it was reported in 1812, that because of the high price of labour some farmers actually preferred 'ploughing up a very weedy crop and sowing the land anew, rather than go to the expense of hoeing it'.⁽²²⁾ In Berkshire, weeding and hoeing were, it was claimed, not always performed 'in a perfect manner, nor with the proper implements'.⁽²³⁾ Evidence from Cambridgeshire suggests that as late as 1811 there were still some areas in which

a major constraint on the adoption of a more intensive root culture may have been the unpreparedness of local workmen to apply themselves to the unfamiliar and very monotonous task of turnip hoeing. Gooch reported the art as 'not well known by the inhabitants, the work is done by persons who travel the country for that purpose and who make great earnings'.⁽²⁴⁾ A century earlier, Edward Lisle, at Crux Easton, Wiltshire, had been obliged to hire turnip hoers from the distant village of Newton whose inhabitants were specially skilled in the art.⁽²⁵⁾

Another labour-consuming technology which came much into favour after 1750 was that of 'dibbling', that is sowing seed (usually wheat or beans) in individual holes, as opposed to broadcast-or drill-sowing. According to Young, dibbling had been practiced in the early seventeenth century but had subsequently fallen into disuse.⁽²⁶⁾ If so, its introduction into East Norfolk in the 1760's was rather a revival than a conspicuous innovation.⁽²⁷⁾ Its chief advantages were said to be, first, that it saved seed, and second, and more significantly, that it provided 'a very lucrative employment for many of the poor, who would at that season (autumn) have little to do'.⁽²⁸⁾ At Bocking, Essex, the incentive to dibbling wheat was precisely stated as the poverty and low wages associated with the decline there of the weaving trade.⁽²⁹⁾

Paring and burning was another important growth technology. Though known in south-west England since medieval times, it was described in 1830 as a method which 'has been but a few years generally practiced in any part of the Kingdom, and it was but little practiced, till within the last sixty years, on the Cotswolds in Gloucestershire, where now, with the adjoining parts of Oxfordshire, it is so extremely and upon some lands so uniformly adopted, that

it became a striking feature in the rural economy of that district'. (30)

After 1835, as labour became scarcer, paring and burning gave way to the paring-plough, the spade to the horse-plough, the dibble to the drill and the hand-hoe to the horse-hoe.

We may conclude, therefore, that between 1750 and 1830 there occurred a significant shift of the farm production function towards a more intensive use of land and labour. We must not assume, however, that all farming systems were equally able to exploit labour as a cheap factor of production, for their capacity to do so was very much conditional on soil and physical environment favouring the spread of mixed farming and the cultivation of root crops. Which is to say that the lightland sector was better placed than the heavyland to increase production, lower unit production costs and raise labour inputs.

There was, however, a second condition, namely that the supply of labour was adequate to meet the demands of all the work peaks and also that farmers could afford to support their peak labour force during the less busy times of the farming year. We return to the problem of reconciling high production and full employment. For having obtained enough labour to see them through the busy summer months, farmers were responsible for maintaining this workforce during the slack winter months, when perhaps full employment could not be guaranteed. A great deal hinged, therefore, on the seasonal distribution of labour requirements and on the average struck between labour productivity in the high and low activity periods. We will go on then to look more closely at the seasonal distribution of labour demand.

III

In all non-mechanised agricultures crop production has always been characterised by the extremely uneven seasonal spread of its workload, and in temperate latitudes, by the greatest concentration of activity in the summer months. As a general rule, the higher the proportion of corn to total cultivated area the greater the disparity of labour requirement between the warm and cold seasons. The introduction of root and fodder crops into corn and bare-fallow rotations lengthened the working season and raised the aggregate level of summer labour demand, but without necessarily reducing demand at the corn harvest, which in most arable farming systems constituted the absolute work peak.

Statistical data illustrating seasonal work-spread are notoriously scarce for the nineteenth century. Farm account evidence is seldom satisfactory, first, because detailed labour records are very scarce, and second, because in piecework operations, such as turnip hoeing and hay and corn harvest, in which whole families often worked together, farmers tended not to record the names of all their workers but only those, usually the senior members of families, with whom the piecework contract had been made. The only detailed published statistics available are those collected by some of the Assistant Commissioners serving the Royal Commission on the Employment of Children, Young Persons and Women in Agriculture (1867). These are summarised below. At this relatively late stage (1867-9), labour-saving machinery was already extensively used on most of the larger farms in the samples with the result that

the ratio of summer workers to winter workers was probably much lower than in, say, 1800.

SEASONAL DISTRIBUTION OF LABOUR ON SELECTED FARMS 1867-9. (31)

	<u>SPRING</u>	<u>SUMMER</u>	<u>AUTUMN</u>	<u>WINTER</u>
<u>OXFORDSHIRE</u> (16,636 acres, 70 % arable)	925	1065	960	814
<u>NORTH EAST SCOTLAND</u> (10,989 acres, 95 % arable)	473	477	564	403
<u>BERKSHIRE I</u> (20,221 acres, 75 % arable)	1051	1122	-	927
<u>BERKSHIRE II</u> (5541 acres, 60 % arable)	364	677	-	332

Of the four samples, only one, Berkshire II, includes the extra workers taken on for the corn harvest. It is immediately apparent, however, that the farm work force in summer was very much larger than in any other season. In Oxfordshire it was 31 per cent larger than in winter, in north-east Scotland 40 per cent, and in Berkshire I, 21 per cent. The Berkshire II sample establishes the corn harvest as far and above the absolute work peak, with numbers employed more than double the winter total, and if compared with the Berkshire I sample, over 60 per cent larger than the average summer workforce. Moreover, the summer totals appear to exclude young children, large numbers of whom often worked alongside their parents, especially at harvest. The data also conceal that in summer the working day was 20 per cent longer than in winter (daylight factor), and that in certain operations, such as hay and corn harvest, up to 60 per cent longer. In rush years work might continue well into the evening, or if the moon was full, perhaps into the night. Thus summertime required not only higher labour participation ratios - larger numbers of female, child,

migrant and casual workers - but also a much expanded supply of effort.

Ideally, of course, we should want to construct a long-run (1790-1870) demand curve for labour. Theoretically this could be done by fixing work norms for every farm task and applying them to known crop areas and livestock populations. In practice, however, such a method is simply not on. Properly detailed crop and stock statistics are not available till 1866, while technology mixes were so complex, the composition of the summer workforce so polyglot and the bases of task allotment so variable as to render the concept of an 'average' work-norm quite meaningless.

The dichotomy of the farming year into summer rush and winter slack dominated contemporary attitudes towards labour employment and productivity. It presented two distinct yet closely linked, sets of problems. Historians have been chiefly concerned with the social effects of winter unemployment. Seasonal unemployment was, it is true, a social fact, but, and more fundamentally, it was also a technical and demographic fact. Technical, that is, because in crop production the seasonal pattern of labour demand is biologically induced. And demographic, because in agriculture, the residual employment sector, there is no a priori reason to expect that labour supply and demand should in practice balance out.

During the immediate post-Napoleonic War decades expenditure on Poor Relief represented only a very small (3-4 per cent) proportion of national income, and of this sum rather less than 20 per cent appears to have been expended in the form of direct wage subsidies. (32) This suggests that even during this, the most labour-glutted period of modern British economic history, 'open'

unemployment was by no means as universally acute as some historians have had us believe. Admittedly in some areas it was high, particularly in the clayland zones of south Britain, where the technical constraints on intensive mixed-farming were greatest.⁽³³⁾ The weight of evidence suggests, though, that seasonal unemployment was more 'disguised' than 'open' due to deliberate and calculated lowering of standards of labour productivity so as to spread work and income among as large a proportion of the working population as possible.

My suggestion is that the strain of maintaining rural populations during low-employment periods was taken more on wages than on the Poor Law. As Morton pointed out, farmers could not just single out a few men and pay them well, they had 'to maintain all in that parish, either in the field or in the workhouse'.⁽³⁵⁾ Most farmers regarded it as part of the social duty to provide work rather than charity, to employ as many men as possible, and to prevent wages falling as low as the market would permit.⁽³⁶⁾ Before 1865, when the Union Chargeability Act came into force, it was usual for farmers to help the men of their parish over the winter, 'by giving them odd jobs at the lowest wage which would induce them to remain, and serve at the same time to keep men off the rates'.⁽³⁷⁾ The 'roundsman' and 'labour rate' systems were favourite devices for work spreading, and part of the standard formula for transferring the onus of finding work onto those who benefitted most from the presence of a large labour force at other times of the year.⁽³⁸⁾ Another common practice was to give first choice of winter work to married men with families and second choice to their dependents.⁽³⁹⁾ The flail became symbolised as the chief provider of winter work. In Cambridgeshire it was known as the 'poverty stick', and some local vestries were actually prepared to subsidize farmers willing

to use it. (40)

Farmers understood only too well the close correlation between wage rates and labour productivity, and between scale of technology and labour input. In return for low wages they expected no more than a minimum of effort. As Caird explained, the average productivity of labour depended on the numbers seeking work, for raising the productivity of the few could only 'diminish the employment of the many for whom work must be found'. (41) The poverty of the countryside relative to the towns was part attributed to the fact that agriculture had, 'a certain number of labourers to employ and we [the farmers] do not find it in our interests to work them very hard'. (42) Labourers thought in similar vein. They preferred day-work to piece-work, that is, moderate work and low wages to hard work and high wages, because it made for more continuous employment. (43) During the period 1815-35, the Wages Fund and Subsistence Wage theories may accurately have described the workings of many local farm labour markets in southern Britain.

The extremes of low labour productivity belong, of course, to the relatively short period 1815-1835. After 1835, and particularly after 1850, the labour market tightened, farm technologies became more recognisably labour-saving and standards of labour productivity improved. (44) The case still holds, though, and is supported by our statistics of seasonal labour distribution in the late 1860's, that throughout the proto-industrial period British arable farming was afflicted by this disparity between its summer and winter labour requirements.

We have examined that end of the farming year in which the demand for labour was weakest, the supply of labour most elastic and labour productivity lowest. But low levels of labour productivity

during the months November to March were offset by relatively much higher levels of labour productivity from April to October. Farmers were often able to justify the retention of a large workforce over the winter on the grounds that in summer, and at harvest time in particular, it was indispensable. It was argued wrong 'to call a soldier supernumerary when he is not fighting.... If a man is actually necessary in harvest but not for the rest of the year, he must be kept during the year for the sake of the harvest'.⁽⁴⁵⁾ One of the subsidiary arguments advanced in favour of allotments was that they helped keep men in the parish during the summer.⁽⁴⁶⁾ Clearly then, farmers regarded average labour productivity over the longer run as more important than low or even zero marginal productivity over the shorter run. In the strictest sense, therefore, there may have been no removeable 'labour surplus' because the product and technology mix guaranteed full employment at the work peaks.⁽⁴⁷⁾ However, we must allow for the possibility that for part of the time (notably 1815-34), labour was so well supplied that key operations could be performed, using all the labour available, well within the time limit, with the result that if labour was removed, the remainder could produce the same work output by working harder and longer. This is to say that the surplus was 'disguised' in the sense not that too much labour was being spent, but that too many labourers were spending it.

These theoretical considerations do not, however, detract from the fact that during summertime the problems tended to be of an altogether different order from those in winter. For in the final analysis, perhaps the chief limiting factor on increased production was the capacity of the labour force at the work bottlenecks. The demand in summer was for a large and extremely elastic supply.

of labour to meet the high and fluctuating demands of a range of overlapping farm tasks in which timeliness and meticulous attention to detail were all important. This called for higher labour participation ratios, a much increased supply of effort, and, when the local labour pool ran dry, the taking-on of non-agricultural and migrant workers. For the farm worker, summertime meant enhanced family earning power, better paid, more continuous employment, more piecework and greater bargaining power.

This thesis will argue that between 1790 and 1870 summer labour demand increased faster than summer labour supply. It will also argue against the conventional view that labour shortage and its associated demand for labour-saving factors did not develop until the third quarter of the nineteenth century.⁽⁴⁸⁾ Statistics

of crop production are virtually non-existent before 1866, but assuming constant per capita consumption and making allowances for net imports it can be estimated that total cereal production increased by between 50 and 70 per cent between 1790 and 1850, and declined only very slightly, by less than 10 per cent, between 1850 and 1870.⁽⁴⁹⁾ Production of roots (turnips, swedes, mangolds and potatoes) is more problematical, but contemporary evidence suggests that root values increased very substantially between 1790 and 1870. The contemporary estimates, for what they are worth, claim that the root and green crop acreage of England and Wales doubled between 1812 and 1854, from 1.2 million to 2.4 million acres. We are on surer ground if we say that their combined acreage in 1650 was zero, in 1870 (according to Agricultural Statistics) almost 3.0 million acres, and that much the greater part of the intervening gain was secured after 1750.⁽⁵⁰⁾

The translation of increased production into summer work

requirements, into weeding, hoeing and harvesting, suggests immediately that at constant techniques crop demand increased faster than labour supply. Between 1790 and 1850 total crop production increased by at least 50 per cent while numbers of full time agricultural workers grew by only 25 per cent. Between 1851 and 1871, the occupational census records that the English agricultural labour force fell by 22 per cent, from 1.254 million to 0.980 million, while, even on the unlikely assumption that all 'casual' labourers were employed in agriculture, the total hired work force would still have fallen by 6 per cent. (51)

A key question is whether, in fact, the long run supply curve of summer labour was different from that implied by the occupational censuses. Little is known about the structure and mechanisms of the nineteenth century farm labour market. It is clear, though, that the occupational census does not describe the peak agricultural workforce, and that because it was taken in Spring it excludes or else enumerates under some non-agricultural head, the majority of casual and part-time workers employed in agriculture during the summer work peaks. In 1921 seasonal agricultural workers in England and Wales numbered over 200,000 and represented about 20 per cent of the peak farm workforce. (52) A century earlier their numbers would have been immeasurably greater, and in many arable areas they would probably have exceeded those of full-time workers. The chief complication was that the summer workforce was so much less homogeneous than the winter workforce. Within it we can discern at least six categories of worker - full-time, migrant, part-time industrial, female, child and itinerant - each with its own long-run and short-run supply curve.

The size of the summer workforce depended therefore on

the interaction of many factors. But we can assume that within the proto-industrial labour market, the geographical and occupational mobility of labour increased, with the underlying tendency for it to move out of agriculture where opportunities for large earnings were few, and confined to just a few weeks of the year, into other industries where wages were higher and employment more continuous. By the 1850's, and in some areas, even by the 1830's, employers had discovered that farm labour was imperfectly distributed relative to demand and that they could no longer rely on the assistance of urban and industrial workers during the summer peaks. The Settlement Laws and the 'open' and 'closed' village system were condemned as operating against the 'free circulation of labour', in so far as 'chain it to the spot where it is not wanted and [check] its natural flow into the place where it is required'. (53)

But it was the shorter-run, inter-seasonal fluctuations of the summer farm labour market which gave greatest cause for alarm. An evenly-phased deterioration would have been met by a carefully phased introduction of labour and labour-cost saving factors. However, the long run was made up of a number of abrupt and often unpredictable contractions and expansions of the labour market in which the supply and supply price of labour varied according to the state of the trade cycle on the one side, and weather, crop yield and crop condition on the other. The one regulated the stock of summer work opportunities outside agriculture and therefore the rate of rural migration. The other the level of on-farm labour demand. Such extreme discontinuities imposed a heavy strain on both labour and technology to the extent that in certain operations labour productivity might have had to vary by as much as 30-40 per cent between one season and another.

IV

Between 1790 and 1870 there must have occurred, therefore, a substantial improvement in standards of work productivity over the whole range of summer operations, of an order which could have been achieved only through technological change. The key question is whether labour-saving technologies were introduced with a view only to save labour, i.e. to reduce labour costs per unit of output, or, with a view primarily to free working capital for further investment in production, i.e. to increase output per unit of capital input. One would have created unemployment, the other held out the possibility that the whole or part of the labour saved might be redeployed elsewhere on the farm. The ideal was a technology which provided acceptable labour-savings, which made for increased production and which also created new work.

There were many reasons, however, why, in the proto-industrial economy, it may not always have been possible to satisfy all the economic and social requirements. The chief threat was that of 'overkill', for now, and for the first time, farmers had access to labour-saving machines which compared to hand tools, afforded large and often spectacular labour savings. Moreover, the substitution of one technology for another is seldom straightforward and as a general rule, the more discontinuous and more costly the technology, the more radical the adjustments which have to be made. At this stage, probably very few farmers were equipped to work out the effects on their profits of choosing to take the cost strain on capital rather than

labour. What may have been economic for the large farm may have been uneconomic for the smaller unit, and the risks of it not being so were always greater if the innovator had no discretion as to scale, and if the technology was indivisible, that is, if, because of the particular nature or timing of the task, the capital costs could not be shared between a number of farmers through either co-operative purchase or by hiring. Another disadvantage of costly machinery was that it tied the farmer to fixed payments over good times and bad, while the more expensive the machine the less was the effect of a reduction in wage levels on running costs. Mechanization could even have meant reduced flexibility. Compared to the machine the human agent may often have been the more versatile and more discriminating piece of equipment. A further risk, and in some farming systems a very real one, was that labour saving in one operation might displace workers who, earlier or later on in the year, were essential for others. Indeed, in this situation, with so many alternatives open to him, it was unlikely that the farmer would ever arrive at an optimum method mix. The highly fluctuating nature of the proto-industrial farm labour market was in itself a serious inhibitor of the smooth non-disruptive flow of labour-saving factors. This was because innovation usually occurred during upturns of the trade cycle, when labour was temporarily scarce, with the result that cyclical and technological unemployment often ran together in the downswings when the supply position improved.

In short, we are suggesting that even if a new method was as proficient as the old, and this was by no means always the case, the social and economic costs of technological change could be extremely high. For the reasons, one, that the resultant method mix might not approximate to an optimum usage of factors of production,

and two, that too much labour might be displaced. The desideratum was a continuous flow of new technology which used capital and labour in the right proportions, which was flexible enough to guarantee production, but continuous enough to guarantee employment. This is to visualise a highly fluid technological spectrum, along and across which capital could take many forms and labour could employ a wide range of skills.

One of the major problems of developing agricultures is that of choosing between alternative technique of production, for the number of alternatives open to them is often large, while capital/output and capital/labour ratios can vary widely from technique to technique and from product to product. This thesis will go on to examine the relationship between labour supply and scale of technology in the corn harvest, the farm operation which historically has always created the exceptional demand for labour, but which, paradoxically, was among the last to be mechanised. In 1870, with sowing, threshing, hoeing and livestock feed preparation largely performed by machine or horse-drawn implements, 75 per cent of the British corn area was still harvested by hand tools. The anomaly is an interesting one, and has not gone unnoticed. Indeed, Derry and Williams, the technological historians, could offer no explanation of why, 'the reaping machines invented in Britain and America from 1780 onwards were left ineffective for more than half a century'.⁽⁵⁴⁾

- 1 In their recent work on British economic growth, Phyllis Deane and W. A. Cole devoted less than 20 of their 335 pages to agriculture, British Economic Growth, 1688-1959 (Cambridge, 2nd edn, 1967). The only detailed discussion of the role of agriculture in economic growth presently available is E.L. Jones, ed, Agriculture & Economic Growth, 1650-1815 (1967), pp. 1-48.
2. Deane & Cole, op.cit, pp.142-5. In France & Germany, where 'take-off' occurred in 1830-50, rural populations did not decline absolutely until after 1900. In Japan, following 'take-off' in the 1890's, reduction came only in the 1950's, although but for the intervention of World War II, this would probably have occurred in the 1940's. For general discussion, see, F. Dovring, 'The Transformation of European Agriculture', in H.J. Habakkuk & M. Postan, eds, Cambridge Economic History of Europe, VI (Cambridge, 1965).
3. I refer, of course, to the Irish, Scottish and North Welsh migration flows whose contribution to the growth of the industrial labour force of Lancashire, the West Midlands and the Central Lowlands was of critical importance. For a good general summary, see, A. Redford, Labour Migration in England, 1800-1850 (Manchester 2nd edn, 1964), Chaps. II, VIII, IX and passim
4. This was especially so in cotton, see J.H. Clapham, An Economic History of Modern Britain (Cambridge, 2nd edn, 1950), I, 72.
5. For the effects of the Settlement Laws on migration, see, Redford, op.cit, pp. 81-96. Southern labourers seldom migrated to the northern industrial towns, even when demand for labour there was running high and migration was encouraged by the Poor Law Commissioners. ibid, pp. 97-117. I am inclined to the view that at times of serious unemployment a 'settlement' rather than an incumbrance was regarded by many as a positive advantage. It enabled agricultural parishes more easily to fulfil their 'residual employer' role.
6. Deane & Cole, op.cit, pp. 170-3.
7. See Jones, op.cit, pp. 1-21, 152-193; J.D. Chambers & G.E. Mingay, The Agricultural Revolution, 1750-1880 (1966), pp. 15-33; Charles Wilson, England's Apprenticeship (1965), pp. 141-159, 243-262.
8. For example, Chambers & Mingay, op.cit, pp.38-40
9. Deane & Cole, op.cit, pp. 103-6.

10. As calculated from:- Primrose McConnell, The Agricultural Notebook (8th edn, 1910), pp. 70-87; J.C. Morton, Hand Book of Farm Labour (1868 edn), pp. 71-136, passim; British Husbandry (S.P.C.K.), I (1834), p.354. I have benefitted here from lengthy discussions with Mr. C.A. Jewell, Keeper of the Museum of English Rural Life, University of Reading, on farm work rates.

11. Josiah Tucker, Brief Essay (2nd edn, 1750), p.37; A. Young, A Farmers Tour through the East of England (1771), IV, p.361; A Young, New Farmers Calendar (edn, 1806), p.281. See also, L.A. Maverick, 'Chinese influence upon the Physiocrats', Economic History, XIII (1938), pp. 54-67; E.A.J. Johnson, 'Mercantilist Concept of "Art" and "Ingenious Labour" ', Economic History, VI (1931), pp. 234-53. See also, E.S. Furniss, The Position of the Laborer in a System of Nationalism (1920) and H. Moller, 'Population and Society during the Old Regime, c.1640-1770' in H. Moller, ed, Population Movements in Modern European History (New York, 1964) pp. 19-47.

12. The 'loss of birthright' argument was advanced by C. Hill, 'Pottage for Freeborn Englishmen: Attitudes to Wage Labour in the 16th and 17th centuries', in, C.H. Feinstein, ed, Socialism, Capitalism and Economic Growth (Cambridge, 1967), pp. 338-50.

13. See, E.P. Thompson, 'Time, work-discipline and industrial capitalism', Past and Present, XXXVIII (1967), pp. 76-9, and passim.

14. W. Marshall, Review of the Reports to the Board of Agriculture from the Western Department of England (1810), p.143

15. See summary of Elizabeth Gilboy's 1700-96 wage series in B.W. Mitchell and Phyllis Deane, Abstract of British Historical Statistics (Cambridge, 1962), pp. 346-7. The best available survey of the early eighteenth century labour market is Moller, loc.cit, pp.19-42. Deane & Cole, op.cit, pp. 96-97 and J.D. Chambers, Vale of Trent (Suppt. No. 3 to the Economic History Review), pp 4-5

16. Jethro Tull, Horse Hoeing Husbandry (Cobbett's edn, 1822), [first published 1733], pp. 111-2, 154-6, 317, 322.

17. A. Young, New Farmers Calendar (edn, 1806), p. 285.

18. This is one of the more important conclusions of a detailed survey of some 250 1650-1800 manuscript farm accounts covered by Dr. E.L. Jones and the present author at Nuffield College, Oxford, in 1964-5. Over 250 sets of farm accounts, relating chiefly to southern Britain, were examined.

19. For 1770, see Young, Eastern Tour, op.cit, especially, I, pp. 434, 439, 442, 459, and also, A. Young, Six Weeks Tour ... (1769), pp. 204, 273.
20. W. Marshall, Rural Economy of Norfolk (2nd edn, 1795), I, pp. 187, 278.
21. The 1793-1815 practices are very fully documented in the Board of Agriculture Reports under the head 'turnips'.
22. W. Stevenson, General View Dorset (1812), p. 258.
23. W. Mavor, General View Berkshire (1809), p. 192.
24. W. Gopch, General View Cambridgeshire (1811), p. 47.
25. Edward Lisle, Observations in Husbandry (1757), p. 237. The adoption of horse-hoeing appears to have been closely correlated with labour supply. In the 1830's, only in labour-scarce northern England and south-east Scotland was drill-husbandry general. In the 1790's it was almost wholly confined to north Britain. W. Stevenson, General View Surrey (1809), refers to shortages of turnip labour and recommended the horse-hoe, for he said, 'on the large scale of cultivating turnips adopted by the farmer, is hand labour bestowed to such an extent, or with such care, as to equal horse-hoeing properly performed: not, indeed, would hand labour pay', pp. 254-5, 266. See also, British Husbandry, op.cit, II, pp. 236.
26. A. Young, New Farmers Calendar (edn, 1806), p. 283.
27. ibid, p. 283; W. Marshall, Rural Economy of Norfolk (2nd edn, 1795), II, p. 44; Journal of the Bath & West, I (1780), pp. 1-5.
28. ibid, p. 6
29. A. Young, General View Essex (1813), I, p. 271
30. Baxter's Library of Agricultural & Horticultural Knowledge (Lewes, 3rd edn, 1834), p. 503. A detailed description of the practice of paring and burning, emphasising its labour-intensiveness, is contained in, Major Gambier Parry, The Spirit of the Old Folk (1913), pp. 71-108. Abundant evidence for the rapid introduction of the practice after 1790 is contained in the Board of Agriculture Reports under the head, "improvements - paring & burning".

31. R.C. Employment of Children, Young Persons and Women in Agriculture (1867), (hereafter R.C. Employment (1867)), Second Report (1869), pp. 327, 368-9, Fourth Report (1870), App. pt. I, p. 64. For other similar data from Scotland (8 counties), see, ibid, pp. 179-88. These and other data are analysed more fully, infra, pp. 77-8.

32. J.D. Marshall, The Old Poor Law (1968), pp. 22-37, and M. Blaug, 'The Myth of the Old Poor Law and the Making of the New', Journal of Economic History, XXIII (1963) and 'The Poor Law Report Re-examined', Journal of Economic History, XXIV (1964). Clapham calculated that in 1830, a particularly bad year for rural labour, the farm worker relied on the poor law for only 15 per cent of his income, op.cit, I, pp. 364-5. Between 1812 & 1833 average annual expenditure in poor relief was c. £6 million, cf. a national income of £300-£400, of which perhaps 40-45 per cent was wage payment, Marshall, op.cit, p. 26 and Deane & Cole, op.cit, pp. 166, 251.

33. For the extreme examples, see E. Hobsbawm & G. Rudé, Captain Swing (1969), pp. 73-4, and W. Hasbach, A History of the English Agricultural Labourer (1908), pp. 178-92, 204-16. For a general discussion of the highland-heavyland dichotomy, see E.J.T. Collins & E.L. Jones, 'Sectoral Advance in British Agriculture, 1850-80', Agricultural History Review, XV (1967), pp. 65-81, and E.L. Jones, The Development of English Agriculture, 1815-1873 (1968), pp. 14-17.

34. Contemporary estimates suggest that between 1812 and 1854 the fodder crop area in Britain expanded by over 1.0 million acres. L. Drescher, 'The Development of Agricultural Production in Great Britain & Ireland from the early nineteenth century', Manchester School, XXIII (1955), p. 167.

35. Morton, op.cit, p. 76

36. E.H. Hunt, 'Labour Productivity in British Agriculture, 1850-1914', Economic History Review, 2nd ser, XX (1967), pp. 289-90.

37. R.C. Employment (1867), Second Report (1869), Culley's Report, p. 81, Farmers Magazine, April 1847, pp. 289-90.

38. For further discussion of the 'labour-rate and 'roundsman' systems, see, Marshall, op.cit, p. 41; Hasbach, op.cit, pp. 181-4, 188.

39. For example, a farmer in the relatively high-wage East Riding described, 'the compulsion that the farmer feels himself under to find work for married labourers who have a settlement in the township', Reports of Select Farms, bound as Volume III, British Husbandry (1840), Scoreby, pp. 19-20.

40. G.E. Evans, The Farm & the Village (1969), p. 85. The threshing machine is a problem all by itself. In some areas landlords and magistrates expressly forbade its use. How serious a threat it really posed to rural employment is not at all clear, even in 1830-1, at the time of the Swing Riots. The only detailed historical treatment of the threshing machine at present available is Hobsbawm & Rudé, op.cit, passim and especially App. IV.
41. J. Caird, English Agriculture in 1850 and 1851 (1852), p.515.
42. Farmers Magazine, April 1847, p. 357.
43. 20th Report on the Poor Law Amendment Act (1838), p.11; Reports for Select Farms, op.cit, Scoreby, pp. 19-20. The case for a direct correlation between wages and work output is argued at length in Hunt, loc.cit, pp. 280-92.
44. See, infra, pp. 306 ff.
45. Baxter's Library of Agricultural and Horticultural Knowledge, op.cit; pp. 6-7.
46. ibid, pp. 6-7.
47. The definitions of 'unemployment', 'underemployment' and 'labour surplus' have been the subject of considerable debate among development economists. I prefer to define 'surplus' as that part of the 'active' farm population whose marginal productivity was zero and which could therefore be removed without lowering agricultural output. This definition assures a constant state of the art. For further discussion of this concept, see G. Myrdal, Asian Drama (Penguin, 1968), III, pp. 2044-9; F. Dovring, 'Unemployment in Traditional Agriculture', Economic Development & Technological Change, XV (1967), pp. 163-73; A.A. Pepelasis & P.A. Yotopoulos, Surplus Labour in Greek Agriculture, 1953-1970 (Athens) 1962), passim.
48. See, for example, Chambers & Mingay, op.cit, pp. 136-47, 186-90; C.S. Orwin & E.H. Whetham, British Agriculture, 1846-1914 (1964), pp. 68-94, 102-117.
49. See, infra, pp. The supply of cultivatable land ran out soon after 1820. Up to that point increased production appears to have been largely secured through the expansion of crop area. On the fixed area, yields did not increase significantly until after 1835. This was closely associated with higher labour input and a much increased consumption of off-farm manures and feeding stuffs. See, F.M.L. Thompson, 'The Second Agricultural Revolution, 1815-50', Economic History Review XXI (1968), pp. 62-77. However, it is clear that between 1835 and 1870, off-farm fertilizers and feedstuffs supplemented rather than replaced conventional inputs.

50. Drescher, loc.cit, p. 167; Agricultural Statistics 1870.
51. Deane & Cole, op.cit, p. 143; E.L. Jones, 'The Agricultural Labour Market in England, 1793-1873', Economic History Review, 2nd ser, XVII (1964), pp. 328-9.
52. A Century of Agricultural Statistics (H.M.S.O. 1968), p. 62.
53. Farmers Magazine, April 1847, pp. 353-60; July 1844, p. 53.
54. T.K. Derry & T.I. Williams, A Short History of British Technology (Oxford, 1960), pp. 671-2.

PART I

HARVEST LABOUR SUPPLY AND DEMAND 1790-1870.

CHAPTER II.

THE DEMAND FOR HARVEST LABOUR.

In its cutting and binding operations the corn harvest required a large and very elastic supply of labour to meet different conditions of crop, and variable speeds of ripening. Time was the critical factor. Farmers knew well, that 'loss by delay, as well as by direct injury to the corn, is serious matter in three seasons out of four'.⁽¹⁾ In a dry season, failure to cut wheat and oats within 8-10 days of ripening could result in heavy losses by shattering and shedding while, in a wet 'catchy' season, irreversible grain wetting could occur if cutting was delayed.⁽²⁾ The greatest hazard was the quick ripening harvest. A spell of warm dry weather during, or on the eve of, the harvest, not only accelerated the ripening process but also increased the risks of all three harvests, wheat, barley and oats, ripening together. Oats, and especially the higher yielding varieties, Polish and Potato, shed more easily than wheat.⁽³⁾ Barley was more resistant, but under extreme conditions the awns bent over and snapped off. The effect of rapid ripening was to telescope the safe-cutting period from the customary three to four weeks to perhaps less than 10 days, while crop loss by shedding may often have exceeded 10 per cent, and much more, if an over-ripe crop was savaged by high winds. Labour shortages were most prone to develop when rapid ripening coincided with a high point of the trade cycle.

Wilson described how, when the supply of labourers ran short, 'there is a scramble to get them - the rates of wages become exorbitant, employers are fain to submit to much sauciness and turbulence, and the while the crops are suffering from over-ripening and are exposed to shattering winds'.⁽⁴⁾ In such years, farmers often had to dredge thier local labour pools to bring into the field, 'the infirm, the young and those who are burdened with household cares'.⁽⁵⁾ In an exceptionally hot dry summer, the corn could ripen simultaneously over a wide area, and with hands wanted everywhere at once, inter-regional labour flows were often seriously disrupted. The synchronised flow of migrant harvest workers between different areas was possible only when ripening was an even, moderately slow process, when the clays were later than the chalks, the hill later than the vale and the north later than the south. Serious labour shortages developed in 1795 following a spell of hot, dry weather, 'which brought harvest to fit together in all England'. In 1806, the crop ripened so quickly in the Lothians that all other work had to be stopped in order to save the harvest. In Lincolnshire, in 1871, the harvest ripened everywhere at once, well ahead of the Irish migrant harvesters working their way south to north up the county. In 1866, Oxfordshire experienced such freak summer weather that the hay harvest actually overlapped the corn harvest to create an unprecedented demand for labour.⁽⁶⁾ Very early or very late harvests were equally disruptive of labour flows. In Lincolnshire, for example, the Irish arrived too late for the early harvest of 1868 and too early for the late harvest of 1869.⁽⁷⁾

Crop yield, straw growth and crop lay were also important determinants of per acre labour requirements. As a general rule the heavier and more tangled the crop and the more prolific the straw

growth, the higher the labour input. Markham calculated that a thick and badly laid (lodged) crop of barley and oats consumed almost 70 per cent more labour than a thick standing crop, and over twice as much as a short, very thin crop. Workers with the heavy (bagging) hook reckoned to cut an acre of upright wheat but only .6 acres of laid wheat a day. A Scottish farmer claimed that 3 acres of thin oats could be mown as easily as two acres of fair. These differentials were naturally reflected in costs. In the 1860's Morton stated that the price of cutting and stooking an acre of wheat varied from 8s. an acre for a light crop to more than double that sum for a heavy twisted crop.⁽⁸⁾

I

Over the long run (1790-1870), labour demand was determined by the following factors.

1. Changes in the size of the corn area, and within it, changes in the proportions under each cereal; wheat, barley and oats. The crop-mix factor was important because wheat was much more labour intensive than the spring corns, requiring with the sickle about 20 per cent, and with the scythe about 80 per cent higher inputs of labour. (see infra, pp. 255-9).

2. Changes in per acre yield. The correlation between crop yield and labour input was probably directly linear. For, in practice, higher yields were associated with more prolific straw growth, which lowered the cutting rates, made more work in the linkage tasks of gathering, binding and stooking, and more serious, promoted crop lodging, which as has already been shown, greatly increased

the demand for labour in the cutting and gathering.⁽⁹⁾ The closeness of this correlation is demonstrated by the fact that due to higher crop yields work rates per acre were much lower in the mid-nineteenth century than in previous centuries.⁽¹⁰⁾

3. Changes in the size of the area devoted to root and market garden crops whose summer work schedules often overlapped the harvest, thus reducing the amount of time available for harvesting.

The difficulties of constructing a long-run corn production (harvest labour demand) curve are formidable. The chief stumbling block is the absence of any satisfactory evidence about British corn output in the period under review. Apart from the 1801 Crop Returns and a few stray estimates for isolated years, there are no reliable acreage figures for England and Wales until the official series begin in 1866. Scotland is rather better served, by the Old (1791-98) and New (1835-40) Statistical Accounts, and the Highland and Agricultural Society Returns (1854-7).⁽¹¹⁾ But even here, the task of extracting, collating and aggregating data for a thousand parishes is a difficult one, while for want of more continuous data they still provide little more than a basis for speculation about long run trends.⁽¹²⁾ Official statistics of crop yield are available only from 1884, up to which point there exist only a few partial series, chiefly for individual farms, and a large number of uncorroborated 'guestimates'.⁽¹³⁾

A further difficulty is that while the contemporary estimates of wheat yield in the 1860's and 1870's conform very closely with the official values for 1884-1900, those of barley and oats greatly exceed them.⁽¹⁴⁾ In fact, comparing the 1800-16 Board of Agriculture averages with the 1884-1900 official averages it would appear that spring corn yields barely improved over the nineteenth

century. The only detailed statistical evidence on corn output available before 1884 is the official series of annual corn sales in various 'inspected' markets in England and Wales which runs from 1821.⁽¹⁵⁾ But, because they are figures of sales and not of output, and moreover of sales in a selected and variable handful of towns, they have only a limited value and must be handled with great caution. It is not surprising, therefore, that contemporaries seem to have preferred to calculate output from consumption, that is, (total population) \times (average consumption per head) - (net imports + seed). But this approach, too, has its drawbacks. First, because estimates of per capita consumption of wheat varied between 6 and 8 bushels per annum, while there is no certainty that it remained constant over the period under review.⁽¹⁶⁾ Furthermore, it is difficult, especially for the early years, to establish just what proportion of the population consumed wheaten bread. Even if we assume that in 1800 all Scotsmen ate oats, Charles Smith's calculations of the bread corn mix, made in 1758, suggest that half a century later significant quantities of rye and barley bread and oatmeal may still have been consumed in England and Wales.⁽¹⁷⁾ Nor are the proportions clear for 1870. Fairlie, in a recent article, assumed that at this stage, 'wheat consumption in both Scotland and Ireland was probably still negligible', but 30-40 years later, in 1909-13, the total UK consumption of oatmeal was put at only 280,000 tons per annum, equivalent to a consumption of 1.6 bushels per head in Scotland and Ireland compared to the average national wheat consumption of 5.6 bushels.⁽¹⁸⁾ Another drawback is the difficulty of estimating the amount of corn used for seed, which in view of the magnitude and uncertainty of the acreage involved, allows of a substantial margin of error on this one item alone.⁽¹⁹⁾

The consumption formula is, moreover, quite inappropriate for calculating the output of barley and oats, crops which were consumed chiefly by livestock, whose numbers and diets are much less well documented than those of human beings. Admittedly, there are statistics of barley used in malt, beer and spirits manufacture derived from the Excise Returns,⁽²⁰⁾ but this still leaves an uncertain, and conceivably very large, quantity used as livestock feed. Most evidence suggests that on-farm consumption of barley increased rapidly after 1815. Oats are even more problematical. They were mostly consumed by horses and even if it were possible to fix the consumption rates of all the different categories of horse-riding, carriage, draught and farm, we still fall down on horse numbers. Farm horses were enumerated only from 1866 while enumerations of non-farm horses were irregular and very incomplete. Unfortunately, the farm/non-farm horse ratio is extremely critical because of their different consumption rates. Farm horses, because they were worked less continuously and had easier access to substitute feeds (grass, hay, chaff etc.), required fewer oats than carriage and dray horses.⁽²¹⁾

III

We will postulate four phases in the chronology of harvest labour demand; namely, 1790-1814, 1815-34, 1835-46 and 1847-70. These will be examined successively.

1790 - 1814.

Up to 1800 it was widely held that corn production was

decreasing, or, at least, had failed by a large measure to keep pace with population growth.⁽²²⁾ After 1800 complaints of tillage contraction gave way to enthusiastic reports of tillage extension, and in some quarters even to complaints about the continuous cropping of the weaker soils. It was estimated that about 1.0 million acres of newly enclosed land, much of it reclaimed waste, had entered corn production between 1784 and 1822.⁽²³⁾ However, not all areas of Britain shared in this expansion. There is, for example, no evidence for tillage conversion in the dairying districts of north-west and south-west England, the grazing districts of the English Midlands, or south-east Scotland.⁽²⁴⁾ Rather, activity was greatest in the traditional corn-growing areas of south and east Britain, on the Yorkshire and Lincolnshire uplands, the West Norfolk Sands, the Fens, the Cotswolds and the southern Chalklands, where tillage extension was closely associated with lightland reclamation.⁽²⁵⁾ Grigg demonstrates a striking, 50 per cent, increase in the corn acreage of south Lincolnshire between 1792-5 and 1801, while on the Duke of Bedford's Woburn estate it increased by 30 per cent between 1795 and 1800.⁽²⁶⁾ A key feature of the enclosure movement was that after 1800 the ratio of 'unmixed-waste' to 'common-field' enclosed increased substantially. Between 1802 and 1844 waste comprised almost 40 per cent of all land enclosed compared with less than 25 per cent in 1761-1801.⁽²⁷⁾ Evidence also suggests that the area under wheat expanded much faster than, and often at the expense of, that of spring corn. Wheat production increased many fold in northern England and Scotland during this period.⁽²⁸⁾ The apparent failure of average national cereal yields to increase over the war years can be attributed to the spread of cereal cultivation onto the more marginal soils, and partly to the disproportionate increase in the cultivation of wheat, the most

exhaustive cereal. But for the large number of deficient harvests in the War Years it is probable that between 1800 and 1815 corn production would have expanded much faster than population. (29)

As it was, it appears to have lagged somewhat behind it.

1815-1846.

The quarter century or so following the Napoleonic Wars was not, as was once believed, a period of general depression for British arable farming, but rather one of 'fierce but silent contest between the productive lands and the unproductive'. (30) Between that is, the heavylands, with their high-traction costs, low fodder-crop values and static output, and the lightlands which through the 'virtuous circle' of mixed farming were able to offset low prices by increased output at lower unit production cost. (31) The mid-1830's marked an important watershed in this development in that following twenty years of relatively slow growth in corn output they ushered in a period of rapidly rising yields, of renewed corn area expansion and of an accelerated shift out of spring corns into wheat.

The case of rising yields is well supported by the contemporary literature, but is best spoken for by the detailed wheat yield surveys carried out by the Liverpool corn merchants, Cropper, Benson and Co., from 1809-36, and after them, from 1837-59, by Joseph Sandars, a Liverpool business man. (32) The great value of the surveys lies in their objectivity and wide coverage. They appear, though, to exaggerate the degree of yield improvement: in the base period, 1815-24, the Cropper Benson Sandars average of 23.0 bushels per acre is very close to the assumed national average of 21.0 - 22.0 bushels per acre, but in 1852-59 it exceeded it by almost 70

75/ per cent. Clearly then, over the period 1830-60, British agriculture had to be content with smaller gains than the ~~120~~ per cent suggested by the Liverpool series, of the more modest but still respectable order of 30-35 per cent. Yield changes in barley and oats are more difficult to establish. Contemporary estimates suggest, however, that the improvement was less spectacular than in wheat, of the likely order 15-18 per cent for barley and 20-25 per cent for oats. (33)

Evidence for the more rapid expansion of the national corn area after 1834 is more tentative. Writing in 1851 Caird was convinced that it had grown considerably since 1827 when Couling made his estimates. The Tithe Commutation Act of 1835 and the General Enclosure Act of 1836 appear to have stimulated areal expansion. (34)

In 1836 James Scott, a Liverpool corn factor, attributed the recent increase in the price of meat to the ploughing up of 'much grassland'. (35)

Land reclamation and tillage conversion continued apace on the Yorkshire and Lincolnshire uplands and in the East Anglian Fens. (36)

The 1844 Committee on Commons Inclosure noted land use changes recently wrought on the Surrey heaths and on the New Forest and north Nottinghamshire Sands. (37)

Tom Hughes recollected in 1859 that 'within the last twenty years would-be wise men have found that they [the Berkshire Downs] will grow decent turnips and not very bad oats'. (38)

Caird wrote of the Cotswolds, where, 'at no very remote period, the greater part of this district was devoted to the pasturing of sheep'; of the Dorset Downs, 'in recent years ...[their] conversion into arable'; of the greater proportion of tillage on Salisbury Plain since the Tithe Commutation Act, and of the recent breaking-up of pasture in the heavyland districts of Suffolk and the Vale of Cleveland. (39)

Further evidence for increased corn production is afforded by the Corn Market Returns, (detailed below), which demonstrate

a continuous increase in wheat and barley sales from the late 1820's till the mid-1840's, with the key upturns occurring in 1833-4 and 1843-4.⁽⁴⁰⁾ The increase in wheat sales is particularly striking while the decline in sales of oats suggests that wheat was substituted for oats in many corn-growing rotations, particularly on the weaker soils. This suggestion is confirmed by evidence from Eastern England,⁽⁴¹⁾ where in south Lincolnshire, for example, wheat was the leading crop in only 25 per cent of parishes in 1801, but lead everywhere in 1851. A switch from oats to wheat was an important feature of the 'revolutionary change in land use' taking place on the East Anglian Fens over this period. Exports of wheat from the Fenland port of Boston rose from 34,871 qrs. in 1830 to 64,648 qrs. in 1850, which increase was associated with a marked decline in exports of barley and oats.⁽⁴²⁾

CORN MARKET RETURNS, 1821-46⁽⁴³⁾
(in millions of qrs. sold)

YEAR	WHEAT SALES	BARLEY SALES	OAT SALES
1821 *	1.53	.97	1.34
22	2.19	1.27	1.63
23	2.19	.99	1.43
24	2.25	1.44	1.36
25	2.03	1.53	1.44
26	1.89	1.15	.97
27 **	2.07	1.18	.76
28	2.77	1.65	1.97
29	2.58	1.61	2.27
30	3.15	2.11	2.06
31	2.81	2.03	1.99
32	3.30	1.95	2.20
33	3.58	2.36	2.26
34	3.77	2.15	2.24
35	3.93	2.03	2.29
36	4.39	2.42	2.38
37	3.89	2.07	2.12
38	4.06	2.48	2.30
39	3.17	2.40	1.93
40	3.85	2.29	2.02
41	3.91	2.23	2.20
42 ***	4.09	2.58	2.20
43	5.30	2.78	2.22
44	5.46	2.83	1.99
45	6.67	2.47	2.00
46	5.96	2.93	1.67

* From 148 Towns, by Act of 1 & 2 Geo. IV. C.87.

** From 150 Towns, by Act of 7 & 8 Geo. IV. C.58.

*** From 290 Towns by Act of 5 & 6 Vict. C.14.

If the Market Returns accurately reflected national output trends it can be calculated that between 1830 and 1845 total corn production increased by upwards of 30 per cent, and harvest labour requirements by upwards of 35 per cent.⁽⁴⁴⁾ No great reliance can be placed on these values, although the order of increase is not incompatible with yield improvements of 35 per cent for wheat (expanding area), 15 per cent for barley (constant area) and 20-25 per cent for oats (reducing area).

1847-1870.

The British corn area probably reached its peak in the mid-1840's.⁽⁴⁵⁾ On the basis of the sharply falling sales of wheat shown by the Market Returns, Fairlie has postulated a very substantial, over 25 per cent, reduction in national wheat output, and by implication, an even more spectacular reduction in oats and barley output between the mid-1840's and late 1860's.⁽⁴⁶⁾ If such was the case it is surprising that contemporaries failed to observe it. On the contrary, 'Mercator' and J.C. Morton both insisted that production was greater in the 1860's than it had ever been.⁽⁴⁷⁾ Caird, writing in 1867, believed that there may have been some fall in wheat output but hinted that this had been offset by increases in output of other grains.⁽⁴⁸⁾

The issue appears to hinge, firstly, on the accuracy of the Market Returns, and secondly, on whether they properly reflect national output trends. Biffen firmly defended the statistical reliability of the Returns in his memorandum of 1879. But, on the second count, 'Mercator' insisted that the Returns 'meant nothing', that it was impossible that '10 million quarters of grain had gone

out of cultivation since the Repeal of the Corn Laws'.⁽⁴⁹⁾ The Market Returns and Fairlie's imputed estimates of national wheat production are reproduced below.

CORN MARKET RETURNS, 1840-1870⁽⁵⁰⁾
(in millions of qrs. sold)

Year	WHEAT		BARLEY		OATS
	Market Sales	Fairlie's Imputed 'National' Output*	Market Sales	Market Sales	
1840	3.85	15.40	2.29		2.02
41	3.91	15.66	2.23		2.21
42 **	4.09	-	2.58		2.20
43	5.30	14.49	2.78		2.21
44	5.46	15.27	2.83		1.99
45	6.67	18.66	2.47		2.00
46	5.96	16.69	2.94		1.67
47	4.6	12.99	2.04		.96
48	5.40	15.12	2.40		1.02
49	4.45	14.47	2.10		.85
50	4.69	13.12	2.24		.87
51	4.49	12.56	2.34		.94
52	4.85	13.39	2.39		.95
53	4.56	12.77	2.47		.88
54	3.91	11.00	2.27		.77
55	5.26	14.71	2.61		.81
56	5.05	14.13	2.68		.70
57	5.24	14.69	2.26		.54
58	5.20	14.57	2.43		.48
59	5.50	15.40	2.41		.50
60	4.62	12.95	1.79		.50
61	4.29	12.01	2.39		.62
62	3.59	10.05	2.28		.70
63	4.49	12.59	2.49		.57
64	4.99	13.97	2.60		.51
65 ***	3.58	14.32	1.77		.22
66	3.13	12.54	1.72		.25
67	2.72	10.90	1.58		.28
68	2.68	10.72	1.67		.25
69	2.82	11.26	1.39		.16
70	3.40	13.60	1.85		.21

* From 1840-2 Fairlie has used a multiplier of 4 to convert the 'Market' totals into 'national' output, from 1843-64 a multiplier of 2.8, and from 1865-70 a multiplier of 4. ibid., pp.114-5.

** From 290 Towns, by Act of 5 & 6 Vict. C.14.

*** From 150 towns by Act 27 & 28 Vict. C.37.

Fairlie's thesis must be set against the more conventional views one, that national corn production declined only slightly over the third quarter of the nineteenth century, and two, that such decline as there was occurred more in north and west Britain than in the specialist grain growing areas of the south and east. As a first step, we will demonstrate from reliable statistical evidence, namely the Highland Society Returns for 1854-7 and the Agricultural Statistics for 1867-70, that far from declining, corn production in Scotland may actually have increased between the early 1850's and late 1860's.

Scottish Cereal Acreages: 1854-7 and 1867-70. (51)

(in thousands of acres)

	<u>1854-7</u> (Highland Society Returns)	<u>1867-70</u> (Agricultural Statistics)
<u>Wheat</u>	211	125
<u>Barley</u>	181	228
<u>Oats</u>	956	1012
<hr/>		
<u>Total Cereals</u>	1348	1365

Unfortunately there are no comparable data for England and Wales. However, there exist some incomplete agricultural statistics for 9 English and 2 Welsh counties collected in 1854 by the Poor Law Commissioners. (52) Their chief defect is their incompleteness, in that a significant proportion of farmers failed to make, or refused to make, a return. However, if it is assumed, first, that the total

cultivated area of these counties (tillage plus grass) was the same in 1854 as in 1870 (Agricultural Statistics), and second, that the acreage outstanding in 1854, i.e. the 'unreturned acreage', was cropped in the same proportions as the 'returned' acreage, then we have some basis for comparison. The margin of error may not be large because in all but three counties, the area returned in 1854 was within 70 per cent of that returned in 1870, and in four counties it actually exceeded it (due to the enumeration of sheepwalk and rough grazings as part of the cultivated area).

SUMMARY OF AREAL CHANGES 1854/1870 (from Table below)

(in per cent)

	Wheat	Barley	Oats	All Cereals
Berkshire	+ 8.5	+ 5.1	+ 18.9	+ 9.4
Hampshire	-	+ .4	+ 11.3	+ 2.5
Leicestershire	+ 5.9	+ 6.7	- 3.8	+ 4.0
Shropshire	- 2.4	+ 1.3	- 7.9	- 2.2
Suffolk	+ .4	+12.6	- 8.8	+ 4.5
Wiltshire	+ .8	+ 5.2	+ 16.3	+ 4.6
Worcestershire	+ 3.4	+ 8.0	- 16.8	+ 2.5

Cereal Acres in Selected Counties, 1854 & 1870

	Wheat			Barley			Oats		
	1870 Recorded Cultivated Area	1854	1854 Adjustment Factor	1854 Returned Acreage	1854 Adjusted Acreage	1870 Returned Acreage	1854 Returned Acreage	1854 Adjusted Acreage	1870 Returned Acreage
Berkshire	367982	188152	1.96	28840	56526	61312	19557	38332	40303
Brecknock	191418	250682	-	11919	-	10567	9377	-	9370
Denbigh	235887	281555	-	21558	-	18737	20373	-	20187
Hampshire	685540	361715	1.89	58959	111433	111041	34516	65235	64948
Leicestershire	458769	367473	1.25	36207	45259	47947	23540	29425	31395
Norfolk	1048929	1076300	-	202971	-	194414	173831	-	193666
Shropshire	667574	549917	1.21	70832	85707	83633	44833	54248	54953
Suffolk	741511	697023	1.06	138277	146573	147141	118858	125990	140176
Wiltshire	722551	393195	1.84	52871	97283	98028	35254	64847	68219
Worcester	372349	289758	1.29	50385	64997	67232	14101	18190	19647
West Riding of Yorkshire	1141704	1281638	-	117200	-	101388	59258	-	70501

The results are admittedly speculative, but they imply as do the Scottish statistics, that the national corn area did not contract over the 1850's and 1860's, and that if anything, it probably expanded. Only the West Riding shows any substantial fall in wheat area between 1854 and 1870 and this tends to confirm the view, prevalent in the contemporary literature, that the wheat area of North Britain declined over this period. Indicatively, both in Scotland and in the West Riding the contraction was largely, in not wholly, offset by increases in the area under spring corns. Nor was 1870 an exceptional year. According to the Agricultural Statistics the national corn acreage in 1870 was slightly lower than in 1868-9 and 1871-4.

The case for a substantial reduction of the national corn area after 1854 visibly weakens. It is possible though, that there was a decline in the years immediately following Repeal (1846-53). Here we are on more difficult ground, but it can reasonably be assumed that contraction in the low-price years 1849-52 would have been at least partially offset by expansion in the high-price years 1853-7. Indeed, the Crimean War saw a new wave of downland reclamation in Berkshire and Dorset, while even the Scottish corn area expanded a few per cent between 1854 and 1857.⁽⁵³⁾ We are not, of course, trying to argue for stability in the size of the British corn area between 1846 and 1870. It was likely to have fluctuated with corn prices, and over certain low-price periods, for example, 1858-60 and 1863-66, it may have contracted sharply. A further factor, and one which would have fully compensated for areal reduction, was rising yields. The Cropper Benson Sandars series shows further improvements in wheat yield between 1846 and 1859. Caird estimated wheat yields as 5-6 per cent higher than in 1868 than in 1850-1. Other contemporary

estimates suggest a 5-10 per cent gain in corn yield between the late 1840's and late 1860's. (54)

What price now the evidence of the Market Returns? Fairlie was concerned only with wheat production, and on the assumption that they reflected national output trends, suggested first, that wheat output reached its peak in the mid-1840's, which is reasonable, and second, that between then and the late 1860's, wheat output slumped by over 25 per cent, which is not. The hypothesis can be rejected on the following grounds. One, that if wheat yields increased by say only 7 per cent between 1846 and 1870, and if, as the Agricultural Statistics indicate, the wheat area of England and Wales was 3.4 million acres in 1870, then a 25 per cent reduction in wheat output would have incurred an areal contraction of 1.2 million acres,

$$\left[\frac{107}{100} [(3.4 \times 1.33) - (3.4)]\right],$$

a decline which was only just exceeded in the Great Depression (between 1875 and 1900 the wheat area of England and Wales fell by 1.36 million acres). The second ground for dissent further suggests that the post-1846 Market Returns bear little relationship to national output trends. Contrary to all other evidence the Returns suggest no increase in barley output between 1843-46 and 1861-4, but more seriously, they suggest over this same period a dramatic and quite unaccountable 70 per cent reduction in oats output. It would appear then, that whereas up to 1846 the Market Returns appear to reflect national output trends and to confirm the conclusions drawn from other evidence, after 1846 they clearly do not. We can only conclude that after 1846, due perhaps to the intervention of the railways, the evolution of new marketing patterns or, as with barley and oats, increased on-farm consumption, large and increasing amounts of corn either by-passed the 'markets' altogether or else were sold in markets

not covered by the Returns. If corn output did decline it did so chiefly in areas such as North Wales, north-west England and western and Highland Scotland, where climate and topography did not naturally favour corn production, or in areas close to large centres of population, such as Cheshire, Lancashire, Middlesex, Staffordshire and the West Riding, where the comparative advantage lay in hay, milk and vegetable production. (55)

IV

There were other factors which tended indirectly to affect harvest labour requirements. The first was the increased cultivation of roots and vegetables, whose work schedules often overlapped the harvest and either compressed it, or as with market garden crops, competed directly with it for labour supplies. The second was that in many regions crop ripening dates tended progressively to run more closely together, thereby disrupting carefully phased inter-regional labour flows, on whose timely arrival the safety of the harvest often depended. On clay soils, improved drainage, and on exposed uplands, the planting of shelter belts, helped hasten maturity, while on the normally much earlier-ripening lighter soils, the greater use of nitrogenous fertilizers tended to retard it. Thus by 1850, the Cotswold harvest had almost caught up with the Vale, while in Leicestershire the harvest on the Charnwood Forest Clays was now only a few days later than in adjoining areas, where it used to be a month. (56)

The harvest was compressed further by more intensive cropping and the consequent need for more rapid clearance of stubbles and earlier autumn cultivations. (57)

Not surprisingly, therefore, in the late 1850's Wilson was able to testify to 'the rapidity and accuracy with which the sowing of grain is now accomplished, [which] frequently issues in the whole crops of a wide district being simultaneously ready for the sickle'. (58)

In the 1860's British arable farming was operating at the limits of its manpower resources. Morton described the situation thus: (59)

'and yet limited as to quality as is the labour now required upon the farm, the quantity needed of it is enhanced so much more by the more vigorous cultivation which the land now recieved, that more labourers are needed now than when nearly all the work was done by men alone. So much more land has now been broken out of pasture; so much less of the arable land is each year in clover and grasses; so much more of potatoes, and of mangold-wurzels, and turnips, and crops of that class, all of them laborious, are grown over whole counties the extention of potato culture has created an increased demand for labourers. Over the whole island the introduction of guano and other concentrated manures has induced a more profitable and therefore more laborious cultivation. In many districts the change of rotation - as for example, the retention of grass and clover only one year down instead of three, and the substitution of wheat and perhaps mangold-wurzel for a second and third year's pasture - has created more need of steam power to thresh the increased produce, of horse power to cultivate the increased arable land, of hand power to superintend and manage the detailed cultivation of the crops, their ingathering and consumption. There is much more grain grown now than used to be, but the food for stock upon a diminished extent of land has much more rapidly increased than even that of grain; and the labour now required is that of men whose competency and skill may be trusted rather than whose mere brute strength may be wielded.'

We may conclude, therefore, that harvest labour requirements expanded continuously between 1790 and 1846 and fell only marginally, if at all, between 1846 and 1870.

1. Agricultural Gazette, 28 Sept 1867, p. 1005
2. See, Reports for Select Farms, bound as Volume III, British Husbandry (1840), Kyle, Ayrshire, pp. 42-3; Farmers Magazine, Aug 1845, p. 97.
3. Ward & Lock's Book of Farm Management (n.d.), p. 84; H. Stephens, Book of the Farm (1844), III, pp. 1056-7; As late as 1892, with reaping machines general, 'enormous' quantities of oats were reported still to be lost by shedding. J. Darby, 'Harvesting Mistakes', JRASE, 3rd ser. III (1892), p. 177.
4. J. Wilson, British Farming (Edinburgh, 1862), p. 311
5. Stephens, op.cit, III, p. 1050.
6. Farmers Magazine, Nov 1806, p. 541; J. Thirsk, English Peasant Farming (1957), p. 325; Agricultural Gazette, 1 Oct 1866, p. 934. Examples of crop ripening convergence causing labour scarcity occur frequently in the contemporary literature, and will be cited passim in those chapters dealing with the chronology of harvest labour supply.
7. Reading Mercury, 21 Aug 1869. See also, J. E. Handley, The Irish in Scotland, 1798-1845 (Cork, 1945), p. 144, for further examples of weather-disrupted flows. The harvest could begin any time within a four-five week period. On one Berkshire farm, for example, between 1820 and 1829 the harvest commenced on Aug 14 (1820), 21, 24, July 21, Aug 21, 20, 3, July 31, Aug 2, 1, 14 (1829) Berkshire Chronicle, 1 Aug 1857.
8. Gervaise Markham, Enrichment of the Weald of Kent (10th edn), pp. 112-8; Private Communications: H. Bew, Padworth, Berkshire; P. E. Ryder, 25 St. Mary St., Monmouth; J. Wilson, Rural Cyclopaedia (Edinburgh, 1851), IV, p. 27; J. C. Morton, Hand Book of Farm Labour (edn 1868), p. 105.
9. I say, in practice, because given equal crop condition there would have been certain economies of scale when harvesting the heavier crop. In the nineteenth century, however, higher yield and higher straw growth (hence greater lodging risk) tended to occur together. Only in the past 50 years has it been possible to breed short-straw varieties. For a detailed survey of nineteenth century wheat varieties, see, J. Percival, Wheat in Britain (2nd edn, 1948), pp. 91-129. Percival demonstrated that higher yields result from higher 'tillering' which in turn depends on growing conditions and soil fertility, ibid, pp. 37-8.

10. Mid-nineteenth century work rates were of the order 0.25-0.33 acres p. diem for reaping wheat, 1.0 acres for mowing wheat and 1.75-2.0 acres for mowing spring corns (see infra, pp. 255). Wheat reaping rates in the 13 c. were put at 0.4 acres and in late 18 c. Norfolk, 0.5 - 0.75 acres. Lord Ernle, English Farming Past & Present (3rd edn, 1922), p. 12; N. Riches, The Agricultural Revolution in Norfolk (new edn, 1967), pp. 132-7. According to D. Henry, 2 acres per day was a standard wheat mowing rate of the Yorkshire Wolds around 1770. The Complete English Farmer (1771), pp. 216-7. In the 17 c. Markham claimed that up to 3.4 acres of light spring corn could be mown in a day, while, in 1812, Strickland reckoned a good man could mow upwards of 3 acres on the Yorkshire Wolds, Markham, op.cit., pp. 112-8; H. E. Strickland, General View East Riding of Yorkshire (1812), p. 125.

11. For the 1854-57 Scottish statistics, see, B. P. P. Sessional Papers, 1854-5, XLVII; 1856, LIX; 1857 (Secs I), XV and 1857-8, LVI.

12. For a critical review of the Scottish statistical evidence, see, G. Houston, 'Agricultural Statistics in Scotland before 1866', Ag. Hist. Rev., IX (1961), pp. 93-97.

13. For a detailed historical survey of nineteenth century yield estimates, see, P. G. Craigie, 'Statistics of Agricultural Production', J. Stat. Soc., XLVI (1883), pp. 1-47.

14. The estimated average national wheat yield in 1860-80 was c.29.0 bushels per acre in England and Wales and 30.0 bushels in Scotland, cf. 29.5 bushels and 32.0 bushels. The corresponding figures for barley were 35.0 and 36.0, cf. 31.5 and 33.5; and for oats, 45.0 and 39.0, cf. 37.0 and 33.5.

15. Summarised in B.P.P. 1898, CII. The original returns are located in the Public Record Office, MAF 10.

16. S. Fairlie, 'The Corn Laws and British Wheat Production', Ec. Hist. Rev., 2nd ser, XXII (1968), pp. 101-2. Part of the problem is to calculate the income elasticity of demand for wheat. Under conditions of economic progress we would expect per capita consumption to fall, but this does not appear to have taken place until at least 1860. In view of the erratic and rather sluggish growth in real incomes between 1790 and 1850 (and among certain consumer groups the possibility of an actual reduction between 1815 and 1835) it is possible that average wheat consumption was higher in 1870 than in 1830. The spectacular increase in potato output after 1750 may be significant, in so far as it probably represents a starch substitution. Similarly significant is that after 1833 both domestic output and imports of wheat increased much faster than population. See infra, pp. 55-58 fn. 31-59.

17. Charles Smith, Three Tracts on the Corn Laws (1766), reproduced in Percival, op.cit, p. 22. For further comment on Smith's averages, see, P. A. Deane & W.A. Cole, British Economic Growth, 1688-1959 (2nd edn, Cambridge, 1967), p. 63.

18. As detailed in Agriculture & Industry Enquiry, Research Papers, mimeographed publication, Agricultural Economics Research Institute, University of Oxford (1960), 'wheat', pp. 1-6 and Table I, 'oats', pp. 1-3 and Table 01.

19. For example, the seeding rate for wheat was variously put at $2\frac{1}{2}$ -3 bushels per acre, i.e. 14 per cent of average crop yield in 1790 and 9 per cent in 1870, while seeding rates for barley and oats represented an even higher proportion of gross output.

20. Reproduced in Mitchell & Deane, op.cit, pp. 247-62.

21. Agriculture & Industry Enquiry, op.cit, 'oats', pp. 2-3.

22. For example, Farmers Magazine, Feb 1801, p. 184; W. Pitt, 'A Essay on the Production and Consumption of Corn in Great Britain', Communications to the Board of Agriculture, V, pt. I, pp. 272-97. See also, the 1760-1800 enclosure analysis in E. C. K. Gonner, Commonland and Inclosure (2nd edn, 1966), pp. 400-47.

23. Anon, Inquiry into the Capacity of the Government to Administer Relief to Agricultural Distress (1822), p. 36.

24. A. H. John, 'Farming in Wartime', E. L. Jones & G. E. Mingay, eds, Land, Labour & Population in the Industrial Revolution (1967), pp. 38-9; R. O. Forsyth, Beauties of Scotland (1805), I, p. 525. For confirmatory evidence for south-east Scotland I am grateful to Dr. R. A. Dodgshon, University of Reading.

25. See, for example, E. L. Jones, 'Eighteenth Century Changes in Hampshire Chalkland Farming', Ag. Hist. Rev., VIII (1960) pp. 8-17; J. Thirsk, English Peasant Farming (1957), pp. 108-41, 159-78; D. Grigg, The Agricultural Revolution in South Lincolnshire (Cambridge, 1966), pp. 13-114; S. Jones, 'On the Farming of Cambridgeshire', J R A S E, VII (1846), p. 36; A. Harris, The Rural Landscape of the East Riding of Yorkshire (Oxford, 1961), pp. 61-123; G. E. Fussell, 'Four Centuries of Farming Systems in Sussex, 1500-1900', Sussex Arch. Trans. XC (1952), p. 90. For general summary, see, John, loc.cit, pp. 30-32, 36-38; and for Wales, D. Thomas, Agriculture in Wales during the Napoleonic Wars (Cardiff, 1968), pp. 160, 166.

26. Grigg, op.cit, p. 71; T. Batchelor, General View Bedfordshire (1805), p. 353.

27. Gonner, op.cit, pp. 400-47; John, loc.cit, pp. 30-2; W. E. Tate, The English Village Community and the Enclosure Movements (1967), p. 88.

28. For example, it was reported that wheat production in the East Lothians doubled between 1778 and 1810; John, loc.cit, p. 36; In Cumberland wheat was reported in 1805 as, 'a modern production here'; J. Bailey and G. Culley, General View Northumberland, Cumberland and Westmoreland (edn, 1805), p. 220; See also, Grigg, op.cit, p. 75.

29. It can be observed here how in years of average yield, e.g. 1802-4, 1814-15, the price of wheat fell; Mitchell & Deane, op.cit, p. 488. By the early 1820's, and even before there were complaints of overproduction forcing down the domestic price.

30. F. M. L. Thompson, English Landed Society in the Nineteenth Century (1963), p. 233.

31. See, E. J. T. Collins & E. L. Jones, 'Sectoral Advance in English Agriculture', Ag. Hist. Rev., XVI (1968), pp. 65-81; E. L. Jones, English Agriculture, 1815-73 (1968), and Grigg, op.cit, Chapter VII, for further evidence of this lightland-heavyland dichotomy.

32. Summarized in M. J. R. Healy & E. L. Jones, 'Wheat Yields in England, 1815-59', Journal of the Royal Stat. Soc., CXXV (1962), pp. 574-9.

33. See, Craigie, loc.cit, pp. 1-47.

34. Tate, op.cit, pp. 133-4. It was also claimed that to recoup their losses many farmers ploughed up following the sheep rot of 1832, S.C. on the State of Agriculture, Second Report (1836), p.101.

35. J. Caird, English Agriculture in 1850 & 1851 (1852), pp. 80,520; S.C. on the State of Agriculture, Second Report (1836), p. 39.

36. Harris, op.cit, pp. 97-123; Grigg, op.cit, pp. 117-154, and passim

37. S.C. on the Inclosure & Improvement of Commons (1844), passim.

39. Tom Hughes, Scouring of the White Horse (1859), pp. 78-9.

39. Caird, op.cit, pp. 31, 58, 80, 157, 326-7.
40. B.P.P. 1898, C II, op.cit.
41. Note the switch from oats to wheat in the East Anglian Fens Grigg, op.cit, pp. 162-3. Sales of wheat at Norwich Corn Market rose from 174000 qrs in 1839 to 241000 qrs in 1843 R. N. Bacon, Agriculture of Norfolk (1844), p. 87. Wheat production also increased rapidly on the Yorkshire Wolds during the period 1815-50, Harris, op.cit, pp. 95, 103, and in Suffolk J. Thirsk & J. Imray, Suffolk Farming in the Nineteenth Century (Suffolk Records Society, 1958), p. 22. In 1858 Read observed how up till a few years previously wheat seldom followed roots in West Norfolk (sandy soils), but that this was now 'almost universal', 'Recent Improvements in Norfolk Agriculture', J R A S E, XIX (1858), p. 275. Caird attributed higher wheat ratios to improved fertility, Caird, op.cit, p. 314.
42. Grigg, op.cit, pp. 161-2, 183.
43. B.P.P. 1898, C II
44. Fairlie has adjusted for the discontinuity of 1842. 1829-41 sales have been multiplied by 4 and 1843-63 sales by 2.8 to obtain a continuous 'national' output series. loc.cit, p. 115
45. I say probably, although the statistical evidence for such a case is far from conclusive. The chief constraint is that contemporaries were far more concerned with wheat than with other cereals, and tended to use the term 'corn' imprecisely, i.e. as a synonym for wheat rather than as a collective noun embracing all grains. The contemporary data are discussed, ibid, pp. 99-101.
46. ibid, pp. 101-9, 114-5.
47. J. C. Morton, Handbook of Farm Labour (1868 edn), p. 72. Agricultural Gazette, 4 Aug 1862, p. 724. Fairlie is, moreover, wrong to assume a constant per capita demand for wheat during this period. Evershed, for one, believed that it increased after 1850. He further implies that even at this late stage many people were shifting out of spring corn into wheat. Numbers of barley eaters, for example, were estimated to have fallen from 1.5 m to .5 m between 1821 and 1853. 'Variations in the Price and Supply of Wheat', J R A S E, n.s. V (1869), pp. 189, 194. See also, Report from the Commission on the Agriculture of the United Kingdom (1821), p. 103.
48. J. Caird, 'On the Agricultural Statistics of the United Kingdom', J. Stat. Soc. XXXI (1868), pp. 129 ff.

49. Fairlie, loc.cit, p. 111; Agricultural Gazette, 4 Aug 1862, p. 724.
50. B.P.P. 1898 C II, op.cit; Fairlie, loc. cit, pp. 114-5.
51. Transactions of the Highland and Agric. Soc. n.s. 1855-7, pp. 207-9; 1857-9, pp. 201-24; Agricultural Statistics, 1870. For a discussion of the Highland Soc. Returns, see, Houston, loc.cit, pp. 93-8. These returns are generally regarded as very accurate - farmers gave their fullest cooperation. They were discontinued in 1857 for reasons of cost.
52. The statistics and accompanying reports are contained in, Reports of Poor Law Inspectors on Agricultural Statistics(England) 1854 (1855). Just why so many farmers refused to make a return is not at all clear. The official view was that farmers believed the census should have been conducted by some agency other than the Poor Law authorities, but we must assume that disinterest and suspicion also played their part. Wiltshire, Hampshire and Berkshire were the chief defaulting counties, and here many of the schedules had to be filled in by the enumerators. In Brecknock, on the other hand, only 14 farmers refused to cooperate. Presumably, Brecknock farmers would have been less happy to comply had the operation been in the hands of the Clergy or Tithe Commissioners!
53. R. C. Labour (1894); I, pt. II, p. 63; J. Darby, 'Farming of the Chalk Soils of Hampshire & Wiltshire', J. Bath & West (1861), pp. 49, 64.
54. Healy & Jones, loc.cit, p. 578; Caird (Ag. Stats), loc.cit, p. 130.
55. It was noted in 1851, for example, that East Cumberland farmers were anxious to contract tillage; Caird, op.cit, p. 357. In East Lothian wheat gave way to barley in 1847-52. In two upland parishes in Peebles, the 1851 Census reported depopulation due to the conversion of tillage to pasture; Census 1851, I, p. 35, and similarly in Glendale, Northumberland, ibid. In the dairying districts of south-west Scotland tillage decreased after 1840; J. Biggar, The Agriculture of Kirkcubrightshire & Wigtownshire (Chapleton, 1876), pp. 21-3. For contraction of the corn area in north-west England after 1850, see, R. W. Sturgess, 'The Revolution on the English Claylands', Ag. Hist. Rev., XIV (1966), pp. 104-21, XV (1967), pp. 82-7.
56. W. Bravender, 'On the Farming of Gloucestershire', J R A S E, XI (1850), p. 166; W. J. Moscrop, 'A Report on the Farming of Leicestershire', J R A S E, 2nd ser, II, p. 324.
57. In 1867, for example, it was stated as 'now generally admitted by agriculturists that autumnal tillage for stubbles or fallow is of vital importance', Agricultural Gazette, 11 May 1867, p. 500.

58. J. Wilson, British Farming (Edinburgh, 1862), p. 311.

59. Morton, op.cit, pp. 70-2.

CHAPTER III

THE SUPPLY OF HARVEST LABOUR.

I

The exceptional demand for labour at harvest time could be met only by the drawing-in of many temporary workers and by a much increased supply of effort. Jefferies described Wiltshire corn villages in which, during the harvest, 'scarcely anyone is left at home; every man woman and child is out in the field From earliest dawn to latest night till the moon silvers the yellow corn'.⁽¹⁾ Here was a quasi-military operation in which disciplined labour had to be brought to bear quickly and efficiently at a time chosen by the weather. In Suffolk and Cambridgeshire workers were summoned by the harvest horn and in Cumberland by the drum and fife.⁽²⁾ In the rush years it was not unusual for work to continue through the evening into the night. In Kent the general rule was to start at dawn and not leave off 'till you can see a star'; in north-east Scotland it was an understood condition of hiring that men worked for 'as long as they can see'.⁽³⁾ It is doubtful whether many workers were able to keep up a constant work rate over so long a day. Stephens believed that 12 hours was 'as long a day's work as reapers can endure for a harvest of 3 weeks especially in warm weather'.⁽⁴⁾ The strongest workers could endure much more. In west Berkshire, for example, an extraordinary 1.75 acres of barley was alleged to have been cut in a single day by a Padworth farm worker in the 1860's.⁽⁵⁾ Harvest casualties were not uncommon. Jefferies reported frequent vertigo and vomiting in north Wiltshire, while in 1801, in Lancashire,

at least two men died in the harvest field:- 'The Heat this Day [is] intolerable, and the Reapers who on account of the extravagant wages are compelled to labour extremely hard, and long Hours, sink under it'. (6)

In many arable areas the heavy demand for casual and part-time labour at harvest time completely transformed the structure of the farm workforce. In the early 1830's, temporary workers were said to have outnumbered regular hands three to one in Kent, while on a Gloucestershire hill farm, the permanent staff numbered 38, turnip hoers in July, 67, and in harvest double this number, with sometimes as many as a hundred hands employed in reaping wheat alone, besides those occupied in mowing barley and oats. On a Cambridgeshire farm, probably in the late 1830's, 300 men were set reaping in a single day, and a whole crop of wheat cut down inside five days. (7)

There exist for the years 1867-9 very detailed statistics of seasonal labour distributions collected by the Assistant Commissioners serving the Royal Commission on the Employment of Children, Young Persons and Women in Agriculture. Only one of the farm samples detailed below, that for Berkshire II, enumerates under the summer head extra workers specially taken on for the harvest. It suggests that even at this late date, with the reaping machines already in use, the harvest workforce in many corn growing districts of Britain, was at least double the winter workforce.

Seasonal Distribution of Labour on Select Farms, 1867-68⁽⁸⁾

OXFORDSHIRE

16,636 acres, 70 per cent arable, 30 per cent pasture.

	Numbers of Males Employed (by age group)					Numbers of Females employed (by age group)					
	8-9	10-12	13-18	over 18	Total	8-9	10-12	13-18	over 18 married	over 18 single	Total
Spring	8	89	113	554	764	-	1	10	130	20	161
Summer	7	93	120	659	879	-	-	15	149	22	186
Autumn	5	92	120	595	812	-	-	11	119	18	148
Winter	4	82	113	526	725	-	-	8	67	14	89

NORTH EAST SCOTLAND

10,989 acres, 95 per cent arable, 5 per cent pasture.

Spring	-	18	35	241	294	-	15	21	54	89	179
Summer	-	3	34	248	285	-	-	24	71	97	192
Autumn	-	14	47	266	327	-	14	50	73	100	237
Winter	-	12	22	234	268	-	8	4	42	81	135

BERKSHIRE I

20,221 acres, 75 per cent arable, 25 per cent pasture.

Spring	8	83	184	560	835	1	1	13	188	13	216
Summer	11	87	188	568	854	1	1	14	238	14	268
Autumn	-	-	-	-	-	-	-	-	-	-	-
Winter	7	80	181	528	796	-	1	11	109	10	131

BERKSHIRE II

5,541 acres, 60 per cent arable, 40 per cent pasture.

Spring	2	24	61	187	274	2	3	10	69	6	90
Summer	6	33	84	355	478	4	3	32	141	19	199
Autumn	-	-	-	-	-	-	-	-	-	-	-
Winter	2	22	59	200	283	-	2	2	40	5	49

SUMMARY TABLE.

GRAND TOTALS

	Spring	Summer	Autumn	Winter
Oxfordshire	925	1065	960	814
North East Scot.	473	477	564	403
Berkshire I	1051	1122	-	927
Berkshire II	364	677	-	332

II

There existed within the nineteenth century farm labour market no straightforward correlation between harvest and normal weekly wage rates, or between labour supply/demand ratios at harvest time and those obtaining at other times of the year. A detailed national wage survey carried out in 1850 by J.C. Morton, editor of the Agricultural Gazette, reveals, rather surprisingly, that harvest wage levels and ratios of harvest to weekly wages were in many cases considerably higher in the so-called 'low-wage' districts of south and east Britain than in the 'high-wage' districts of north Britain.

AVERAGE WEEKLY AND HARVEST WAGES OF MALE WORKERS, 1850 ⁽⁹⁾

	<u>Average Weekly Wages</u>	<u>Average Harvest Wages</u>
Northumberland	12s (+ cottage, coal and potatoes)	12s (+ food)
Cumberland	13s 3d (+ food & drink)	14s (+ food & drink)
Westmorland	11s	12s (+ meat, drink & lodging)
Lancashire	12s 4d	15s 3d
Yorkshire	10s 3d	16s 2d (sometimes + beer, bread and cheese)
Derbyshire	10s	12s (+ beer and food)
<hr/>		
<u>Average Northern Counties</u>	11s 2d	13s 6d

	<u>Average weekly wages</u>	<u>Average harvest wages</u>
Rutland	9s	18s (+ beer)
Norfolk	7s 6d	23s 3d (sometimes + beer)
Suffolk	7s 9d	21s
Cambridgeshire	9s	19s 6d
Huntingdonshire	8s	20s
Essex	7s 2d	21s 3d (+ beer or malt & hops)

Average Eastern Counties

	8s 1d	20s 6d
Warwickshire	8s 9d	15s 7d
Worcestershire	8s 2d (+ beer)	15s (+ beer)
Oxfordshire	7s 9d	10s 3d (sometimes + beer)
Hertfordshire	9s 3d (sometimes + beer)	19s (+ beer)
Buckinghamshire	8s 6d	18s (+ beer)
Herefordshire	7s 6d (+ beer or food) and drink)	7s 6d (+ food & drink)

Average South & West

<u>Midland Counties</u>	8s 4d	14s 3d
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Berkshire	8s 7d	18s 3d
Surrey	10s 9d	17s 9d
Sussex	9s 8d	17s (+ beer)
Hampshire	8s	16s (+ beer)
Dorset	7s 6d (usually + beer)	13s 2d
Kent	10s	16s
Wiltshire	9s	9s 7d

Average South, South
East England Counties

	9s 1d	15s 5d
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SUMMARY

	<u>Average weekly wage rate (shillings)</u>	<u>Average weekly harvest wage rate (shillings)</u>	<u>Harvest wages Weekly wages %</u>
Northern counties	11.2	13.5	121
Eastern counties	8.1	20.5	253
South & West Midland counties	8.3	14.3	172
South and South East counties	9.1	15.4	170

The scale of harvest perquisites in north Britain was more generous than in south Britain. But even if northern food was worth 3s 6d more than southern beer, the average northern harvest wage was still exceeded in 11 of the 19 southern, eastern and midland counties.

A further complicating factor was that women were much more extensively employed and much better paid in north than in south Britain. In north Britain women did most of the actual cutting and in some districts were paid almost as much as the men. In south Britain they engaged chiefly in gathering and binding and when directly employed by the farmer received only 30-40 per cent of the male wage. However, the key determinant of task allocation and of regional wage differentials was the technology mix, for although harvest wages were higher in south and east than in north Britain, per acre costs were often lower, because the methods employed there were more labour-saving and more amenable to the employment of lower cost child and female labour in the linkage operations.⁽¹⁰⁾

III

The sources of increased labour supply were many and various. On Tom Strong's 'Stubble Farm', (probably in east Berkshire), the harvest workforce comprised, 'all sizes and ages, men and women, Irish and English, strollers and neighbours, reapers and faggers, good workmen and bad, grandmothers and children, kettle boilers and tiers, married and single'.⁽¹¹⁾ Farmers turned first to their local populations; smallholders, cottage housewives and children. Village tradesmen also participated, out of fear perhaps, that unless they did so farmers would withhold their patronage over the winter.

Often, considerable pressure was put on married labourers to send their wives and children into the field. In Dorset for example, this was a usual condition of hiring, while in north Britain, male labourers were contracted to provide a 'bondager', usually a female member of their family, to assist at the busy seasons.⁽¹²⁾ Cottage industry was another important source of temporary harvest labour. It was said of Scottish hand-loom weavers that they were 'as often found handling implements of manual labour in the field as on the loom-board'. In the early nineteenth century spinners, weavers, colliers and quarrymen were essential components of many harvest gangs in northern England and the Scottish Lowlands.⁽¹³⁾ Many towns staged weekly or daily hiring markets, from which local farmers recruited their harvest labour. Many areas, of course, relied heavily on migrant workers.

The scouring of local labour pools was often so thorough that the composition of many harvest workforces, like Tom Strong's, was so complex as to defy analysis. A few examples should make the point. In the 1830's Kent farmers employed rural craftsmen, gypsies, male servants and soldiers on furlough.⁽¹⁴⁾ In parts of Suffolk, there could be found wheelwrights, carpenters, blacksmiths and collar-makers.⁽¹⁵⁾ In west Berkshire, around 1900, young men from the gravel-pits often did harvest work during the evenings.⁽¹⁶⁾ In Somerset, as late as 1914, 'slingers' (casual labourers), miners, fishermen and dredgers joined in.⁽¹⁷⁾ As the nineteenth century advanced, harvest workforces tended to become more homogenous and to consist more exclusively of agricultural workers and their families. But as late as 1870, the weight of rural custom was still strong when it came to the harvest, and in the 'rush years', with the threat of a spoilt harvest hanging over the village, the older pre-industrial

work rhythms occasionally managed to break through the new, to bring the whole community into the field. 'How few now know', wrote Miss Ashby, 'what it was ninety years ago [i.e. 1870] to get in a harvest'.⁽¹⁸⁾ Earlier in the century, the spirit of the harvest would have been far stronger. Writing in 1800, Mavor, the Board of Agriculture reporter for Berkshire, described it thus:-

'The harvest is a season of joy, as well as of labour; and its various operations are carried on with pleasure and animation. The toils of the labourer are not only sweetened by good pay, and a liberal allowance of beer, but he anticipates the feast which commonly attends harvest home; and if he sees a plentiful crop on the ground, congratulates himself on the cheapness of bread, which is its natural result'.⁽¹⁹⁾

Up to, and in many rural areas, long after, the passing of the 1870 Education Act village schools adjusted their summer and autumn terms to allow children to help their parents in the harvest field.

In Wales and Ireland labour was often supplied by the 'work debt' system, that is, harvest work in lieu of cottage rent. Cardiganshire farmers allowed local cottagers to plant potatoes in their fields and agreed to do most of the heavy cultivations in return for harvest work at the rate of one day's cutting or one and a half day's binding per 80 yard row of potatoes. As late as 1918 some Welsh farmers still required men who had migrated away from the village to return at harvest-time to discharge the work debt on the family cottage. In western Ireland fishermen were sometimes obliged to harvest for their cottage. In small-farm communities labour was often freely exchanged between holdings at harvest time.⁽²⁰⁾

Methods of wage payment were as diverse as sources of labour supply. In south Britain beer or cider, and in north Britain food and drink, were standard perquisites. But on many farms, items

such as fuel, malt, hops, potato grounds, livestock keep and rent-free cottages also entered into the harvest bargain.⁽²¹⁾ Payment in the north was usually by the day or week, and in the south by the acre, while in parts of East Anglia the whole harvest, including carting and stacking, was contracted out to the resident workmen of the farm. Migrant workers were sometimes boarded in the farmhouse during the harvest (a dying practice after 1800), or given bedroom in a barn or outhouse. Extra wages were always given at harvest time, except to living-in farm servants, who were expected to harvest at the normal weekly wage. Higher wages could take the form either of a bonus, of overtime payments, or of a straight doubling of the weekly wages.⁽²²⁾ More usually though, the price of the harvest was the subject of negotiation between the farmer and his 'harvest company', the exact price depending on such factors as crop yield and condition, speed of ripening, and the state of the labour market. In some counties the harvest bargain was made in April or May, but in others, and always where migrant and casual workers were employed, it was made on the eve of the harvest itself. As a general rule harvest wage rates in the 'public market' tended to fluctuate much more sharply within and between seasons than in the 'on-farm market'.

1. R. Jefferies, Hodge & His Masters (uniform edn, 1949), p. 293;
R. Jefferies, The Toilers of the Field (edn, 1894), pp. 120-1.
2. G. E. Evans, The Pattern under the Plough (1966), pp. 153-4;
E. Hughes, North Country Life in the Eighteenth Century (1965),
II, p. 230.
3. Report on the Employment of Women & Children in Agriculture (1843),
p. 171. See also, R.C. Labour (1893), III, pt. I, p. 115;
See also, P. McConnell, Diary of a Working Farmer (1906), pp. 258-9;
'Furness Diary', Countryman, LV (1958), p. 429.
4. H. Stephens, Book of the Farm (1844), III, p. 1054.
5. Private Communication, H. Bew, Padworth, Berks.
6. Jefferies (Toilers), op.cit., pp. 120-1; 'A Furness Diary',
Countryman, LV (1958), no. 1, p. 32.
7. Report on the State of the Irish Poor in Great Britain (1834),
App. G, p. 165; Reports of Select Farms (bound as Volume III),
British Husbandry (1840), Glos. Hill Farm, pp. 19-20; S. Jonas,
'On the Farming of Cambridgeshire', JRASE, VII (1846), p. 49.
8. R. C. Employment (1867), Second Report (1869), pp. 327, 368-9;
Fourth Report (1870), App. pt. I, p. 64. It was also stated
that farmers were unable to enumerate harvest field populations
because of the difficulty in estimating the numbers of child
and female workers.
19. Agricultural Gazette, 27 April 1850, pp. 266-7. The survey was
made in the autumn of 1849 and refers to wage rates paid in the
1849 harvest. All wages were expressed by the week, except
in Norfolk and parts of Essex where they were by the 'harvest
month'. In many cases details of perquisites (food, drink,
fuel, cottage etc) are also given. Similar surveys were conducted
in 1860 (Agricultural Gazette, 30 April 1860, pp. 392-3) and
1867 (Agricultural Gazette, 17 Aug 1867, p. 863; 24 Aug 1867,
pp. 888-92). See also J. C. Morton's summary in his Hand Book
of Farm Labour (1868 edn), pp. 73-84.
10. For per acre costs, see, Agricultural Gazette, 27 April 1850,
pp. 266-7. The whole issue of technology and its effect on
labour productivity and wage rates is discussed at length in
Section II of this thesis, infra, pp. 234 ff.
11. Anon, Stubble Farm (1880), II, pp. 17-18.

12. W. Rose, Good Neighbours (Cambridge, 2nd edn, 1945), p. 27; R.C. Employment (1867), Second Report (1869), App. I, pt. II, p. 19. For an account of the 'bondager' system, see, W. Hasbach, A History of the English Agricultural Labourer (1908), pp. 226-7, 262.
13. New Statistical Account for Scotland, V, p. 371; Hasbach, op.cit, p. 82; R. Brown, General View West Riding of Yorkshire (1799), p. 225; I. Pinchbeck, Women Workers & Industrial Revolution (1930), pp. 55-9; Report on the State of the Irish Poor, op.cit, p. 165.
14. Ibid, pp. 165-6.
15. J. Thirsk & J. Imray, Suffolk Farming in the Nineteenth Century (Suffolk Records Society, 1958), pp. 55, 149-50.
16. Private Communication, H. Bew, Padworth, Berks.
17. R.C. Labour (1893), I, pt. II, p. 108.
18. M.K. Ashby, Joseph Ashby of Tysoe (Cambridge, 1961), p. 24.
19. W. Mavor, General View Berkshire (1809), p. 193.
20. R.C. Labour (1893), II, p. 9; IV, pt. I, p. 71; Report on Conditions of Employment in Agriculture (1919), III, pp. 416, 489. Earnings of Agricultural Labourers, Second Report (1905), p. 70; J.G. Jenkins, 'Technological Improvements and Social Change in South Cardiganshire', Ag. Hist. Rev., XIII (1965), pp. 99; For Welsh harvest customs see also, T.M. Owen, Welsh Folk Customs (Cardiff, 1950), Chap. IV.
21. For details of these miscellaneous payments see, Agricultural Gazette, 27 April 1850, pp. 266-7; 30 April 1860, pp. 392-3; 17 Aug 1867, p. 863; 24 Aug 1867, pp. 888-92.
22. In addition to the references detailed in fn.21 supra, there is Wilson-Fox's excellent survey of the different methods of harvest wage payments, most of them dating from at least the early nineteenth century, in, Earnings of Agricultural Labourers, Second Report (1905), pp. 19-21. Wages tended to fluctuate more when hand tool methods were employed than when the harvest was cut by machinery. Thus in the early twentieth century there appears to have been very little inter-seasonal fluctuation in harvest wage rates, while as an extreme example of the effects of an overstretched harvest labour market on wage rates we may note that in Suffolk in the 1840's, it was usual to pay the same price per acre for 'high-reaping' wheat as the average weekly wage obtaining in the period immediately preceding the harvest - and this was regulated largely by the price of wheat. W. & H. Raynbird, The Agriculture of Suffolk (1849), p. 139. The mediaeval practice of paying harvest workers in corn appears to have died out in all areas of Britain by 1790.

CHAPTER IV

THE HARVEST LABOUR MARKET: Mechanisms and long run change: The

Problems of Analysis.

At present very little is known about the mechanisms of the proto-industrial seasonal labour market. So little in fact, that labour is generally regarded as a homogeneous factor of production, even in an economy where production was mostly carried on by labour-intensive methods, and where high levels of economic growth were dependant of the supply of labour being flexible enough to meet the highly fluctuating requirements of a vast number of different industries, each using capital and labour in different proportions, and each demanding different qualities of labour. To analyse the structure and internal mechanisms of the labour market is like trying to record the flow and morphology of a river from just a few pieces of driftwood. For a start, it is notoriously difficult to ascertain just what part of the total population was 'agricultural', what part of the agricultural population was 'active', and what part of the active population did harvest work. The occupational censuses, first, because they were decennial, and second, because they were taken in spring rather than in summer, cannot detect short run changes in the geographical and industrial distribution of the labour force. No single historical source, nor it would seem, any amalgam of sources, can properly expose the highly sensitive mechanisms of a labour market in which occupational divisions were often blurred and a large part of the workforce casual or itinerant. The mature industrial economy

has few counterparts of Hobsbawm's 'tramping artisan', the Irish migrant harvesters, of itinerant casual labourers of the type of the man and wife team which, Macmillan's Magazine reported in 1861, perambulated between Yorkshire and Kent, Oxford and Hereford, Birmingham and South Wales, taking work where they could find it, sometimes in agriculture, sometimes in general labouring.⁽¹⁾

It is impossible to generalize about the workings of the seasonal labour market not only because of the complexity of regional and local experience, but also because it is clear that between 1790 and 1870 the seasonal labour market underwent not just one but a succession of structural transformations. In some industries, particularly those unaffected by technological or locational change, there may have been a measure of continuity, but in others, especially the factory-based industries, changes in location, type and scale of technology, and size of production unit, must have profoundly affected the structure of many regional labour markets.

We will begin by assuming that after 1790 the seasonal labour market became more active, that new labour flows developed and that labour circulations speeded up. Within it we can recognize two opposing tendencies: one, for increased mobility of agricultural workers, especially after 1830 when the building, mining, trade and transport industries began to expand; the other, for urban industrial workers to transfer from the 'floating' and 'itinerant' labour pool into more permanent employment. Indeed, in all its aspects - migration, emigration and seasonal migration - the volume of population movement in the proto-industrial period was unprecedented. The belief, still very much part of the urban folklore of Britain, that village horizons extended only as far as the nearest market town, is confounded by nineteenth century experience. If we were able to 'ring' all birds of passage, we would discover a migration pattern

which permeated every stratum of national economic life.⁽²⁾

The proto-industrial labour market was ruled by two factors. The first was the need for seasonal redistributions of manpower to meet the exceptional demands of a large number of 'outdoor' industries, such as agriculture, building and brick-making, whose work peaks occurred during the summer months. The second was the trade cycle, which regulated the stock of work opportunities outside agriculture and the volume and direction of internal labour flows. During economic upswings casual and itinerant (tramping) labourers would tend to transfer from agriculture to other industries, and the rate of migration out of agriculture (permanent, temporary and seasonal) would increase.⁽³⁾ In the downswings the process was reversed, that is: casual and itinerant labourers would return to agriculture, the geographical mobility of agricultural labour would slow down, and from all sources agriculture would receive an increased supply of labour for its summer operations. In the deeper troughs, e.g. 1815-16, 1825-6 and 1846-8, the net rural migration rate may even have been negative as many recent migrants, now unemployed, returned to their native villages to await the next upturn.

The harvest labour market was perhaps the most complex of all. First, because the harvest was the most labour-consuming farm activity and the one in which the supply of labour was most imperfectly distributed relative to demand. Second, because it coincided with the work peaks of many other outdoor industries utilising casual labour. And third, because its workforce was comprised of so many different categories of worker, drawn from within and without agriculture, each with its own individual supply curve: - full-time agricultural workers, migrant workers, women and children, urban

and industrial workers, casual labourers, vagrants and gypsies.

Over the course of the proto-industrial period the harvest labour force expanded more slowly than crop demand, its numbers declined, and its composition became less heterogeneous. The chief operative factors were:-

- (a) increasing permanent rural migration, particularly among the younger, more physically active members of the rural community, which not only reduced the numbers of full-time farm workers available for harvesting but also resulted in a disproportionate reduction in the total supply of effort from this source.
- (b) a growing tendency for casual labourers and young farm labourers to seek summer work outside agriculture, in the general labouring trades.
- (c) a reduction in the numbers of child and female harvest workers.
- (d) a contraction of migrant harvest worker flows, particularly the upland and small-farm Celtic zones.
- (e) a progressive, and after 1830, a very rapid, decline in the supply of part-time urban and industrial harvest workers.

To examine the harvest labour market is therefore to embrace the whole economy, but by stressing the interdependence of the farm and non-farm labour markets we are drawn inevitably into uncharted areas of general economic history. The magnitude and complexity of the problem, and the patchy and epigrammatic nature of the historical evidence, means inevitably that this thesis can do no more than outline long run changes in harvest labour supply, and expose rather than solve the intricacies of the proto-industrial seasonal labour market. For want of a much larger stock of regional and industrial case studies on which to draw, and of time and opportunity to locate

and process the archival sources, I am forced to rely heavily, often exclusively, on the contemporary agricultural periodical literature, official government publications, and a few highly-aggregated studies of nineteenth century British economic development. Inevitably, therefore, many of my conclusions will be speculative, admitting of considerable regional variation and based to a considerable extent on inference and extrapolation than on direct evidence. It may be, of course, that the relationships which we are trying to establish are so complex that literary analysis is an unsuitable medium for investigation. If so, the outlook is bleak, because the statistical data available do not lend themselves to sophisticated model-building. Overall, it appears infinitely wiser to seek partial answers to the right questions in an attempt to discover what happened, than to apply effete methodologies to situations which conventional economic theory cannot even describe, let alone explain.

II

The changes which occurred in the size and structure of the full-time agricultural labour force between 1790 and 1870 will be discussed in the chapters devoted to the chronology of harvest labour supply. (infra pp. 287 - 322).

Before embarking on this major exercise, I will examine first the long run changes in the supply of the three most important categories of 'casual' harvest worker: female, urban and industrial and migrant. These were the farmers' 'hidden' reserves of harvest manpower; hidden that is, because they were either unrecorded by

the occupational censuses or else were enumerated under a non-agricultural head. They were important because even relatively small changes in their numbers would have had significant and immediately perceptible effects on the overall harvest labour supply position. We will try to demonstrate that over the longer run these categories of harvest worker declined faster than full-time agricultural workers, with the result that in 1870 the total national harvest workforce may have been smaller than in 1790, notwithstanding the fact that between 1790 and 1850 the farm population probably increased by more than 25 per cent.

1. E. J. Hobsbawm, 'The Tramping Artisan', Labouring Men (1964) pp.34-63; Macmillan's Magazine, Dec 1861, pp. 150-1.
2. Indeed, the historical literature dealing specifically with the workings of the early industrial labour market is very thin. Apart from Hobsbawm's study of the tramping artisan, there is to my knowledge no English counterpart of N. Helge's, 'Some Remarks on Seasonal Wanderings', Folk-Liv, XXI (1957), pp. 85-99, which examines the incidence and mechanisms of seasonal migration in nineteenth century Sweden. Fluctuations in the level of employment have been similarly neglected, as is reflected by the very inadequate treatment of the subject in A. D. Gayer, W. W. Rostow & A. Schwartz, The Growth & Fluctuations of the British Economy, 1790-1850 (Oxford, 1953), 2 vols, and particularly, II, pp. 939-70. The Pauperism Returns may throw more light on both cyclical and seasonal fluctuations in employment but these have still to be worked in detail. The chief characteristic feature of the proto-industrial labour market was its complexity and extreme sensitivity, and these are conveyed neither by 'average' wage rates nor by casual statistics of demographic and occupational change. Other than that in the early stages of industrialization employers found difficulty in assembling an industrial wage-labour force, little is known about the supply price elasticity of the different categories of industrial worker during the period under review. That the process of job mobility was extremely complex is apparent from even the most cursory examination of the nineteenth century 'blue-book' literature on labour and trade unionism. Nor are the standard histories of individual firms or industries very helpful in this respect, most are concerned with production, entrepreneurship and technological change and treat the subject of labour only very superficially.
3. The distinctions between the three categories of rural migrant, the permanent, temporary and seasonal, may seem artificial. The distinction I am trying to make, however, is between migrants who changed jobs and retained their home bases and who returned there either for the winter or when the supply of work ran out, and between migrants who changed permanently both jobs and 'homes'.

CHAPTER V

PART-TIME FEMALE HARVEST LABOUR

Over most of Britain, excepting perhaps East Anglia, women were the chief source of extra labour at harvest time. Ratios of female to male workers were then usually much higher than in any other farm operation. Indeed, throughout the summer months female/male ratios were greatly in excess of those of the official occupational censuses. These points are brought out, first, by the following seasonal breakdown of the 1867-9 labour statistics (Royal Commission on the Employment of Young Persons, Women and Children in Agriculture), and, second, by a comparison of these ratios with those of the 1861 Census.

FEMALE EMPLOYMENT RATIOS, 1867-9 cf 1861 (Census)⁽¹⁾
(as percentage of male employees)

COUNTY	Spring	Summer	Autumn	Winter	1861 Census ratio: county average
Oxfordshire (a) (16,636 acres)	27	21	18	12	4
North-East Scotland (a) (10,989 acres)	61	67	72	58	—
Berkshire I (a) (20,221 acres)	26	31	—	16	8
Berkshire II (b) (5,541 acres)	33	42	—	—	8
Norfolk (c) (44 parishes)	—	80	—	—	9
Gloucestershire (c) (26 parishes)	—	76	—	—	13
Sussex (c) (15 parishes)	—	27	—	—	1

(a) = Excludes harvest

(b) = Includes harvest

(c) = The returns for Norfolk, Gloucestershire and Sussex were not compiled on a seasonal basis, but they probably represent the peak summer field populations.

A further breakdown of these data reveals that in south Britain many more married women engaged in farm work than single women. In the Oxfordshire sample, for example, married outnumbered single by almost 5 : 1. In north Britain on the other hand, the balance was often the other way. In north-east Scotland single women, a high proportion of them probably migrant workers from the Highlands, heavily outnumbered married.

The economic incentives for women to participate in harvest work were always strong. Direct employment was more common in north than in south Britain, and here women were hired on the same basis as male workers. In other regions, where piecework was more the rule, women and children were seldom employed directly, except in such tasks as raking and swathe-turning, but instead usually worked as part of a family group led by their menfolk. In many areas farmers expected the wives of farm labourers to turn out as a matter of course.

The most important determinants of female deployment in the harvest field were first, technology, and second, the ratio of male to female workers. The chief technological factor was that with the light hand reaping tools, the sickle and reap hook, women could engage in cutting, but with the heavier and more physically demanding scythe and heavy (bagging) hook, their usefulness was confined to the linkage tasks of gathering and binding. Thus in north Britain, where women often comprised the bulk of the harvest workforce and where consequently it was difficult to employ the heavier tools, women did most of the cutting and the men most of the gathering and binding. In south Britain on the other hand, the sex ratios were reversed, and the scythe and bagging hook were very extensively used, with the result that only very occasionally were women employed in cutting. Even so, task allocation appears to have depended to some

extent upon local custom. It was observed in the early 1840's how in south-west England women reaped in some villages but not in others, that on the Weald of Kent women were responsible for binding the corn but in Thanet only for gathering it together, and that in parts of Norfolk and Suffolk women seldom worked in the harvest at all, except for an occasional day's raking after the barley wagon. (2)

Women were already extensively employed in harvesting in 1750 but we can reasonably assume that subsequently, as crop demand expanded, as family-size increased and as male real incomes fell, female participation ratios improved substantially.

During the labour-scarce years of the Napoleonic Wars strenuous efforts were made not only to expand further the supply of female harvesters, but also to encourage them to reap, and thereby increase their productivity. Coke of Holkham contended that if guaranteed their gleaning rights women could perhaps be prevailed upon to cut a quarter of an acre of wheat a day. At least two local agricultural societies, the Brecon and the Bath and West, went so far as to offer premiums to women reapers. In south-west England and southern Scotland women shouldered many of the tasks previously performed by men. J.G. Cornish recollected the "Petticoat Harvests" on the Berkshire Downs when, with the men away at the Wars, the women-folk did most of the harvesting. 'Many women reapers' were doing their quarter of an acre a day in Cambridgeshire in 1811, while, on a Wiltshire farm, women outnumbered the males 3 : 1 and reaped not only wheat but also most of the spring corn. (3)

Between 1815 and 1835 it appears that fewer women were employed in harvest work than in the War years. Admittedly the evidence here is inconclusive, but it was specifically stated that in south-west England female labourers 'made way for men immediately

at the Peace'. However this may have meant only that they gave up the sickle and returned to their customary harvest tasks of gathering and binding, rather than that they abandoned the harvest field altogether. (4)

But if the demand for female harvesters fell after 1815, it appears to have recovered again with the rapid expansion of corn output after 1835. In 1838 Dr. Kay observed that since the new Poor Law came into operation, 'The extent of employment of--employment of women and children has most wonderfully increased', and indeed, by 1842 it had reached such proportions that the Poor Law Commissioners felt obliged to make it the subject of a special enquiry. (5) It has been usual to attribute this increased employment of child and female labour to the introduction of the New Poor Law, which by abolishing child allowances and outdoor relief, 'rendered it necessary that the children should be so employed in order to adjust the wages to the wants of the family'. (6) Yet this explanation obviates the possibility that labour participation ratios may have increased in response to increased demand, which, in the more labour flush areas would have been satisfied initially from within the local labour pool, thereby increasing family incomes without necessarily raising the wage rates of male workers. (7)

Less controversial is the contention that the demand for female labour accelerated rapidly after 1850, and remained at a very high level throughout the third quarter of the nineteenth century. This time though, and in marked contrast to the earlier periods, 1790-1815 and 1835-46, the supply of female labour was decidedly inelastic. Critically, their numbers were declining at the same time as changes in harvesting technology were increasing the demand for female labour in the secondary field operations. (8)

By the late 1860's the reduction in the female supply had become a major talking point among arable farmers. Many were clearly apprehensive at the prospect of a further withdrawal of female labour which they believed was essential for the success of intensive mixed farming. A Gloucestershire hill farmer reckoned that in his area alone, the numbers of female workers had declined by more than half between 1840 and 1867, and on one Cumberland farm their numbers were reported to have decreased to such an extent that but for machinery, 'it would be impossible to carry on the business of [the] farm'. In the Furness and Fylde districts of Lancashire, female labour became so scarce that even light repetitive tasks, such as weeding and turnip hoeing, had to be performed by men, while in other parts of northern England the 'bondager' system was beginning to break up, because it was alleged, fewer cottage girls were now prepared to 'forgo the pleasures of town life to live with their parents'. (9)

The more monotonous operations, such as hoeing and weeding, were probably more prone to defection than harvesting, but even here many fewer females participated in 1870 than in 1850. By the late 1860's women had ceased entirely to harvest in the Bakewell district of Derbyshire, while in the Fylde they turned out only very rarely. Nor was this reluctance wholly confined to north Britain. In 1867 it was complained that in the Cranleigh district of Surrey, only the wives of farm workers now assisted in the harvest, and then only very begrudgingly, and that in east Kent women could hardly be prevailed upon to work at all, and then did so only 'as a favour'. (10)

In the mid-1870's Richard Jefferies appraised the situation thus:-

'From a variety of causes, the number of women working in the fields is much less than was formerly the case; thus presenting

precisely the reverse state of things to that complained of in towns, where the clerks, etc., say that they are undersold by female labour. The contrast is rather curious. The price of women's labour has, too, risen; and there does not appear to be any repugnance on their part to field-work. Whether the conclusion is to be accepted that there has been a diminution in the actual number of women living in rural places, it is impossible to decide with any accuracy. But there are signs that female labour has drifted to the towns quite as much as male - especially the younger girls. In some places it seems rare to see a young girl working in the field (meaning in winter) - those that are to be found are generally women well advanced in life. Spring and summer work brings forth more, but not nearly so many as used to be the case'. (11)

As Jefferies perceived so well, young girls particularly, were anxious to escape the boredom and confinement of village life. Farmers complained increasingly about their antipathy to field work and their preference for indoor work, a predilection which had already begun to show by the early 1840's. (12) Jefferies said of them: 'Their aim is domestic service, and they prefer to be engaged in the towns. They shirk the work of the farmhouse'. (13) They shirked too the work of the harvest field. In 1867, on a sample of Berkshire farms, only 19 single women over 18 were employed in harvesting compared to 141 married women. (14) In Westmoreland it was then becoming less and less the custom to send servant girls out into the fields at busy times. (15) Cotswold farmers claimed that because so many young girls had gone into domestic service, the only unmarried women available to them were those, 'with no character who cannot get to service', (16) Yet even though married women were better disposed to field work, smaller families, rising real incomes and more continuous employment progressively reduced the necessity for them to supplement household incomes by casual work, more especially in 'closed' villages and in the high-wage counties. In the Muncaster Castle area of Cumberland it was reported in 1868 that labourers earning 15s to

16s per week would 'not permit their wives, or excepting for a short period of the year, even their children to work in the fields'.

Similar attitudes had by then crept into some low-wage districts of southern Britain. In Norfolk, for example, many parishes could report the 'increasing indisposition' of women to do field work, due, it was said, to 'more comfortable circumstances'. As one farmer observed; 'in the present conditions of the labour market, women are quite able to protect themselves from unsuitable and exhaustive work'. (17)

Increasingly after 1850 opposition towards child and female employment in agriculture began to increase. Gang labour was condemned as immoral and female manual labour as coarsening and uncondusive to well-ordered cottage life. The more reactionary farmers countered these notions by claiming that field work was more healthy than indoor work, and that female casual labour was the backbone of arable farming. (18)

Even so, the better-off farm labourer households came gradually to regard the keeping of wives and daughters at home as a hallmark of superior social status. In 1868 it was claimed that in some areas of Somerset women were 'above working out it makes their hands dirty'. By this stage too, the term 'bondager', with its connotations of servility, had become unpopular in northern England and was being replaced by that of 'woman worker'. Flora Thompson recollected that by the 1880's the notorious reputations left behind by the old field gangs had given Candleford women a violent distaste for 'goin' afield'. (19)

1. R.C. Employment (1867), First Report (1869), App. pt. II, pp. 3-4; Second Report (1869), pp. 327, 368-9; Fourth Report (1870), App. pt I, p. 64. For other Scottish data (for the counties Berwick, Fife, Lothians, Peebles, Perth, Roxburgh, Stirling) see, ibid, pp. 179-88.
2. Report on the Employment of Women and Children in Agriculture (1843), pp. 3, 133, 170, 172, 230. In some parts of East Anglia, August, the harvest month, was described as 'the dearest time for all [female] employment', ibid, p. 230.
3. The Practical Norfolk Farmer (1809), p. 133; Annals of Agriculture, XXXII, p. 246; XXXVIII, p. 110; A. Graham, General View Stirlingshire (1812), p. 313; Report on Employment (1843), op.cit, p. 27; W. Davies, General View South Wales (1815), II, p. 489; J. G. Cornish, Reminiscences of Country Life (1939), p. 121; W. Gooch, General View Cambridgeshire (1811), p. 286; Farm Account of R. Coward, 1806-12 (mss), deposited at Devizes (Wilts) Museum (microfilm in Reading University Library). See also, Annals of Agriculture, XXXII, pp. 85-6; T. Davies, General View Wiltshire (1794), p. 89; W. Pearce, General View Berkshire (1794), p. 35; G. S. Keith, General View Aberdeen (1811), p. 520.
4. Report on Employment (1843), op. cit, p. 27. The overall impression is that fewer women reaped in south Britain in the 1830's and 1840's than during the Napoleonic Wars. However, in north Britain, especially in industrial counties, numbers of female reapers may have increased. On the other hand, Irish seasonal migration may in some areas have led to a lowering of female/male ratios.
5. Report on the Poor Law Amendment Act (1837-8), pp. 467 f. For similar evidence, see, W. Hasbach, A History of the English Agricultural Labourer (1908), pp. 218-35.
6. ibid, pp. 218-35, and more recently, C. S. Orwin & E. H. Whetham, History of British Agriculture, 1846-1914 (1964), pp. 72-3.
7. Vaughan, the Poor Law investigator for Kent, Surrey and Sussex, specifically stated that women and children did not displace men, they merely supplemented them in acts of neatness and economy and were 'part of the economy of wealth', in which the farmer paid for speed and time rather than task; Report on Employment (1843), op.cit, pp. 131-2. The more intensive employment of women and children correlates nicely with the substantial improvement of agricultural output during the decade 1835-46. This subject will, however, be examined at length, infra, pp.180-1 .
8. See, infra, pp.270-1 for technological change and its effects on the sex composition of the harvest work force.
9. R.C. Employment (1867), First Report (1868), App. pt II, pp. 102, 209; Second Report (1869), App. pt I, pp. 153, 520.

10. ibid, Second Report (1869), App. pt II, pp. 112, 215, 561-2; Returns of the Average Weekly Earnings of Agricultural Labourers in England & Wales (1861), p. 584.

11. R. Jefferies, Hodge & His Masters (uniform edn, 1949), pp. 240-1. Jefferies was, of course, referring primarily to his native county of Wiltshire but presumably also to adjacent districts of Hampshire and Berkshire. As a contemporary observer of the agricultural scene in the 1870's, Jefferies has few equals. His background (son of a small farmer), occupation (roving reporter for a local newspaper) and hobby interests (the countryside), enhance his value as a historical source.

12. Evidence for the 1840's is mixed but instructive. A comparison of the two reports on female agricultural labour, 1843 and 1867-9, suggests that at the earlier date women were more extensively employed and that young girls were less averse to field work. Even so, in East Anglia, in 1843, although some young girls preferred the field to the house, because they were, 'at liberty to go where they like, and to form acquaintance', others clearly preferred the more genteel environment of domestic service. At Framlingham, Suffolk, for example, women were said to dislike field work and it was observed that, 'formerly daily work was much more common, indeed very general, but that is not the case now'. Report on Employment (1843), op.cit, pp. 234, 243 and 215-80 passim.

13. Jefferies, op.cit, pp. 235-6, 240-1, 244.

14. supra, pp. 77 ff.

15. R.C. Employment (1867), Second Report (1869), App. pt II, p. 548

16. ibid, First Report (1868), App. pt II, pp. 34, 102.

17. ibid, Second Report (1869), App. pt II, pp. 489, 518; First Report (1868), App. pt II, pp. 36, 39, 41, 43, 47-8, 61, 64. See also, Second Report, App. pt I, p. 136; First Report, App. pt I, p. 76.

18. For a general statement of farmers' attitudes towards child and female employment and child education, see, Orwin & Whetham, op.cit, pp. 206-20, and, Hasbach, op.cit, pp. 259-73. By 1867-9 a large number of farmers had swung round to the view that the field was no place for young single girls and that unless properly supervised child labour was seldom efficient. A distinction must be drawn, however, between women and children employed directly by the farmer and those who worked only as part of a family group in piecework operations such as the harvests.

19. R.C. Employment (1867), Second Report (1869), XIII; *ibid*, App. pt II, p. 477; Flora Thompson, Lark Rise to Candleford (Oxford, edn, 1954), p. 49.

CHAPTER VI

PART-TIME INDUSTRIAL HARVEST WORKERS.

'In hay and harvest time', observed an anonymous Inquirer in 1773, 'it is inconceivable what numbers of tradesmen and handicraftmen flock into the country'.⁽¹⁾ Indeed, one of the most characteristic features of pre-industrial agriculture was its heavy dependence on large transfers of labour from other industries during the summer work peaks. At this stage of economic growth the opportunity costs of a permanent shift of manpower out of farming were still extremely high, to the extent that the marginal productivity of labour in harvesting was probably often higher than in many branches of manufacturing. This is reflected by the fact that harvest wages were sufficiently attractive to draw in even the highest grades of industrial worker. According to Arthur Young's figures, average weekly wages (including food and beer) in 1768-70 were 60-100 per cent higher in harvesting than in the textile, pottery and lead mining industries.⁽²⁾ The cash incentives were in some cases strong enough to induce industrial workers to travel long distances in search of harvest work. In the late eighteenth century West Riding manufacturers harvested in the East Riding, West Country clothiers on the Wiltshire Downs and Leicestershire stocking workers in Cambridgeshire.⁽³⁾

Economists have so far been unable to devise a model which describes adequately the relationship between agriculture and industry in the pre-industrial and early-industrial economies. We know only that economically and physically the two sectors were closely integrated, and that between them there existed many and complex exchanges of factors of production. In 1790 perhaps the majority of non-

agricultural workers were engaged in servicing agriculture or processing its products. Industrial households supplemented their incomes by agricultural work in the same way as agricultural households mitigated underemployment by handicraft industry. Most townspeople then lived and worked within a short distance of the open countryside, and with the harvest fields close at hand and industrial production carried on in small and highly flexible units, the opportunity costs of job switching were unusually negative. As late as 1831 at least half of the population of Britain could still be classed as 'rural' and most manufacturing industries as 'handicrafts'.⁽⁴⁾

Conceivably as many as one third of the 1.13 million families enumerated by the 1811 Census as occupied in 'trade, manufactures and handicrafts' engaged in harvest work, representing perhaps one million active participants, compared with the 1.8 million persons estimated by Deane and Cole to have been permanently employed in 'agriculture, forestry and fishing'.⁽⁵⁾

At this stage many farmers drew a large part of their harvest labour force from the towns, not only in north Britain where agricultural populations tended to be concentrated in larger units, but also in south Britain where the settlement pattern was more variegated and farm populations more evenly distributed over the countryside. Bedfordshire farmers drew from Ampthill and Kent farmers from Rochester, while farmers on the Berkshire Downs recruited most of their summer labour from the poorhouses of Newbury and Hungerford.⁽⁶⁾ In the summer of 1811 Consul Vander Horst was still able to report that 'agricultural pursuits now employ a great number of those who at other seasons of the year[are] occupied in the different manufactures of the Kingdom'.⁽⁷⁾ Inevitably, there occurred some conflict between agriculture and cottage industry over the seasonal allocation of labour. There were, for example, occasional

complaints from Scotland about the shortage of part-time industrial harvesters when trade was brisk.⁽⁸⁾ But elsewhere in Britain, even during the 'Golden Age of Handloom Weaving' (1790-1815), agriculture may still have had first call on the services of cottage textile workers during the harvest months. Except for 1792, when 'the manufacturers had orders to an uncommon extent', industry and agriculture did not conflict in the West Riding, and it appears that as long as farmers were prepared to pay an incentive wage, handloom weavers could normally be relied upon to assist with the harvest.⁽⁹⁾

In 1921 permanent farm workers in England and Wales outnumbered part-time and seasonal workers 5 : 1.⁽¹⁰⁾ A century earlier the balance would have lain heavily the other way. But as early as 1821 some farmers had already discovered that the stream of part-time urban and industrial labour was running dry and was becoming increasingly erratic. The new 'inter-sectoral' exchanges of labour which sprang up after 1790 were of an altogether different order from the old pre-industrial labour flows, in that they emanated not from the town but from the countryside. By 1850 the numbers of young farm labourers seeking summer work outside agriculture probably far exceeded those of urban and industrial workers seeking harvest work within it. By the 1870's the once very substantial urban and industrial contribution to harvest work output had been reduced to a mere trickle, and most of those who still participated now did so 'rather for the change of air, scene and food, than with the object of making money'.⁽¹¹⁾

The factors underlying this defection, because they are so much a part of the broader process of economic growth, are difficult to isolate. Admittedly, there are no statistics illustrating the decline in the numbers of part-time urban and industrial harvest

workers, but we know enough about structural changes in the economy to be able to postulate that after 1790 farmers became more physically isolated from urban and industrial sources of harvest labour, and that the economic incentives for urban and industrial workers to enter harvesting progressively weakened. On the first score, it is almost enough to say that by 1880, at least two thirds of the British population was recognisably 'street-bred', physically and culturally isolated from the countryside, and owning no agricultural skills. Between 1801 and 1871 numbers of towns with populations greater than 40,000 increased from 7 to 48, and those with more than 100,000 from 1 to 17. At the latter date over 60 per cent of all townspeople were concentrated in large conurbations.⁽¹²⁾

In southern England urban supplies of harvest labour were already low by the 1830's, and farmers had accepted the fact that as townspeople became more exclusively 'town-bred' and lost their 'rural tastes' the supply would diminish further. Looking back, one Kent farmer remembered, 'inns and workshops in Rochester, which used in harvest and hopping to be nearly deserted by their inmates, and many individual families who formerly turned out, the whole of whose aid was now entirely withheld'.⁽¹³⁾

In north Britain the settlement pattern was more conducive to urban participation in farmwork, but even though in some areas urban harvesters were still numerous in the 1860's, few women then came out from the large industrial towns, while in many of the smaller towns, such as Gosforth and Workington, it was complained that women no longer cared for field work.⁽¹⁴⁾

In the 1830's, even without large local industries to provide alternative employment, Edinburgh women were reluctant to harvest, or at least they were not prepared to do so at the same low wages as the Irish migrant harvesters were willing to accept.⁽¹⁵⁾ By 1870 the day

was long past when Berkshire Downland farmers had been able to recruit all their extra summer labour from the Thames and Kennet valley towns, and when around Workington, farmers had congratulated themselves on their good fortune at being so near to a source from which they could obtain hundreds of reapers at no extra cost.⁽¹⁶⁾

A further isolating factor was that over the course of the nineteenth century opportunities for non-agricultural workers to participate in harvest work gradually diminished. On an increasing scale, livestock and vegetable production became the predominant farm enterprises around all large centres of population. Already by the 1830's, it was reported that, 'the harvest in the neighbourhood [of Manchester] and for many miles around being but trifling, there have always been plenty of labourers for that purpose....'⁽¹⁷⁾ In 1850-1 most of north Cheshire was in milk, potatoes and market gardening. Similarly, the agriculture of the industrial West Riding was but 'little influenced by the price of corn', while much of the land around Nottingham was 'in pasture for supplying the town with dairy produce'.⁽¹⁸⁾ Around London, hay fields and market gardens extended 20 miles or more into the Home Counties. In 1875 the proportion of the cultivated area under corn was a mere 18 per cent in the 'industrial counties' of England, compared with a national average of 31 per cent and a 'corn counties' average of 41 per cent.⁽¹⁹⁾ Apart from a few Irishmen from Glasgow, Leeds, London and Manchester, few urban and industrial workers were then prepared to migrate long distances to the corn growing districts to obtain harvest work.⁽²⁰⁾

The constraints of distance and diminishing work opportunities apart, it would appear that after 1790, and more so after 1835, the economic incentives for urban and industrial workers to take seasonal work in agriculture progressively weakened. By 1860

the harvest had lost most, if not all, of its earlier cash appeal, in that industrial wages were in most cases now higher than the peak agricultural wage. In northern England, the average harvest wage of 22s. a week was matched by 26s. in the Manchester building trades, 25s. in the Lancashire coal mines, 20-24s. in the Huddersfield weaving mills, and more than 30s. in the Sheffield and Staffordshire metal trades. Most manual labourers were then able to earn at least 15s - 18s. per week, and much more during the summer months when activity in the building and construction industries was at its peak. Female workers could earn 10s. - 14s. in the West Riding textile mills compared to only 10s. - 12s. in harvesting.⁽²¹⁾ Even in the rural districts of southern Britain, domestic trades such as button-making, straw-plaiting and gloving paid well enough for women to spurn harvest work.⁽²²⁾ Other disincentives to harvesting included, first, its very long hours, 65-75 per week compared with 50-60 in most other occupations. And second, changes in harvesting technology, in particular the substitution of the scythe and heavy hook for the sickle and reap hook, and after 1851 the adoption of reaping machines, which tended to lower the earning capacity of part-time workers, who were unable to use the heavier hand tools and whose usefulness was now chiefly confined to the subordinate and much less rewarding tasks of gathering and binding.⁽²³⁾

We may postulate, therefore, that from the early nineteenth century urban and industrial workers tended increasingly to regard agriculture as an area of residual employment. Workers in the decaying rural and cottage industries, handloom weavers in particular, looked to harvest work as a source of extra income. In Lancashire, for example, there were many handloom weavers harvesting in the slump

years of 1827 and 1849. Similarly, harvest earnings were important to silk-weavers and flax hecklers in the Yorkshire Dales in the 1830's, weavers in the Howe of Fife in the 1850's, textile workers in Herefordshire and Cumberland in the 1860's, and in the same decade, nail-makers in Bromsgrove and Oldbury.⁽²⁴⁾ In 1867, the temporary slump in the straw-plait industry forced many mid-Essex housewives into harvesting.⁽²⁵⁾ During industrial slumps, there were always some urban unemployed who, 'perambulate the country immediately surrounding the large labour centres' looking for farm work. As late as 1919, 'disengaged colliers, fishermen and quarrymen' still harvested in Pembrokeshire, while in the 1930's, a few unemployed Jarrow shipyard workers were employed in the Norfolk sugar beet fields.⁽²⁶⁾ Yet these twentieth century examples rank only as idiosyncratic survivals of a way of life which had already disappeared from most areas of Britain by 1870. As numbers of casual labourers owning agricultural skills became fewer and as their supply became more erratic, so farmers adjusted their work programmes so as to be able to get in the harvest using just their resident farm staffs and their immediate families.

We have already argued for a progressive weakening of the economic incentives for non-agricultural workers to engage in harvest work, and it remains now only to demonstrate that that sector of the economy which traditionally had constituted the largest off-farm source of casual harvest workers, namely rural and cottage industry, declined so dramatically over the proto-industrial period as to be virtually extinct by 1870. One inevitable condition of economic progress was that the 'mixed' pre-industrial economy gradually gave way to a 'two sector' economy in which agriculture and industry became physically and economically more discrete. In south Britain rural

domestic industry was already in an advanced state of decay in 1790, and while north Britain was then on the threshold of a dramatic expansion in hand textiles, this was centred mainly on the new towns. The mid-1820's, however, marked an important watershed in British industrial development. By the 1840's the Lancashire hand loom weaver had become, 'a relatively rare species'. By the 1850's hand loom worsted weavers were found only 'at places like Wuthering Heights'. By the 1870's a diligent search would have been necessary to locate even isolated individuals working textiles by hand.⁽²⁷⁾ The transformation in wool, jute and flax was slower than in cotton, and faster in England than in Scotland. Yet in 1870, only in the more remote parts of Wales and the Scottish Highlands and Islands were hand-made textiles to have a much longer future. In south Britain those rurally-based industries which had endured the ups and downs of the Napoleonic War years did not long survive the slump of 1825 and the Huskisson Free Trade budgets. J.L. Green's Rural Industries of England, published in 1895, gives an impressive list of handicraft trades which had once been carried on in the countryside and which by the end of the nineteenth century had almost entirely disappeared.⁽²⁸⁾

Between 1815 and 1850 the decline of rural industry may not immediately have affected the harvest labour supply position. In south Britain, a large number, perhaps even a majority, of redundant cottage industrialists became full-time agricultural labourers. In north Britain they tended more often either to transfer to local factories or to migrate to the expanding industrial towns, their places in the harvest field being often filled by Irish migrant harvesters whose numbers spectacularly increased between 1815 and the Famine. Rather the effects of the decline of rural and cottage were delayed until after 1850, when with resident farm workforces diminishing

and Irish migrant harvest labour flows slowing down, farmers discovered that there was no longer a reserve pool of industrial labour on which to draw in the difficult seasons. The local decreases in population which had followed the collapse of cottage industry in the West Riding, Lancashire, Cheshire, Cumberland, Stirling, Fife, and even here and there in southern England, now assumed a new significance.⁽²⁹⁾ As a Lancashire farmer explained, there was no difficulty with summer labour, 'so long as hand loom weaving was kept up. Our cottages were largely filled with hand loom weavers ... [and] ... These men were always available for a push'.⁽³⁰⁾ In the Scottish Lowlands farmers bemoaned the fact that, 'Tradesmen, artisans and small shopkeepers in the country districts found, as the means of locomotion increased, that trade went to the towns, and they punctually followed it'.⁽³¹⁾ In Perthshire, in the 1860's, the current scarcity of agricultural labour was blamed specifically on the decline there of the weaving and needlework trades, and the migration of labourers to the factories of Dundee, Perth and Blairgowrie, where prospects were 'better and more certain than the hard labour and uncertain wages of outdoor work'.⁽³²⁾

As the cottage workshops faded out, so factories came into their own. Inevitably, labour became increasingly disciplined to the habits of regular and continuous industry. Thus was resolved the basic manpower problem of the early factory masters - the unwillingness of workmen to be tied down, their wish to be free to allocate their time between different occupations, between the field and the workshop, between the loom and the sickle. Writing in the 1840's (probably of southern Scotland), Stephens complained that when trade was brisk, 'manufacturers not only pick up all the hands they can procure, but the work which they supply being done by the piece,

at which operation higher wages than field-work can be earned in long hours of labour, a temptation is presented to women labourers to desert the fields, and to such a degree of stringency is this monopoly of labour carried by the manufacturers, that they will not allow their people to go and assist in the harvests'. (33)

We may conclude, therefore, that as labour became more efficiently allocated between agriculture and industry, as rural and cottage industries declined and town and country moved farther apart, so the numbers of part-time urban and industrial harvesters diminished. By 1870, their only substantial contribution to farm production was in the hop fields and market gardens.

1. Anon, An Inquiry into the Present Price of Provisions (1773), p. 50.
2. A. Young, Northern Tour (1770), IV, pp. 442-5, 447-9, and also ibid, I, pp. 151-3, 156, and Eastern Tour (1771), IV, pp. 312-3, 317.
3. Reports for Select Farms (bound as Vol. III, British Husbandry (1840)), Scoreby, pp. 7-8; E. L. Jones, 'Eighteenth Century Changes in Hampshire Chalkland Farming', Ag. Hist. Rev., VIII (1960), p. 18; T. Stone, General View Lincolnshire (1800), p. 306.
4. J. H. Clapham, An Economic History of Modern Britain (Cambridge, 2nd edn, 1964), I, pp. 66-74; P. Deane, The First Industrial Revolution (Cambridge, 1965), p. 123.
5. B. R. Mitchell & P. Deane, Abstract of British Historical Statistics (Cambridge, 1962), p. 60 ; P. Deane & W. A. Cole, British Economic Growth, 1688-1959 (Cambridge, 2nd edn, 1967), p. 143.
6. T. Batchelor, General View Bedfordshire (1808), p. 583; Report on the State of the Irish Poor in Britain (1835), App. G, p. 166; A Redford, Labour Migration in Britain, 1800-1850 (Manchester, rev. edn, 1964), p. 90.
7. W. F. Galpin, The Grain Supply of England during the Napoleonic Period (New York, 1925), p. 81.
8. e.g. Farmers Magazine, Nov 1804, p. 489; Nov 1805, p. 503.
9. R. Brown, General View East Riding (1799), p. 225.
10. A Century of Agricultural Statistics (HMSO, 1968), p. 62.
11. R. S. Skirving, 'On the Agriculture of East Lothian', Trans. Highland Soc., 4th ser. V (1871), p. 37.
12. Mitchell & Deane, op.cit, pp. 24-7. See also, Clapham, op.cit, I, pp. 536-7; II, pp. 489-98; S. G. Checkland, The Rise of Industrial Society in England, 1815-1885 (1964), p. 33
13. Report on the State of the Irish Poor, op.cit, p. 166.

14. R.C. Employment (1867), First Report (1868), Mr. Tremenhoe's Report, pp. 136-7; Second Report (1869), Evidence of Assistant Commissioners, pp. 518, 520-1.

15. J. E. Handley, The Irish in Scotland, 1798-1846 (Cork, 1945), pp. 48-9; Report on the Irish Poor, op.cit, p. xlvii; Select Committee on the State of Agriculture (1836), Third Report, Q pp. 9938-41.

16. Redford, op.cit, p. 90; Farmers Magazine, March 1810, p. 92.

17. Report on the Irish Poor, op.cit, p. 81; The demand for harvest labour in the industrial West Riding was by no means large even in the 1790's. J. Holt, General View Lancashire (1795), p. 66.

18. J. Caird, English Agriculture in 1850 & 1851 (1852), pp. 252-62, 288, 210, 283, and also 228, 263-85, 344-5.

19. Agricultural Statistics, 1875.

20. R.C. Employment (1867), First Report (1868), App. pt II, p. 294; R.C. Labour (1893), I, pt VII, p. 107; III, pt I, p. 82.

21. Agricultural Gazette, 30 April 1860, pp. 392-3, and supra pp. ; Returns of Wages published between 1830 & 1886 (1887), passim. J. R. Bellerby estimated that average industrial wage rates in 1858-66 were 23s 7d. per week. Proceedings of the Agricultural Economics Society, X (1952), p. 135.

22. R.C. Employment (1867), First Report (1868), App. pt II, pp. 67-9; Second Report (1869), App. pt I, p. 35; pt II, p. 477.

23. For technological change, see, infra, Chapters XII-XV.

24. D. Bythell, The Hand Loom Weavers (Cambridge, 1969), pp. 58-9; J. D. Marshall, 'The Lancashire Rural Labourer in the early 19th Century', Trans. Lancs. & Chesh. Antiq. Soc, 71 (1961), p. 92; B. Jennings, A History of Nidderdale (Huddersfield, 1967), p.230; W. H. Marwick, Economic Development in Victorian Scotland (1936), pp. 134-5; R.C. Employment (1867), First Report (1868), App. pt II, pp. 225, 260; Second Report (1869), App. pt II, pp. 522, 526. In many rural areas, there was considerable congestion in the low-entry cost small trades in the period after 1835. Many cobblers, dress makers and milliners must have oscillated between their trades and the farm during this period. B. Kerr, Bound to the Soil (1968), pp. 172-3 and passim.

25. R.C. Employment (1867), First Report (1868), App. pt II, p. 67. See also Pershire glove industry, ibid, First Report (1868), App. pt II, p. 267.

26. R.C. Labour (1893), I, pt II, p. 108; III, pt I, p. 82; III, pt II, p. 52; V, pt I, p. 42; Report on Wages and Conditions of Employment in Agriculture (1919), II, p. 489. The Norfolk evidence was communicated to the author by a farmer from the Wells-next-Sea area of the county. He remembered that the Jarrow men because they were unaccustomed to farm work quickly tired of it and returned home after only a few days.

27. Bythell, op.cit, pp. 254, 264, 267, and 251-68 passim; Redford, op.cit, pp. 40-9, 129-31; Clapham, op.cit, I, pp. 193-6, 554-5; II, pp. 82-5, 127-8; Reports of the R.C. on Handloom Weavers, XLII (1839), XXIII-IV (1840). For Scotland, see, H. Hamilton, The Industrial Revolution in Scotland (Oxford, 1932), pp. 113, 138-42. A further distinction can be drawn between cottage hand-loom weavers and factory-based hand-loom weavers, the former being a much more elastic source of harvest labour than the latter.

28. The 'notes' in the population abstracts of the 1851 Census provide abundant examples of the decline of cottage industry in all areas of Britain. There were many casualties - flax at Staines, lime making at Haslemere and fleecing hosiery at Godalming, (Census 1851); woollens at Corstey (Wilts), M. F. Davies, Life in an English Village (1909), p. 84; plush at Banbury, A. M. Taylor, Gilletts, Bankers at Banbury & Oxford (Oxford, 1964), Ch. 5; hemp at Burton Bradstock (Dorset), Kerr, op.cit, p. 77; spinning at Goring & Gloucester, Select Committee on the Poor Laws, 1830-1 (1831), pp. 283, 294-5; lace-making in East Berkshire, ibid, p. 186; textiles at Lavenham, Royal Commission on the Poor Laws (1834), App. O, p. 213d, and in Norwich, M. F. Lloyd Prichard, 'The decline of Norwich', Ec. Hist. Rev., III (1951), pp. 371-8; pillow-lace in north Wiltshire, J. Caird, English Agriculture, 1850-51 (1852), p. 75. For general surveys, see, Clapham, op.cit, I, pp. 43-9 & 143-218 passim, and Redford, op.cit, Ch. 4-5 passim. For survivals, see, FitzRandolph & Hay, Rural Industries in England & Wales (Oxford, 1927). In a recent study of rural industries in southern Britain over the first half of the 19th c, O. Westhall suggests that the 'luxury' trades (silk, straw, gloves etc) did well during the Napoleonic War years (due to the weakness of European competition), became depressed after 1815 and further depressed following the free trade budgets of the later 1820's. Rural Industry & Rural Labour, 1800-1850, unpublished paper read at the Institute of Agricultural History (Univ. of Reading) Seminar, March 1970.

29. For decreases of population following decline of cottage and rural industry, see, 1851 Census, Enumerator's notes, e.g. pp. 17, 19, 27, 33, 35, 43, 48, 56; Redford, op.cit, pp. 38, 40-1, 45-6, 51-2, 54, 62-3, 129; Bythell, op.cit, pp. 255-6, 265 & 251-68 passim; J. D. Marshall, Furness in the Industrial Revolution (Barrow, 1958), pp. 237-8; Jennings, op.cit, p. 235.

30. R.C. Labour (1893), V, pt II, Section IIB, p. 291.
31. Report on the Present State of the Agriculture of Scotland (Highland Society, 1878), p. 146.
32. J. Dickson, 'On the Farming of Perthshire', Trans. Highland Soc., 4th ser., II (1869), pp. 173-4.
33. H. Stephens, Book of the Farm (1845), II, p. 386. For an inspired discussion of the sociology of changing work-patterns, see E.P. Thompson, 'Time, work-discipline & industrial capitalism', Past & Present, XXXVIII (1967), pp. 56-7, and for the economic implications, S. Pollard, 'Factory discipline in the Industrial Revolution', Ec. Hist. Rev., 2nd ser, XVI (1963-4), pp. 254-71.

CHAPTER VII

MIGRANT HARVESTERS

I

The existence of migrant harvest labour flows subsumes, first, that resident farm labour was imperfectly distributed relative to harvest labour demand, and second, that the work schedules of the source and receiving areas did not seriously overlap. Their geographical mobility and sensitivity to regional changes in crop demand rendered migrant workers an extremely valuable source of additional harvest labour during the proto-industrial period. Their average work output was higher than that of most other categories of harvest worker, the majority of migrants being young able-bodied males, often specialists in this branch of labour, doing two, three and sometimes four harvests a season. Unfortunately, apart from the Irish who were enumerated in 1841 and annually from 1880 to 1914, there are no statistics of numbers of migrant harvesters in Britain. The migrant harvest labour force probably reached its peak in the mid-1840's, when the Irish contingent alone exceeded 70,000 and the total might easily have exceeded 150,000. At this stage the migrant harvester contribution to national harvest work output was conceivably as high as 15-20 per cent. In 1790 it was obviously much lower, but even then there were large areas of Britain, in particular, the Home Counties, the Fens and southern Scotland, heavily dependent on migrant workers. The Fens attracted harvesters of all nationalities - English

Welsh, Scots and Irish - so much so that in 1794 harvest dialects in south Lincolnshire were described as as many as the 'builders of Babel'.⁽¹⁾

Seasonal migration was not, of course, an exclusively proto-industrial phenomenon, as Redford discovered in the Balkans during the First War and as we can observe today in the fruit and vegetable farming districts of the United States.⁽²⁾ In England 'aneillipimen' and 'aneillipiwomen' were sweeping the countryside in search of harvest work, in the thirteenth century,⁽³⁾ while in the next century there is evidence for a substantial volume of long-distance movement. The 1351 Statute of Labourers authorised 'Gentz des countes de Stafford, Lancastre et Derby ... De Cravene [North Riding], et de la Marche de Gales et d'Escosce [Welsh and Scottish Borders] et autres lieus', ~~was~~ to travel to other counties during the harvest months.⁽⁴⁾ The 1662 Law of Settlement made special provision for the movement of migrant harvesters,⁽⁵⁾ about which time Henry Best of Elmswell in the East Riding was hiring 'mowers out of the [North Riding] Moores' to cut his 'haver' corn, and 'troops of workmen with their scythes and sickles' were thronging the roads of East Kent.⁽⁶⁾

After 1790, as the harvest labour market became increasingly imperfect due to the rapid expansion of corn production on the light-lands and the thinning of the ranks of resident harvest workers in the industrial areas of north Britain, larger and more complex seasonal redistribution of labour were necessary to satisfy the changing pattern of demand.

II

The historical evidence is much too imprecise to permit the identification of all migrant harvest labour flows and still less changes in their volume and direction, which were determined over the shorter-run by such variables as the speed of ripening and timing of the harvest in the receiving areas and the stock of intervening work opportunities.⁽⁷⁾

On the supply side seasonal migration was 'a response to marginality' in that it enabled labour in areas where summer work opportunities were relatively scarce and wages relatively low to improve their income position. In practice, however, the supply factors were much more complex. Labour did not always flow 'uphill' between low-wage areas and high-wage areas, not did all low-paid agricultural workers choose to maximise their earnings through greater mobility. Time and distance were key factors. Much depended on the spatial distribution of potential source areas relative to potential receiving areas and the amount of time which the labourer or small farmer could afford to be away from home. As a general rule young unmarried men were more mobile than older married men, their local ties were looser, their employment more irregular, their work output higher and their sensitivity to the lure of higher wages greater.

Migrant harvester flows can be divided into three broad categories.

(1) Grass to Corn Migrants, that is, from pastoral areas where the corn acreage was low and employment opportunities in the

later summer months few, and which could therefore release labour after the completion of the hay harvest. Labourers from the Vale of Gloucester and from the 'cheese' districts of north Wiltshire migrated eastwards and southwards for a corn harvest on the southern and south-central chalklands.⁽⁸⁾ Similarly, labour flowed between the Vale of Somerset and the Mendips, the Devon and Somerset grazing districts and the Isle of Wight, the Vale of Shaftesbury and the Hampshire Downs, the Lancashire Plain and north Nottinghamshire and the Yorkshire Dales and the hill farms of the East Riding.⁽⁹⁾

(2) Many labourers were able to exploit the different timings of the harvest between hill and vale, heavy land and light land, and north and south, to get in two harvests a season, one at home and the other at a distance. The possibilities are suggested by the Agricultural Gazette's harvest survey of 1867 which gives the approximate harvest timings in the different areas of Britain.⁽¹⁰⁾ In Lincolnshire there was a fortnight's lag between the Wolds and the Fens, and in Oxfordshire, a similar disparity between the Cotswolds and the upper Thames Valley. In Yorkshire timings varied from the fourth week in August in the lower Humber Valley, to mid-September at Richmond on the Pennine slopes, to late September at Whitby on the Yorkshire Moors. Men from north Essex and the Stour Valley were able to take an early harvest in the Marsh Hundreds in the south-east of the county where the ripening was earlier by 10-14 days. In Somerset the hill harvest was a fortnight later than in the Vale which meant that in the 1790's, at least, there was seldom a shortage of hands in the county. Similarly in Cambridgeshire, labourers flocked from the late heavy soils to the early light soils. In south Hertfordshire the harvest was mostly performed by 'strangers'

from distant areas where the harvest was later. Alex Somerville recollected how, after they had completed their home harvest, Berwickshire labourers sometimes took a second in the hill country of the Lammermuirs.⁽¹¹⁾

Some of the more mobile migrant harvester groups were able to time their movements to correspond very exactly with the fluctuating work rhythms of the home and receiving areas. From the heavy clays around Rotherfield in East Sussex, men went first to hay-work near London, returned home for the corn harvest, did a late harvest in the 'hill country' around Lewes and finally a hop harvest in Kent or Surrey.⁽¹²⁾ Similarly, labourers from the north Hampshire 'Woodlands' took an early harvest in south Sussex, a second harvest at home, a third at a distance (probably on the Wiltshire Downs) and returned home for the hop and acorn harvests.⁽¹³⁾

Mobility tended to be greatest in the clayland arable areas of south Britain where, because of low root and fodder crop values, full employment even in summer could be guaranteed only in the corn and hop harvests.⁽¹⁴⁾ Thus, while the relatively low levels of summer activity in clay arable and pastoral areas allowed labourers to withdraw not just once, but two or three times during the season, very few harvest labour flows emanated from the lightland where the summer working season was longer and more continuous. The value of the clayland flows lay in their extreme elasticity, which enabled them to meet the different timings and durations of the harvest in the receiving areas. On one Warwickshire farm, for example, the date of commencement of the wheat harvest over the 9 year period 1852-60 varied from July 30th in 1857, to August 5th in 1852, August 14th in 1855 and 1856 and August 28th in 1860.⁽¹⁵⁾ On a Gloucestershire Cotswold farm the harvest occupied less than 25 days in 1861 and 1864.

38 days in 1865 and 49 days in 1863. (16)

The above categories of migrant flow can best be regarded as 'short distance - short duration', in so far as few were carried on over distances greater than 50 miles, or took the migrant away from home for a period longer than two or three weeks at a time, or involved the taking of more than two harvests.

A frustrating feature of nineteenth century Censuses is that they were taken not during the summer months when seasonal migration was at its peak but in the early spring (March or April) before it actually began. One exception, the June Census of 1841, suggests tantalisingly the potential value of an August or September count. (17) It records, for example, that 177 'strangers' were then haymaking in Hendon (Middlesex), 182 at Woodford and West Ham (Essex) and 315 at Stone (Kent), and that in the south Essex market gardening parishes of Stifford and Purfleet many Irish were engaged in pea picking.

We are forced back, therefore, on the contemporary literary sources which at best provide only a very partial view of what we know to have been an extremely complex intra- and inter-regional pattern of movement. With the aid of cropping, wage and population statistics and soil distribution maps many otherwise unrecorded flows might be postulated, especially between heavy and light soils in the English Midland counties and the uplands and lowlands of northern England, south Wales and Central Scotland.

The following list of migrant flows deliberately excludes purely 'local' movements, such as those between 'open' and 'closed' villages, or, as in Cambridgeshire, Lincolnshire and Norfolk, between the 'skirt' villages and the newly-reclaimed lands of the Fens and Wolds. It excludes also all Celtic (Scots, Irish and Welsh) flows,

which are treated elsewhere. All flows listed below are known to have existed sometime during the period 1790-1914. The majority appear to have been already established in 1790 and to have continued until at least 1870. There were a few latecomers such as the Aberdeen-Roxburgh flow which began in the 1840's. Conversely, a few flows such as those between the Vale of Craven and the East Riding, and north Staffordshire and north Nottinghamshire, appear to have more or less ceased by 1850.

INTERNAL SHORT-DISTANCE MIGRANT HARVEST LABOUR FLOWS IN GREAT BRITAIN (18)

RECEIVING AREAS

SOURCE AREAS

SOUTHERN ENGLAND

1. Hampshire (chalk areas)	N. Wiltshire
2. Hampshire (Basingstoke area)	N. Hampshire (Tadley area)
3. Hampshire (Fordingbridge area)	Dorset (Vale of Shaftesbury)
4. Isle of Wight	Devon & Somerset, W. Surrey
5. Sussex (South Downs)	N. Hampshire
6. " " "	W. Surrey (Farnham area)
7. " " "	S.E. Sussex (Rotherfield area)
8. " " "	S.E. Hampshire (Selbourne area)
9. Wiltshire (Downs)	N.W. Wiltshire
10. " "	Somerset
11. " "	Devon
12. Hertfordshire (south)	-
13. Berkshire (Reading area)	N. Hampshire (Tadley area)

EASTERN ENGLAND

14. Essex (south-east)	N. Essex & S. Suffolk
15. Cambridgeshire	Internal, light-heavy land movement
16. Norfolk (Docking area)	Norfolk (Hevington area)
17. Lincolnshire (Fens)	Norfolk and Suffolk

RECEIVING AREAS

SOURCE AREAS

MIDLAND ENGLAND

18. Leicestershire

Derbyshire ('peakrills' from Peak District & 'low country' from north Staffordshire 'Moorlands')

19. Bedfordshire (east)

-

20. Nottinghamshire (north)

Derbyshire & Lancashire

21. Warwickshire (south)

Buckinghamshire & Berkshire

WESTERN ENGLAND

22. Somerset

Internal, light-heavy land movement, Somerset (Vale of Blackmoor)

23. Gloucestershire (Tibberton area)

Herefordshire and Forest of Dean

24. Gloucestershire

Somerset

WALES

25. Monmouthshire (Ross area)

Gloucestershire (Olveston area)

26. Denbighshire

Internal movements: Petrevoelas & Llangerniew to Eglwysbach & Vale of Clwyd

27. Carnarvonshire

Internal movements: Pwllheli, Penmorfa & Bontnewydd to Gwyfrai

28. South Wales

Somerset

29. Glamorganshire (Vale)

Cardiganshire

NORTHERN ENGLAND AND SCOTLAND

30. East Riding

West Riding (Dales) & North Riding (Craven and Cleveland areas)

31. Roxburghshire & Berwickshire

Aberdeenshire

32. E. Lothian (Lammermuirs)

Berwickshire

(3) The third and most important source of migrant harvest workers were the small-farm, agriculturally uncompetitive Celtic-fringe areas of Britain, namely Western Ireland, the Scottish Highlands and the upland areas of west and north Wales. These were the British counterparts of those other great European migration flows, the Alpine, Appenine, Basque, Breton, Carpathian and Polish. (19) They were important both numerically (their combined numbers probably exceeded 100,000 in the mid-1840's) and in terms of average work output (their work capacity and mobility being much greater than those of the 'shorter distance' flows).

The Celtic flows were recognizably 'long distance - long duration'. The one, because the source areas were remote from the corn growing districts of Lowland Britain; the other because summer work opportunities in the source areas were so few that a large part of the resident labour force could be spared for the whole of the summer period, June - October. It was not unusual for Celtic migrants, particularly the Irish, to take three or even four harvests a season. They also gave valuable assistance in the hay harvest, in root and market garden crop cultivations and in the potato, fruit and hop harvests. Their special advantage was that they were able to serve areas which internal migrants and part-time urban and industrial workers did not.

Summer migration was an internal feature of the croft and cottier economies of the Celtic zone. Chronic overpopulation, small farm size, lack of local wage-employment and a climate and physical environment unconducive to a viable agriculture, less still an expanding one, forced the majority of poorer households into by-employments. Cottage industry was one outlet, but this being precarious

most households found it more profitable to sell their surplus labour than manufactured goods. Seasonal migration was, therefore, the cottier's response to marginality. It guaranteed subsistence and provided a cash income for the payment of rent and purchase of clothing and other necessities. As was explained:

'necessity drives them [the Irish] to come here [to England] to make something of a livelihood for their families; for, after they get their little potato crop in the ground, they come off here to make up the harvest If they had remained at home all this time, they would have had nothing to eat; they could not live, neither could they get an employment and what little they earn here they bring home' (20)

Summer migration, moreover, fitted neatly into the pattern of peasant agriculture, more so after the mid-eighteenth century when the potato displaced corn as the main arable crop. The Irish cottier would dig his plot, plant his potatoes, perhaps sow a few oats, cut his annual requirement of peat and by mid-June be free to cross to the Mainland, secure in the knowledge that what little work remained to be done could be left to the womenfolk and older males. (21) He was often joined by the sons of small farmers whose withdrawal became similarly possible once the spring and early summer cultivations were completed. Most seasonal migrants from Ireland were males, although female ratios appear to have increased after 1830 with the greater demand for market garden hands around the large urban conurbations. In the Scottish Highlands, on the other hand, female migrants predominated, the males obtaining summer employment in fishing and kelping. Wales too, provided large numbers of female migrants, less for harvest work as for market garden cultivations and fruit and hop picking. (22)

In the present state of knowledge it is impossible to construct an accurate long-run migrant harvest labour supply curve for the period 1790-1870. We can assume, though, that apart from a temporary hiatus during the Napoleonic Wars, their numbers increased rapidly and more or less continuously between 1750 and the mid-1840's. On the demand side there were strong factors making for an increasingly imperfect harvest labour market.⁽²³⁾ Corn production expanded faster on the more thinly populated light soils than on the more densely populated claylands. Vigorous tillage extension, and after 1835 higher yields, rendered many expanding agricultural areas increasingly dependant on migrant labour. Migrant harvesters became more essential too in many expanding industrial areas, as supplies of part-time industrial harvest labour dried up and local farm populations declined.⁽²⁴⁾

On the supply side, the incentives to harvest migration strengthened as the populations of the source areas increased. In Connaught, the chief source area of Irish migrant harvesters, rural congestion, already serious in 1800, soon reached crisis proportions; the combined population of Donegal, Leitrim, Mayo, Roscommon and Sligo growing by 25 per cent between 1821 and 1841.⁽²⁵⁾ Predictably, therefore, the Irish supply increased spectacularly between 1790 and the Famine, to the extent that by the 1820's the Irish completely monopolised the harvest labour market in a number of receiving areas.⁽²⁶⁾

There is evidence for a contraction of the Welsh and Scottish Highland flows between 1830 and the mid-1840's, but it is likely that the shortfall was more than offset by increases in the Irish supply.⁽²⁷⁾ But the late 1840's and early 1850's saw an initial, and in

the case of the Irish a dramatic reduction of all migrant flows.

There were, however, two opposing, if unequal, forces at work.

On the one hand there was greater mobility among young farm workers in areas which could provide full-employment during the harvest but could not match the wages paid in some adjoining areas. Thus in the mid-1870's young Wiltshire labourers preferred 'going abroad' for their harvest and strongly objected to any form of tied employment likely to restrict their mobility in the summer months. (28)

Oxfordshire farmers became increasingly concerned because many young labourers who had migrated for an early harvest often failed to return for the home harvest. (29)

These local increases in supply failed by a very large margin to compensate for the massive contraction of the older-established flows. The defection can be easily explained:-

(a) the stabilising, and in west and north Britain, the decline of the source area populations.

(b) more and better-paid employment in the source areas which lowered the incentive to migrate.

(c) an increasing supply of alternative summer work opportunities outside agriculture due to the rapid expansion of the heavy industrial, trade, transport and construction sectors of the economy. (30)

The Celtic flows were very substantially smaller in 1870 than in 1850. By 1860 the Welsh had ceased almost entirely to visit the West Midlands, while few Scottish Highlanders now harvested south of the Forth and Tay. Statistical evidence shows Irish migrants 60 per cent fewer in 1870 than in 1846-8. (31)

It would appear, in fact, that after 1850, numbers of migrant workers declined much faster than those of resident workers. But not only was the supply falling, but also, and perhaps more critically,

it was becoming increasingly unreliable, the inelasticities being most apparent in years of high industrial activity, or when rapid and convergent crop ripening occurred simultaneously over a large area, thus preventing the smooth and orderly flow of labour between early and late ripening districts. Such was the case in Lincolnshire in 1871, when instead of the usual south-north ripening sequence which allowed migrant harvesters to work gradually up the county, the harvest was ready everywhere at once.⁽³²⁾ The timing of the harvest also became more critical, and there was an increasing risk of farmers being by-passed if their harvest was not ready when the migrants arrived, as in east Berkshire where the Tadley 'gypsy' gangs pressed on into Middlesex if local farmers were unable to employ them.⁽³³⁾ In areas heavily dependent on migrant workers their increasing unreliability obliged many farmers to adopt reaping machinery, even though scarcity one year might be followed by glut the next.

The Celtic Migrant Harvest Labour Flows.

We will now proceed to examine in greater detail the special contribution of the Celtic seasonal migrations to harvest work output in Lowland Britain. We are fortunate in that these, the most important sources of migrant harvest labour, are also the best documented. The several national flows, the Welsh, the Scots and the Irish will be treated successively

The Welsh Flows.

In the late fourteenth century bands of Welsh reapers, up to a hundred strong, were harvesting in the West Midland counties

of England.⁽³⁴⁾ By the 1790's the wheat harvest in Herefordshire and in the Vale of Glamorgan was largely in the hands of migrant workers from Cardiganshire.⁽³⁵⁾ Warner met large numbers of 'Ancient Britons' en route for Hereford and Gloucester in his Walk through Wales (c. 1790)⁽³⁶⁾ travelling in groups of four or five, led by the one of them who knew enough of the English roads and the English language to act as guide and interpreter.⁽³⁷⁾ Contemporaneously, migrant workers from north Wales were harvesting in Shropshire, Cheshire and Flintshire.⁽³⁸⁾ Welsh women also migrated but did not usually assist in the corn harvest with the result that in Herefordshire the cutting was done by Cardiganshire males and the gathering and binding by local women and children.⁽³⁹⁾ Large numbers of women from North Wales annually visited the London area (a journey of over 200 miles) where they were extensively employed in such tasks as 'weeding and making hay [and] in gathering green pease (sic) and beans'. Middleton, writing in 1798, described their numbers as 'astonishing' and their industry as 'unequalled in Britain, or perhaps in the world'. South Wales women were less adventurous, travelling only as far as Herefordshire and Worcestershire for the apple and hop harvests.⁽⁴⁰⁾

The Welsh flows appear to have slowed down during the Napoleonic wars.⁽⁴¹⁾ Duncumb remarked in 1805 that although many Welshmen still visited Herefordshire, the harvest was 'gradually becoming a branch of industry amongst our natives,⁽⁴²⁾ while a decade later, Davies observed of the supply areas (Brecknock, Cardigan and Radnor), that, 'as long as they remained open, labourers were obliged to migrate to the southern [Vale of Glamorgan] and eastern [West Midlands] parts in search of employment', but that now, through enclosure and the extension of tillage, they find 'enough employment

at home'.⁽⁴³⁾

The Welsh supply appears, however, to have recovered again after the Wars. The populations of Carmarthen and Cardigan, the chief source counties, increased dramatically between 1811 and 1831, by over 30 per cent.⁽⁴⁴⁾ In 1831 Welsh harvesters were 'flocking' into Worcestershire⁽⁴⁵⁾ and a 'good many' were visiting Herefordshire.⁽⁴⁶⁾ Even so, the case for a really substantial growth in their numbers over the immediate post-Napoleonic War decades is by no means conclusive. The Irish were reported to be displacing them in Shropshire in the late 1820's, although, admittedly, this might have meant less actual diminution in total outflow as redirection into areas where Irish competition was less fierce.⁽⁴⁷⁾

More certain is that the Welsh flows began to contract after 1835. In the 1830's the populations of Carmarthen and Cardigan stabilized and thereafter grew only very slowly. Radnor reached its peak population in 1831, Montgomery in 1841, Anglesey in 1851 and Brecknock in 1861.⁽⁴⁸⁾ The 1820's saw the beginning of a 'long and continuous depopulation of the west Wales hill country', the young men being lured away by the higher wages of the expanding South Wales industries.⁽⁴⁹⁾ Herefordshire farmers experienced a sudden contraction of supply in the railway boom of the mid '40's.⁽⁵⁰⁾ The Crimean War saw it fail completely. It was reported in 1857 how formerly Hereford was visited by large numbers of Welsh harvesters, but that now, 'they found sufficient occupation in cultivating their own soil'.⁽⁵¹⁾ As their numbers diminished, those who remained were able to obtain remunerative employment much nearer home, in the Vale of Glamorgan, where they continued to harvest, though in ever decreasing numbers, until late on in the nineteenth century.⁽⁵²⁾ Welshmen were still employed in Shropshire in the late 1860's,

but evidence implies that their numbers were declining.⁽⁵³⁾ In the early 1890's the Montgomery flows were reported to have 'ceased entirely'.⁽⁵⁴⁾

The Scottish Highland Flows.

The migration of Scottish harvesters to the Central Lowlands and northern and eastern England was already well-established in the late eighteenth century.⁽⁵⁵⁾ Redford claims that Scotsmen were then responsible for a large part of the Norfolk harvest, although it appears unlikely that the true Highland flows penetrated as far south as East Anglia.⁽⁵⁶⁾ Probably the majority of Scotsmen harvesting south of the Humber were either Lowlanders or, as Haldane has suggested, Scottish drovers who came down with their stock in early summer and stayed on to do harvest work.⁽⁵⁷⁾ A proportion may have consisted of tramps and vagrants attracted to England by the prospect of more liberal poor laws and settlement regulations.⁽⁵⁸⁾ However, in the 1820's, there is no indication that any of the Scottish vagrants relieved in southern England were stranded harvesters.⁽⁵⁹⁾ It would appear, then, that the Highland migrations proper extended down only as far as the Lowlands and the Border Counties. A further interesting feature of the migratory movement was that it consisted largely of young females. The wheat harvest of the Lothians was largely performed by Highland girls who, after an overland journey of up to 200 miles, congregated in their thousands at the hiring markets of Edinburgh West Port.⁽⁶⁰⁾ Presumably it was the males who ventured further afield and tried for the higher wages of the Yorkshire Wolds and East Anglian Fens. As far as can be deduced from

the evidence the standard itinerary of the more mobile Highlanders was south to the Border Counties, then north to Haddington, Lanarkshire and the Lothians, then north again to Fife and Perth. Some groups, however, appear not to have strayed outside the Central Lowlands or to have travelled only as far as the coastal plains of Aberdeen, Moray and Nairn.

Demographic evidence would lead us to expect that seasonal migration from the Highland Zone increased rapidly during the second half of the eighteenth century. Between 1755 (Webster's Census) and 1801 (first official census) the population of the Highland counties, Argyll, Inverness, Ross and Cromarty is calculated to have increased by more than 25 per cent. Contemporaries allude to the extreme over population of the crofting areas and the effects of higher rents, farm consolidation and the spread of sheep farming in raising migration rates.⁽⁶¹⁾

The flow appears to have slowed down over the Napoleonic Wars. The large numbers of Scotsmen claimed by Marshall to have harvested in Norfolk in the early 1780's seem to have disappeared by 1800. Neither Young nor Kent refer to them in their agricultural surveys of Norfolk, nor, apart from a passing comment by Stone in 1798, is there any subsequent reference, positive or negative, to their presence in East Anglia. We can postulate, therefore, that after 1790, canal building, the armed forces, the expansion of industry in the Central Lowlands and the growth of fishing and kelping on the East Coast provided alternative outlets for many former and would-be migrant harvesters. The increased demand for harvest labour within Scotland itself would presumably have lowered the Highlanders incentive to travel to England in search of harvest work. Yet within Scotland there appears to have occurred a significant

reduction in the Highland supply. About 1790 Highlanders ceased to visit south-west Ayrshire; in 1811 a decline was reported in East Lothian; while in 1814 it was reported from the Glasgow area that, 'the number of hands from the northern counties has been gradually diminishing for some years'. (62)

Whether, and to what extent, the Highland flows recovered after 1815 is difficult to determine. A few Scotsmen were still harvesting in Yorkshire and Lincolnshire in the early 1830's, but their source of origin is unknown. (63) In Scotland itself, the years 1815-17 saw substantially larger numbers of migrants from the 'north and west' in the Berwick hiring markets, but they contracted again in 1819 when it was claimed large numbers of Highlanders were temporarily employed in building the Caledonian Canal. (64) Yet by the early 1830's, and in some areas by the mid-1820's, it is clear that the Highland supply was failing fast. (65) The inexplicable feature is that the decline appears to have set in very suddenly, soon after 1825, for in 1821 over 500 persons left a single Perthshire parish for summer service in the Lowlands, while as late as 1824, 2500 Hebridean reapers are stated to have passed through Glasgow en route for the Lothians. (66)

Contemporaries were prone to blame the Highland defection on the Irish, whom, it was complained, by 'the facility of late years afforded by the steam navigation of the Clyde and the comparative speed and cheapness with which they can come into the market have driven out the Scottish Highlanders altogether from the Eastern Lowlands'. (67) According to one source they had already done so in the Glasgow area by 1824, it being claimed that, 'except for a few Highlanders the Irish have completely usurped the place of the Scottish shearers'. (68)

However the explanation appears to lie elsewhere than with the Irish, for the 1830's saw the beginnings of a rapid decline in the population of the Highland Zone. Argyll, Kinross and Perth recorded their maximum populations in 1831, Inverness in 1841, and Ross, Cromarty and Sutherland in 1851.⁽⁶⁹⁾ According to a witness testifying before the Emigration Enquiry of 1826-7 there were then very few crofters actually living in the interior, most having already migrated to the coasts and the Lowlands.⁽⁷⁰⁾ Many were employed in the East Coast fishing industry and returned to harvesting only when the fishing failed.⁽⁷¹⁾ By 1850 relatively few Highland harvesters penetrated south of the Tay and Forth.⁽⁷²⁾ Isle of Skye women were still visiting Perth and Stirling in the late 1860's, but they were 'year by year diminishing in numbers',⁽⁷³⁾ as in the following decade was the supply of crofter labour in Aberdeen.⁽⁷⁴⁾ By the 1890's the once very considerable flow of Highlanders into the north-eastern Lowlands had become a mere trickle. Over most of the rest of Scotland the 'blue-bonnets' survived only in the folk memory.⁽⁷⁵⁾

The Irish Flows.

Economic historians have always been interested in Irish seasonal migration, less it seems, because of its important contribution to British agricultural development, than that it forms an integral part of the demographic background to the Famine.⁽⁷⁶⁾ Indeed, certain aspects of seasonal migration movement require considerable amplification. There is first the need to assess its contribution to British agricultural development during the proto-industrial

period, and second, to construct a long run supply curve of Irish migrant harvest labour, especially after the Famine, the juncture at which the economic historian's interest in Irish immigration to the British Mainland perceptibly wanes.

Not all Irish harvesters employed on the British Mainland were by strict definition 'migrant harvesters', for it is reasonably clear that other categories of Irish worker, vagrants, handloom weavers and casual labourers also assisted in the harvest. The bulk, however, would have comprised cottiers and small farmers from Western and northern Ireland who integrated harvest work in Britain with the seasonal round at home, who regularly came over in May or June to return in September or October.⁽⁷⁷⁾ The 'true' migrant harvester should be distinguished, first, from the 'short-distance' migrants from south-west Ireland who harvested only as far away as Leinster, and second, from Leinster and east Ulster men who migrated to Britain for work in navvying and general labouring and whose migrations were far less regular than those of migrant harvesters. Even so, in the harvest field these distinctions became sometimes blurred, for here, the 'brawny' Leinsterman and the 'scrawny Connaught mountaineer' often joined forces, especially during periods of low industrial employment. In the 1830's Irish building workers from Edinburgh frequently took a harvest in Berwickshire, and indeed, to prevent them from doing so, employers raised wages by 2s - 3s a week during the harvest period.⁽⁷⁸⁾ On the other hand, it is clear that some migrant harvesters, given the incentive would remain in Britain to work as hod-men, dock-porters, ditchers and drainers.⁽⁷⁹⁾ The 'professional' Irish navvy generally reckoned himself a class apart from the Irish migrant harvester, but nevertheless it would appear that he may sometimes have preferred harvesting to unemployment.⁽⁸⁰⁾

It appears too that some urban Irish, permanently settled in Britain, migrated each summer in search of harvest work. In 1867, for example, urban Irish from Manchester and Leeds were reported to be harvesting in the Fens.⁽⁸¹⁾ In Lancashire and West Scotland, Irish handloom weavers also assisted in the harvest for as long as the trade kept up.⁽⁸²⁾

A major difficulty in determining the composition of the Irish harvest workforce is that contemporaries often lumped all itinerant Irish together in the mendicant and vagrant class without properly distinguishing hawkers and drovers from vagrants and harvesters. Many of the Irish 'vagrants' passed by the Poor Law Authorities in the 1820's and 1830's were either stranded harvesters or harvesters who had plead destitution in order to obtain a free passage home.⁽⁸³⁾ In 1832 no less than 34,000 Irish vagrants were passed from the six counties, Berkshire, Buckinghamshire, Cheshire, Lancashire, Middlesex and Wiltshire.⁽⁸⁴⁾ Similarly significant is that the south-west Essex parish of East Ham was habitually afflicted by influxes of Irish 'paupers' after harvesting, hop picking and other summer work had ended.⁽⁸⁵⁾

Irish migrant harvest workers were valued for their mobility, their high work capacity and their cheapness. They were generally regarded as the best 'shearers' (hand reapers) in the market. In south Britain the usual practice was for resident workmen to mow the spring corn and for the Irish to reap the wheat. Long after the sickle and reap hook had given way to the scythe and reaping machine, many farmers continued to reserve their heaviest and most difficult stands of wheat for Irish sickles. By the 1860's, it was often only the Irish who could be relied upon to do a cheap and efficient job with the hand-reaping tools. Long after 1870, in

the Lothians in the late 1880's, and in the East Anglian Fens in the early 1900's, Irish reapers were still regarded as invaluable in seasons when the crops were too twisted for the scythe and reaping machines.⁽⁸⁶⁾ The Irish had the reputation of being excellent pieceworkers but poor day workers, good harvesters of corn and hoers of roots but poor ploughmen.

Irish harvesters had been visiting Britain since at least the late seventeenth century but it was not until the Napoleonic Wars that their contribution could properly be described as 'indispensible'. An Ayrshire farmer claimed that there were periods during the war, when, but for the Irish, the farming labour of the country could not have been done.⁽⁸⁷⁾ In 1812 the following testimonial to their good services appeared in Evans and Ruffy's Farmers Journal.⁽⁸⁸⁾

'It is fortunate for Corn counties, that the operation of the harvest is aided by Irish labourers. Were it not for these seasonable and able assistants, the work could not be performed in time, and the workmen of the county would know no bounds to their demands, both as to price and as to beer. Surely then, not liberality only, but interest also, render it the duty of all who can afford it, and particularly the farmer, never to refuse them relief when needed, and to strain a point to afford them encouragement by employment and otherwise. Should they arrive as frequently happens, before the corn is ready, they will be found willing and active in other work, such as spreading manure upon fallows or grass, or what else may be required, and some though not all can hoe turnips.'

After the War, and even during the labour-glutted years of the 1820's and early 1830's, many expanding industrial and agricultural areas regarded Irish labour as essential. In 1828, for example, it was asked how anybody could claim there was a surplus of farm labour in England when the harvest could not be got in without

an annual importation of Irish.⁽⁸⁹⁾ 'The sturdy Irishman', it was observed, 'is too much the object of ridicule in his periodical immigrations to this his sister country; but on a moment's reflection, everyone must see that his presence could not, in reality, be dispensed with at the harvest season. But for the presence of these Irish reapers, how much of the finest produce of the land must have this season [i.e. 1834] wasted in the furrows'.⁽⁹⁰⁾

The majority of farmers reporting to the 1834 Irish Poor Law Inquiry stated emphatically that the Irish were indispensable at harvest time, and it is equally clear that they were also essential for market garden cultivations, hop picking and potato lifting.⁽⁹¹⁾ In Essex for example, they were described as 'a very important element'; in Surrey it was claimed that without them it was impossible to harvest the corn at the 'favourable moment'; similarly, in central-southern and west Midland England their contribution was regarded as invaluable. In some parts of central and southern Scotland almost all the harvesting was by this stage in the hands of Irish reapers.⁽⁹²⁾ Conversely, the rise of the gang system in Norfolk and Suffolk in the 1820's and 1830's, may owe something to the fact that few Irish penetrated east of the Fens.⁽⁹³⁾

By 1850 the Irish were the chief, and sometimes, as in central and southern Scotland, north-west England and the East Anglian Fens, the more or less exclusive source of casual labour. In the Fylde district of Lancashire they were engaged for the whole of the summer period, June to September, and so extensively, that it was claimed that but for their assistance large areas of arable land would have had to be converted to grass.⁽⁹⁴⁾ In the Northwich and Knutsford districts of Cheshire such was the dependence on

Irish labour that landlords were obliged to erect special accommodation to house them.⁽⁹⁵⁾ In some parts of northern England, notably Cheshire and Lancashire, local labour became so scarce that by the 1860's Irish labourers were being employed all the year round.⁽⁹⁶⁾

It has been claimed, chiefly by social historians, that Irish labour was over supplied between 1815 and 1850, that it glutted the market and forced down the wages of resident workmen. The implication is that if Irish labour had been less well supplied the wages and living standards of the British worker would have risen. The logic of this argument is strong and because it has some basis in fact, would appear difficult to refute. However, two factors are highly relevant here. The first is that the bulk of Irish migrant labour was concentrated in high-wage north Britain and was only very thinly spread over low-wage south Britain. The second is that the hypothesis is based on the ex ante assumption that if Irish labour had not been available, and if resident labourers' wages had increased, farmers would have had no alternative but to carry the increase in labour costs. This ignores the possibility of their introducing labour and labour cost saving factors. The harvest labour shortages which developed in the years, 1824-5, 1834-40 and 1845-6 suggest that the supply in elasticities were never far beneath the surface, and indeed, the post-1835 evidence makes it quite clear that given a tighter harvest labour market, farmers were not averse to technological change.

This does not imply that native workmen were indifferent to the Irish. On the contrary, in many cases their appearance was often the signal for riots and disturbances. Typical of anti-Irish feeling was the incident at Felmersham (Herts) in August 1824, in which,

according to a contemporary account, 'a mob of 30 of our men Rison upon the ireshmen, all our Men had bludgins in their hands. But our Farmers Made pease'. Similarly, around Birmingham, farmers who employed Irish were forced to 'protect tham from abuse', while in Cheshire, the natives were 'very jealous' of the Irish and 'use all means to prevent their coming; they beat them and steal their sickles and C.'⁽⁹⁷⁾ Yet it appears that such extreme hostility was largely confined to urban and industrial areas where farmers drew most of their casual labour from hiring markets situated within the towns themselves. In Kent, in the 1830's, the Irish were said to compete with, 'the townsmen and other temporary helpers and not with the regular labourers'.⁽⁹⁸⁾ In many rural areas harvest contracts agreeing wages, perquisites and conditions of hiring were drawn up some weeks before the harvest began. Casual workers, on the other hand, including migrants, were hired immediately before, or often during the harvest. As a general rule migrants were never taken on until all locals had been employed.⁽⁹⁹⁾ Evidence also suggests that Irish wage rates were normally lower than those of resident workmen. In south Wales, in the 1820's, they received half the native wage, in south Lancashire in 1851, 60 per cent, and in Lincolnshire in 1867, 60-70 per cent.⁽¹⁰⁰⁾

The Irish were also accused of selling their labour so cheaply as to force townsmen and other migrant workers right out of the market.⁽¹⁰¹⁾ Yet as we have already noted there were factors other than Irish competition which made for a reduction in the supply of harvest workers from these sources, and although in some areas the Irish may have accelerated this process, in many others they were for the most part only filling vacant gaps. Inevitably though, there would always have existed some disparity between Irish labour

supply and local harvest labour demand. Even in the 1860's the harvest labour market was still far from perfect and when, as was often the case, the Irish did three or more harvests a season, and because the speed of ripening and timing of the harvest in the different receiving areas varied so much from year to year, regional imperfections could easily develop. A glut of Irish labour in say Cheshire or south Lancashire in early August was wholly compatible with a scarcity on the Yorkshire Wolds three weeks later. The trade cycle also played its part in exacerbating the imperfections, in so far as the Irish were less likely to glut the market in the upswings than in the downswings.

It remains only to emphasise that clashes between Irish and native harvesters were chiefly characteristic of the years 1830-33, a time of acute rural unemployment and social unrest. Subsequently, apart from a passing spell in the late 1840's, the tensions evaporated in the heat of growing harvest labour scarcity and rising wages.

The areas of Britain most visited by Irish migrant harvesters were as follows:-

- (a) London and the inner Home Counties
- (b) East Anglian Fens
- (c) West Midland Plain
- (d) Shropshire Barleylands
- (e) North Midlands (Cheshire, Derbyshire, Lancashire, Nottinghamshire and the West Riding of Yorkshire)
- (f) East Riding of Yorkshire

- (g) Northumberland and Durham
- (h) Scottish Border Counties
- (j) Scottish Central Lowlands.

Few, if any, Irish visited the south-western and extreme southern counties of England, Norfolk and Suffolk outside the Fens, the Oxfordshire and Gloucestershire Cotswolds, and northern and eastern Scotland.

Three main paths of migration can be traced:-(102)

I. From south and south-west Ireland via Bristol and the South Wales ports eastwards along the Great West Road to the London area, northwards into the west Midland counties and north-eastwards into the south Midlands and East Anglian Fens.

II. From Connaught via Liverpool, south into Cheshire and Shropshire, east across Lancashire, Derbyshire and north Nottinghamshire into Lincolnshire and Yorkshire, and north into the Fylde and Furness.

III. From Ulster and north Connaught via Glasgow and the Kyle ports to southern and central Scotland.

According to the 1841 Census, the greatest number of seasonal migrants disembarked at Liverpool and worked in north and north Midland England.

PORTS OF DISEMBARKATION OF IRISH SEASONAL MIGRANTS IN 1841. (103)

	<u>LIVERPOOL</u>	<u>GLASGOW</u>	<u>LONDON</u>	<u>BRISTOL</u>	<u>CARLISLE</u>
<u>Numbers disembarking</u>	35430	18937	1880	914	490
<u>As % of total migrants</u>	62.4	33.3	3.3	1.6	.8

Migrant worker / corn area ratios were highest in Scotland, ⁽¹⁰⁴⁾ where in Roxburgh-Berwick and the Lothians the Irish far outnumbered all other categories of harvest worker, and lowest in southern England, where, except in the London area, the Irish were very thinly spread. It should be noted, however, that although migrant worker densities were low in south-east England, large numbers of London Irish participated in farm work, chiefly in market gardening and hop picking. In 1854, 600 London Irish were employed on one Kent hop farm along. ⁽¹⁰⁵⁾

The concentration of Irish in north and north Midland Britain cannot be explained by wage differentials, for as we have already noted, harvest wages were often higher in the south and east than in the north and west. Rather, distance from the ports of embarkation was the chief determining factor, which meant that three quarters of the migrant host was drawn from Ulster and Connaught and only a very small proportion from the remote south-western counties of Clare, Cork and Mayo, which provided the bulk of the Irish 'internal' migrant labour force. ⁽¹⁰⁶⁾ Moreover, the passage from Londonderry, Belfast and Dublin was short and cheap, while travellers from Cork, Waterford and Wexford faced a long and expensive sea-voyage and a considerable overland journey besides.

The itineraries of Irish harvesters in Britain were many and complex. Some bands harvested regularly on the same farms, often entering into informal contract with the farmer, the arrangement being confirmed by correspondence each spring. Most Irish expected to take at least two corn harvests a season and to spend the rest of their time haymaking, in root and vegetable cultivations and in hop picking. Their extreme mobility is demonstrated by the following itineraries. In Scotland the general direction

was first to the Lothians and Roxburgh-Berwick, then back again to meet the ripening harvest in Stirling, the Forth Valley and south Fife, then perhaps northwards into the Carse of Gowrie and finally onto the market garden and potato farms around Glasgow. In the 1850's a favourite harvest-round was East Lothian, Berwick and the Lammermuirs. In Ayrshire, Primrose McConnell recollected them doing three harvests, one in the east, one in the west and the third in the 'hill country'. South of the Border, migrants disembarking at Liverpool appear to have worked the circuit: Cheshire/Lancashire (hay harvest) → Derbyshire/north Nottinghamshire (hay and corn harvest) → Cambridge/Lincolnshire/Yorkshire (corn harvest) and Cheshire/Lancashire (potato harvest). One group did a hay harvest in north Derbyshire, an early corn harvest in south Derbyshire, a late corn harvest in north Derbyshire, and to finish the season, a potato harvest in Lancashire. Itineraries in southern England are more problematical. It would appear, though, that large numbers of migrants based themselves on London and then radiated north-westwards as far as Birmingham, north-eastwards to the Fens or southwards into the southern Home Counties. The different flows probably came together again for the Kent, Surrey and Worcestershire hop harvests.⁽¹⁰⁷⁾

Mobility was increased by the railways, which not only brought some of the more remote parts of Ireland into the catchment area, but also, and more importantly, enabled the migrants to concentrate more exclusively on the high-wage areas. They were using trains in Scotland in the 1840's and by the 1860's many went by rail direct from Lancashire to the Eastern Counties. According to one of the author's informants, one particular group of Irish harvested hay around Chelmsford in central Essex, then entrained for the Fens

and the East Riding for the corn harvest and then onto Lancashire for the potato harvest. Another informant, an ex-migrant harvester from Co. Wexford, claimed that in one year (c. 1912), he did no less than six harvests: two hay, two corn and two potato, having zigzagged across England between Bristol and Suffolk, via Lincolnshire and Northamptonshire. (108)

In attempting to determine the shape of the long-run supply curve of Irish migrant labour we have two useful statistical bench marks: in 1841, the official Irish Census count, and in 1880, the returns of the Irish Agricultural Statistics and of the port and railway authorities. Admittedly, before 1841 and between 1841 and 1880 there are no statistical data, but the literary evidence is sufficiently detailed for us to be able to establish the broad chronology of change. (109)

Already by 1750 Irish harvesters were regularly visiting the Mainland. In 1737 Sheridan featured them in his play, "The Brave Irishmen", while a decade later Kalm observed large numbers of them harvesting in the Home Counties. In the 1790's companies of Irish 'acremen' were busy in the Fens, the Vale of London, Hertfordshire, Surrey and Herefordshire. (110)

The 1798 Rebellion marked an important upward turning-point in the Irish migration movement. (111) By 1814 seasonal migration assumed very sizeable proportions and was already dominating the harvest labour market in parts of north Britain. (112)

The close of the War saw a spectacular increase in the

migrant supply. Drove of Irish paupers entered Britain during the summer and autumn of 1815. Great influxes of Irish harvesters were reported in Berwick in 1816-18 and again in 1821-22. Numbers again increased dramatically following the potato famine of 1822, in which year Yorkshire was inundated by 'swarms of Irish who migrate in annually increasing hordes'.⁽¹¹³⁾ Such was the inflow that by 1828 harvest wages at the Edinburgh hiring markets barely exceeded 1s. a day, where in wartime they had often exceeded 2s. 6d.⁽¹¹⁴⁾ 'It is very hard on these poor people', sympathised the Glasgow Chronicle, 'that, after travelling several hundreds of miles they should be under necessity of working for only about one half of an ordinary wage'.⁽¹¹⁵⁾

The Irish entry was facilitated by the appearance in 1816 of the steamship and the subsequent intense competition between rival shipping companies which reduced the steerage fare from Belfast to Glasgow from 1s. 6d. — 2s. 0d. to 3d. — 6d.⁽¹¹⁶⁾ From south-west Ireland migrants sometimes journeyed to South Wales free of charge, as ballast in returning colliers.⁽¹¹⁷⁾

Some indication of the spectacular growth which took place in Irish immigration after 1815 is provided by the vagrancy statistics. In the counties of Berkshire, Cambridgeshire, Cheshire, Cumberland, Essex, Hertfordshire and Middlesex, numbers of Scotch and Irish vagrants passed by the Poor Law authorities increased from 3,500 in 1811 to 8,600 in 1826 to 22,745 in 1831.⁽¹¹⁸⁾ The diversion of Cork and Kerry harvesters from Limerick to England was commented upon in 1830, and was said to be caused partly by the hostility of the native Limerick labourers.⁽¹¹⁹⁾ The 'vast influx' of Irish into Lincolnshire began in the late 1820's, while it was observed in 1834 how the Irish visitations to eastern England

had 'lately' become considerable. (120)

The peak immigration occurred during the Famine Years 1846-48. From an annual inflow of 6000 - 8000 in the 1820's harvesters arriving by the Clyde steamers were running at 25,000 in the mid 1840's. Total numbers visiting Britain, already estimated at over 57,000 in 1841 (and this probably an understatement), probably exceeded 70,000 in 1846. To the regular migrants must be added large numbers of other Irish, unemployed handloom weavers, building workers and railway navvies, who would have resorted to harvest work during the industrial depression of the late '40's. By 1843 the Irish had penetrated the Hebrides and Orkneys in search of farm work. In 1846-48 they threatened to overrun south-west England, which up till then had been comparatively unaffected. South Wales was inundated with floods of Irish, 'bringing pestilence on their backs, famine in their stomachs'. Sussex and Hampshire swarmed with Irish 'tramps' [harvesters?] from March to October. Similarly, north-east England reported super-abundant supplies of 'migratory pisantry (sic)'. (121)

The Famine marked an important watershed in the Irish seasonal migration movement. The contraction of the Irish harvester flows was as dramatic after 1846 as had been their expansion after 1815. Between 1841 and 1851 the population of Ireland fell by 1.66 million, and over the next two decades declined by a further 1.1 million; the population in 1871 being in fact smaller than in 1811. Significantly famine mortality was greatest and immediate post-Famine emigration highest in Western Ireland, the chief source area of migrant harvesters. (122) The emigration rate accelerated again following the potato failures of 1860-62, the exodus in Galway, Kerry, Mayo and Roscommon being so great that

houses were left 'open and deserted' and land reverted to waste.⁽¹²³⁾
Between 1841 and 1871 the population of the six major source counties declined by 36 per cent, and indicatively emigration was greatest among the young who comprised much the greater part of the seasonal migrant host.⁽¹²⁴⁾

Yet not only were the populations of the source areas declining, but also, because of the rapid expansion of the 'casual employment' industries in Britain, an increasing proportion of seasonal migrants engaged in occupations other than harvesting. A further factor making for diminishing supplies was rising wages and increased employment in Ireland itself, which lowered the incentive to migrate. Between 1850 and 1870 Irish agricultural wages increased by between 50 and 100 per cent. In the late 1860's some areas of southern Ireland were experiencing actual shortages of harvest labour; in Cork and Kilkenny good mowers could command wages of 18s. per week, which compared very favourably with those paid on the Mainland itself.⁽¹²⁵⁾

As the Irish flows slowed down so they became more concentrated on the high wage districts. Wages which would have been gladly accepted in the 1840's were spurned in the 1860's. Harvest wages of 16s. per week in Oxfordshire were then not enough 'to induce Paddy to join us in this district'.⁽¹²⁶⁾ And why should they have been when Paddy could obtain 20s. around Birmingham, upwards of a guinea on the East Anglian Fens, 25s. in Lincolnshire and 30s. in Yorkshire.⁽¹²⁷⁾

Also apparent is that after 1850 the geographical mobility of some Irish flows diminished. This was particularly true of north-west England where within just a few miles of the Liverpool quays the Irish were guaranteed high wages and a long working season on vegetable and market garden farms.

British farmers soon felt the draught of the Irish withdrawal. Between 1835 and 1846 the then rapidly increasing numbers of Irish harvesters had been quickly and easily absorbed. It is not surprising, therefore, that their reduction in the early 1850's was the signal for a long drawn-out wail about the increasing cost of what had previously constituted the cheapest and most elastic source of casual labour. Already by 1850 the Glasgow Herald was observing that, 'the numbers of this harvest are estimated to have fallen off a fourth compared with former years; and it is pleasing to note that the harvesters are this year better attired, and altogether in a better condition of body'. In 1855 further attention was drawn to their considerable moral and physical improvement, it being noted that the present generation of harvesters was 'infinitely superior in physical and external appearance to the multitudes of gaunt and ragged creatures that used to annually visit our shores'. Their rewards contrasted sharply with the 1s. to 1s. 2d. a day of the late 1820's. In country districts of Lanark, Renfrew and Ayrshire daily wages rates were 4s. 6d. to 5s. 6d. in the late 1850's, while in Berwick, Roxburgh and Stirling the immigrant could expect to make 18s. a week, in addition to free food and lodging.⁽¹²⁸⁾ The serious harvest labour shortages of 1859 were exacerbated by a further contraction of the Irish supply.⁽¹²⁹⁾ By the late 1860's the Irish element was reported virtually extinct in Middlesex, much reduced in Berkshire, Buckinghamshire and Oxfordshire, and very unreliable in Durham.⁽¹³⁰⁾ There were reported 'far fewer' Irish than formerly in Warwickshire, while significantly, these were concentrated around Birmingham where wages were highest.⁽¹³¹⁾ It was claimed that in one area of Derbyshire the Irish had declined by 80 per cent, and that in others,

the shortfall, though less dramatic, had created a 'great demand for reaping machines'.⁽¹³²⁾ Reductions were also reported from Lincolnshire ('as scarce as before they were plentiful') and from Cambridgeshire.⁽¹³³⁾ Maclelland compared the situation in Scotland in 1850 when there was 'no want of Irish shearers eager to be employed', with that of 1875, when 'scarcely a man from the sister isle can be had except he is expressly sent for'.⁽¹³⁴⁾ As Tuxford complained in 1867, with the Irish supply diminishing, farmers now had to rely more or less exclusively on local sources of labour, and to contend with their restlessness and strikes for more money.⁽¹³⁵⁾ Indeed, by this stage, the supply price of the Irish, formerly the lowest in the market, had become almost too high for the majority of British farmers who now looked to technological change to provide labour and labour cost savings.⁽¹³⁶⁾

A crude long-run supply curve for Irish migrant harvest labour can be constructed as long as we abide by the following assumptions.

- (1) that the 1841 Irish Census understates the true number of migrants. The Census appears to exclude migrants travelling by non-scheduled passenger and cargo ships. The Census Commissioners themselves contended that, 'no considerable number of harvest labourers' avoided enumeration in this way. I will assume the degree of error at 10 per cent, thus raising the 1841 total from 57,651 to 63,416.⁽¹³⁷⁾
- (2) that the peak immigration occurred during the Famine years 1846-7, of the approximate order 75,000.

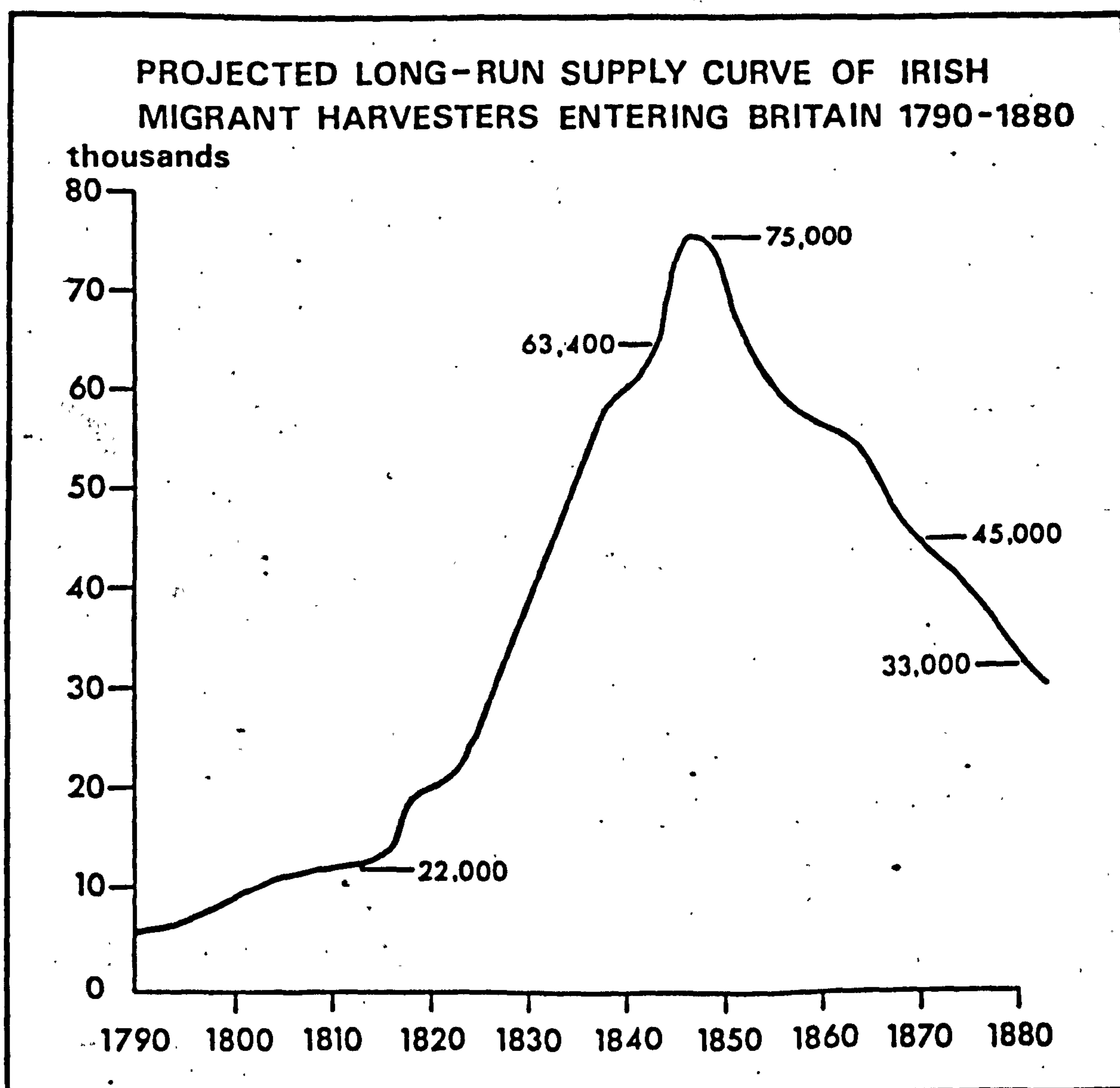
(3) that between the early 1820's and mid- 1840's total numbers increased in the same proportion as those entering Scotland by the Clyde steamers, that is by 350 per cent. (138)

(4) that the total of 22,900 migrants as given by the 1880 Agricultural Statistics understates the true volume. There exists considerable discrepancy between this figure and that of 44,272 returned by the railway and port authorities. The former figure appears to exclude a large number of labourers who in June, when the Agricultural Statistics were taken, had not yet made up their minds to migrate, plus uncertain, but conceivably large, numbers who were deterred from giving information by the fact that the Census was taken by the police. On the other hand, the latter figure includes both agricultural and non-agricultural migrants, and therefore errs on the side of overstatement. In 1914 it was officially admitted that the Agricultural Statistics recorded probably only 60 per cent of agricultural migrants. However, an adjustment factor of $1.66 \left(\frac{x}{6} \times 10 \right)$ would appear too high for 1880, as this would mean,

assuming the port returns as approximately correct, that only 6200 men left Ireland for industrial work, compared with 38,000 for agricultural work $\left[44,272 - \left(\frac{22900}{6} \times 10 \right) \right]$. In 1885 Hancock estimated that in the late 1870's, 30,000 - 35,000 agricultural labourers migrated annually in a good year, a total which accords closely with the Irishman estimate of 30,000 in 1880. (139) I will plump, therefore, for an 1880 entry of 33,000.

(5) that as suggested in the text the key upward movements of the supply curve occurred in 1798, 1815, 1822 and 1846, and the key downward in 1848-51 and 1863-4.

The resultant curve is plotted below. It suggests that between 1790 and 1846/7 numbers increased from c. 75,000, and that between 1846/7 and 1870 they declined from c. 75,000 to c. 40,000, an overall fall of about 40 per cent.



1. T. Stone, General View Lincolnshire (2nd edn, 1800), pp. 306-7.
2. A. Redford, Labour Migration in England, 1800-1850 (Manchester, new edn, 1964), preface, and also, pp. 1-9.
3. G.C. Homans, English Villages of the Thirteenth Century (New York, 1960), p. 136.
4. W. Hasbach, A History of the English Agricultural Labourer (1908), p. 16. See also, Lord Ernle, English Farming Past and Present (3rd edn, 1922), p. 11.
5. Redford, op.cit., p. 86.
6. The Farming & Account Books of Henry Best (Surtees Society, 1857), p. 48; A. Everitt, 'Farm Labourers', in ed. J. Thirsk, Agrarian History of England & Wales, IV(1967), 434.
7. A more broadly based analysis of the workings of the proto-industrial farm labour market and the effects of external influences can be found in the chronology chapters, infra, pp.150ff, which includes further discussion of the factors ruling the supply curve of migrant labourers.
8. T. Davis, General View Wiltshire (1811), p. 21; J. Caird, English Agriculture in 1850-1851 (1852), p. 518; R.C. Employment (1867), First Report (1868), App. pt. II, p. 114, p.129, p.244.
9. J. Billingsley, General View Somerset (1794), pp. 74-5; Rev. Warne & A.&W. Driver, General View Hampshire (1794), p. 65; R.C. Employment (1867), First Report (1868), App. pt. II, p. 129; T. Bowick, 'Recent Improvements in Haymaking', JRASE, XXIII (1862), p. 58; J. Leatham, General View East Riding (1794), p. 32; G. Legard, 'Report on the Farming of the East Riding of Yorkshire', JRASE, IX (1848), p. 117.
10. Agricultural Gazette, 17 Aug. 1867, pp. 864-8; 24 Aug. 1867, p. 887.
11. A. Young, General View Essex (1807), p. 304; R. Baker 'On the Farming of Essex', JRASE, V (1844), pp. 27-8. Billingsley, op.cit., (3rd edn, 1798), p. 97; S. Jonas, 'On the Farming of Cambridgeshire', JRASE, VII (1846), p. 49; A. Young, General View Hertfordshire (1804); A. Somerville, Autobiography of a Working Man (1848), p. 103.
12. 10th Report of Poor Law Commissioners (1834), p. 176A.
13. W. Clift, Reminiscences (n.d. Basingstoke), pp. 64-6.

14. Workers from hop-growing districts were especially mobile. The hop areas of southern England were mostly clay soils, their average farm size small and their standard arable rotation wheat, beans and fallow. They were very densely populated. The most important 'hop flow' was from West Surrey onto the Sussex Downs and into the Isle of Wight. For this see, Report on the Employment of Women and Children in Agriculture (1843), p. 175 and G. Bourne, Lucy Bettesworth (edn, 1913), pp. 137-42. For others, see Clift, op.cit, pp. 64-6 and J.A. Eggar, Remembrances of Life and Customs in Gilbert White's, Cobbett's and Charles Kingsley's Country (2nd imp. n.d.), p. 88.
15. Agricultural Gazette, 7 Oct. 1861, p. 893.
16. E.L. Jones, Seasons and Prices (1964), pp. 62-3.
17. 1841 Census, I, enumerators' notes, pp. 23, 49, 76-7. For other hay examples, see, ibid, pp. 23, 41, 47, 49, 51, 63, 73, 76.
18. Sources are as follows:-
 - (1) R.C. Agriculture (1833), p. 188.
 - (2) R.C. Labour (1894), I, pt. II, p. 79.
 - (3) R.C. Employment (1867), Second Report (1869), p. 129.
 - (4) Rev. Warne and A. & W. Driver, General View....Hampshire (1794), p. 65; G. Bourne, Lucy Bettesworth (edn, 1918), pp. 139-40.
 - (5) W. Clift, Reminiscences (n.d. Basingstoke), pp. 64-6; Report on Employment of Women and Children in Agriculture (1843), p. 175.
 - (6) Bourne, op.cit, pp. 139-40.
 - (7) 10th Report of the Poor Law Commissioners (1834), p. 176a.
 - (8) J. A. Eggar, Remembrances of Life and Customs in Gilbert White's, Cobbett's, and Charles Kingsley's Country (2nd impn, n.d.) p. 88.
 - (9) T. Davis, General View Wilts (1811), p. 211; J. Caird, English Agriculture in 1850 & 1851 (1852), p. 518; R.C. Employment (1867) Second Report (1869), App. pt. II, p. 244.
 - (10) Davis, op.cit, p. 211.
 - (11) S.G. Kendall, Farming Memoirs of a West Country Yeoman (1944), p. 228.
 - (12) A. Young, General View Hertfordshire (1804), p. 217.
 - (13) Private Communication, F. Wyeth, Trowes Lane, Swallowfield, Berks. Sept. 1968.
 - (14) A. Young, General View Essex (1807), p. 304; R. Baker, 'On the Farming of Essex', JRASE, V(1844), pp. 27-8; R.C. Labour (1893), I, pt.V, p. 76.
 - (15) S. Jonas, 'On the Farming of Cambridgeshire', JRASE, VII(1846), p. 49.
 - (16) Private Communication, H. Andrew-Tuddenham, Aylsham, Norfolk, Aug. 1968.
 - (17) R.C. Labour (1893), I, pt. VI, p. 107.
 - (18) W. Marshall, Rural Economy of the Midland Counties, I (1790), p. 215.
 - (19) T. Batchelor, General View Bedfordshire (1808), pp. 583-4.
 - (20) T. Bowick, 'Recent Improvements in Haymaking', JRASE, XXIII (1862), p. 58.
 - (21) R.C. Employment (1867), Second Report (1869), p. 227.
 - (22) J. Billingsley, General View Somerset (1794), pp. 74-5.
 - (23) R.C. Employment (1867), First Report (1868), App. pt. II, p. 126.
 - (24) Report of the S.C. of the House of Lords on the State of Agriculture (1836), Third Report; p. 416

- (25) R.C. Employment (1867), First Report (1868), App. pt. II, p. 114.
 - (26) Report on Wages and Conditions of Employment in Agriculture (1919), II, p. 439.
 - (27) Ibid, II, p. 434.
 - (28) Report of the S.C. of the House of Lords in the State of Agriculture (1836) 3rd Report, p. 416.
 - (29) M.I. Williams, 'Seasonal Migrations of Cardiganshire Harvest Gangs to the Vale of Glamorgan in the Nineteenth Century', Ceredigion, III (1957), pp. 156-9.
 - (30) J. Leatham, General View East Riding (1794), p. 32; G. Legard, 'Report on the Farming of the East Riding of Yorkshire', JRASE, IX (1848), p. 117; Report on the State of the Irish Poor in Great Britain (1835), App. G. p. xlvi.
 - (31) Farmers Magazine, Nov. 1838, p. 335; July 1845, pp. 64-5.
 - (32) A Somerville, Autobiography of a Working Man (1848), p. 103.
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19. See E.J.T. Collins, 'Labour Supply and Demand in European Agriculture 1790-1880', E.L. Jones & S.J. Woolf, eds, Agrarian Change and Economic Development (1969), pp. 77-9.
 20. Report on the State of the Irish Poor in Great Britain (1835), App. G. p. xlvii.
 21. J.H. Johnson, 'Population movements in County Derry during a Pre-Famine Year', Proc. Royal Irish Academy, 60 (1959), pp. 158-60.
 22. See, infra, p. 114
 23. The demand factors have already been discussed supra, Chapter II.
 24. See supra, pp. 87-96.
 25. Census data in B.R. Mitchell & P. Deane, British Historical Statistics (Cambridge, 1962), p. 21.
 26. See infra, pp. 122 ff.
 27. For a detailed examination of the factors which were likely to have affected migrant harvester flows during the period 1835-47, see infra, pp. 179-192.
 28. R. Jeffries, Hodge and His Masters (uniform edn, 1949), pp. 229-30.
 29. C. Morton, Hand Book of Farm Labour (edn, 1868), p. 72.
 30. See infra, pp. 4, 212.

31. Report of the Commissioners Census of Ireland (1843), pp. xxvii; Agricultural Statistics (Ireland), 1880. The sources suggest that between 1846 and 1870 numbers of Irish harvest migrants fell by between 50 and 60 per cent. For more detailed discussion, see infra, pp. 132-137.
32. J. Thirsk, English Peasant Farming (1957), p. 325.
33. Private Communication F. Wyeth, Swallowfield, Berks, Sept. 1968.
34. R.C. Grant, A History of Worcestershire Agriculture (Worcester, 1939), p. 47.
35. J. Duncomb, General View Hereford (1805), p. 64; J. Clark, General View Hereford (1794), p. 29; Williams, loc. cit, pp. 156-9.
36. Cited A.H. John, The Industrial Development of South Wales (University of Wales, 1950), p. 32.
37. Duncomb, op.cit, p. 64 and for more detailed discussion of this movement see, Williams, loc. cit, pp. 156-9.
38. They were harvesting in Cheshire and Flintshire in 1828, Redford op.cit, p. 145.
39. Duncomb, op.cit, p. 64.
40. J. Middleton, General View Middlesex (1798), p. 382.
41. E.L. Jones, 'Agricultural Conditions and Changes in Herefordshire, 1660-1815', Woolhope Transactions, XXXVII(1961), p. 46; W.T. Pomeroy, General View Worcestershire (1794), p. 49.
42. Duncomb, op.cit, p. 64.
43. W. Davies, General View ... South Wales (1815), I, p. 223.
44. Census data in Mitchell and Dean, op.cit, p. 20.
45. R.C. Agriculture (1833), Evidence, p. 393; Report of S.C. of H of L on the Poor Laws, 1830-31(1831), p. 158.
46. H. Tanner, 'The Agriculture of Shropshire', JRASE, XIX(1858), p. 62.

47. Redford, op.cit, p. 145. In the mid-1830's Cardigan and Carmarthen women still did market-garden work around London. Report on the State of the Irish Poor, op.cit, App.G. p.xlvi. Large numbers were still working in Kent in the mid 1840's. G. Buckland, 'On the Farming of Kent', JRASE, VI (1845), p. 268. There were at this stage a few Welshmen harvesting in Cheshire and Flintshire, Report on the State of the Irish Poor, op.cit, App.G. p.xlv.
48. Census data in Mitchell and Deane, op.cit, p. 20.
49. John, op.cit, p. 64. The effect of the rise of the South Wales industries on harvest labour supply generally is discussed at infra, pp. 212 ff.
50. Herefordshire Journal, 2 Oct 1845. Reference supplied by Dr. E.L. Jones (University of Reading).
51. Herefordshire Journal, 21 Oct 1957.
52. Williams, loc.cit, pp. 156-9.
53. Agricultural Gazette, 14 Aug 1867, p. 889, implies that in the Much Wenlock area of Shropshire machines had begun to displace the Welsh and Irish and that farmers who used them now harvested with 'their usual staff of labourers'.
54. R.C. Labour (1893), II, pp. 82-3.
55. The term Scot here includes both Highlanders and Lowlanders but the evidence does not always distinguish between the different bonnets, or between seasonable harvest migrants and other categories of itinerant labour.
56. Redford, op.cit, p. 135; see also, A. Young, Political Arithmetic (1774), pp. 103-4; W. Marshall, Minutes of Agriculture (1783), 7 Aug 1775.
57. A.R.B. Haldane, Drove Roads of Scotland (1952), pp. 22-3.
58. Redford, op.cit, p. 138.
59. Ibid, p. 139 and Appendix Map F.
60. C.G. Robertson, General View Midlothian (1795), p. 93.

61. J.E. Handley, The Agricultural Revolution in Scotland (Glasgow, 1963), p. 108; J.E. Handley, Scottish Farming in the Eighteenth Century (1953), pp. 234-65; J.A. Symon, Scottish Farming Past and Present (Edinburgh, 1959), pp. 272-6; J. Sinclair, Analysis of the Statistical Account of Scotland (edn, 1825), 145ff. M. Gray, The Highland Economy 1750-1850 (Edinburgh, 1957), pp. 53, 161-2, 219.
62. Redford, op.cit, p. 142; Report on the State of the Irish Poor, op.cit, App.G, p. 150; Evans and Ruffy's Farmers Journal, 14 Oct 1811; Glasgow Chronicle, 4 Oct 1814 cited J.E. Handley, The Irish in Scotland 1798-1845 (Cork, 1945), p. 37.
63. Reports of Selected Farms, bound as Vol.III British Husbandry (1840), Scoreby Report, pp. 7-8; Redford op.cit, p. 147.
64. Farmers Magazine, Nov 1816, p. 487; Nov 1817, p. 476; Nov 1818, p. 491; Nov 1819, p. 492.
65. Handley (Irish), op.cit, pp. 48-9; J.H. Clapham, An Economic History of Modern Britain, I, p. 65; Report on the State of the Irish Poor, op.cit, pp. xlv-xlvi, pp. 123-7.
66. Handley (Irish), op.cit, pp. 48-9.
67. Report on the State of the Irish Poor, op.cit, pp. xlvi, pp. 123-8.
68. Glasgow Chronicle, 17 Aug 1824, cited Handley (Irish), op.cit, pp. 48-9.
69. Census in Mitchell and Deane, op.cit, p. 21.
70. Clapham, op.cit, I, p. 65. For the 'Clearances' and their effects on migration and emigration see, P.T. Wheeler, 'Landownership and the Crofting System in Sutherland since 1800', Ag. Hist. Rev. XIV (1966), p. 45.
71. Gray, op.cit, pp. 161-2, 219; Redford, op.cit, p. 144.
72. The evidence must not be taken to mean the total disappearance of Highland ers south of the Farm. Some were still harvesting in Durham in 1840, Farmers Magazine, July 1841, p. 8, in Haddington in 1836, S.C. on the State of Agriculture (1836), Third Report, Q. 9938-41.
73. R.C. Employment (1867), Fourth Report (1870), App. pt.I, pp. 34, 51-3, 58 and 48-88 passim.

74. R.C. Agriculture, 1879-82, Minutes of Evidence, II, Q. 39537-48.
75. R.C. Labour (1893), III, pt. I, pp. 109-115.
76. In particular, J.E. Handley, The Irish in Scotland (Cork, 1945), pp. 21-56; A. Redford, Labour Migration in England 1800-1850 (2nd edn Manchester 1964), pp. 132-149; B.M. Kerr, 'Irish Seasonal Migration to Great Britain, 1800-38', Irish Hist. Studies, 3(1942-3) pp. 365-80; J.H. Johnson, 'Harvest Migration from Ireland', Instit. Brit. Geog., Trans. 41(1967), pp. 97-112.
77. See Johnson, loc.cit, pp. 101-9 for a detailed discussion of the regional distribution (by place of origin) of migrant harvesters in Ireland.
78. Report on the State of Irish Poor, op.cit, pp. 97, 116.
79. Ibid, pp. xlvi, 4-5, 10, 144; Handley, op.cit, p. 57; Clapham, op.cit, I, p. 58.
80. Report on Railway Labourers (1846), p. 28; A.M. Taylor, Gilletts, Bankers at Banbury and Oxford (Oxford, 1964), p. 105.
81. R.C. Employment (1867), op.cit, First Report (1868), p. 294; R.C. Labour (1893), I, pt. VI, p. 107.
82. Infra, pp. 89, 92, 94-5.
83. Handley, op.cit, p. 173; Redford, op.cit, pp. 148-9, 137-41.
84. S.C. on Irish Vagrants (1833), pp. 42-3. See also, R.C. on the Poor Laws (1834), App.E, p. 62e; S.C. on the Poor Laws, 1830-1 (1831), p. 295.
85. Redford, op.cit, p. 139.
86. R.C. Labour (1893), III, pt. I, p. 67; III, pt. II, p. 200; Oral Communication, Mr. S.B. Paul, Bottisham, Cambs, 6/68. See also Implement and Machinery Review, 2 Oct 1907, p. 711 which confirms the use of scythes and sickles in difficult seasons and A.D. Hall, A Pilgrimage of British Farming (1913), p. 75.
87. Report on the State of the Irish Poor, op.cit, App.G, pp. 150-1.
88. Evans and Ruffy's Farmers Journal, 7 Sept 1812.

89. W. Smart, Annals of the Nineteenth Century, II (1917), p. 469.
90. Glasgow Courier, 6 Sept 1834, cited Handley, op.cit, p. 45.
91. Report on the State of the Irish Poor, op.cit, passim.
92. S.C. on the State of Agriculture, Third Report (1836), p. 145; S.C. on Agriculture (1833), Q. 3713; Report of the Poor Law Commissioners, X (1834), p. 172A; S.C. on the Poor Laws, 1830-1 (1831), p. 158; Redford, op.cit, pp. 145-6; Kerr, Loc.cit, p. 373; (Scotland) - S.C. on the State of Agriculture, Third Report (1836), p. 31; Report on the State of the Irish Poor, op.cit, pp. 123, 127, 148, 153; Handley, op.cit, pp. 45-6. For general statement on indispensibility of Irish in mid 1830's, see, Report on the State of the Irish Poor, op.cit, pp. xliii-xlvi, passim.
93. Clapham, op.cit, I, p. 469.
94. R.C. Employment (1867), op.cit, Second Report (1869), Tremenhare's Report, p. 153.
95. Ibid, Second Report (1869), p. 11; Agricultural Gazette, 23 April, 1870, p. 576.
96. J.D. Dent, 'Agricultural Notes on the Census of 1861', JRASE, XXV (1864), p. 320; R.C. Employment (1867), op.cit, Second Report (1869), pp. 69-70, 562; First Report (1868), App. pt. II, p. 229.
97. T.W. Bagshawe, 'The Itinerants', Bedfordshire Magazine, 8, no. 61, pp. 206-7; Report on the Irish Poor in Britain, op.cit, pp. xlv, 7; See also Handley, op.cit, pp. 46-7; Clapham, op.cit, I, p. 58; S.C. on the Poor Laws, 1830-1 (1831), p. 168. Anti-Irish feeling featured in the Swing Riots of 1830-1. Redford, op.cit, p. 162; Kerr, loc.cit, pp. 376-7.
98. Report on the State of the Irish Poor, op.cit, pp. 167-8.
99. S.C. on the Poor Laws, 1830-31 (1831), p. 136; Kerr, loc.cit, pp. 375-6. That Irish were not taken in in rural areas if the supply of resident workmen was adequate is implied by the following observation for Warks and Staffs in 1833:- '[The Irish] come up to London and work in the southern counties and then work back again; but there is no great demand for them in the present day, there being rather a superabundance of labourers in most county districts;' S.C. on Irish Vagrants (1833), p. 40.
100. John, op.cit, p. 68; Caird, op.cit, p. 284; R.C. Employment (1867), First Report (1868), App. pt. I, p. 74. See also, ibid, Second Report

100. Continued

- (1869), App. II, pp. 222, 562; Report on the State of the Irish Poor, op.cit, p. 7; Caird, op.cit, p. 251.
101. Handley, op.cit, pp. 48-9; Redford, op.cit, pp. 145-7; Report on the State of the Irish Poor, op.cit, pp. xlv-xlvi, 123-7.
102. Redford, op.cit, pp. 144-47.
103. Report of the Commissioners appointed to take the Census of Ireland for the year 1841 (1843), pp. 450-1. The figures probably underestimate the extent of the emigration for they exclude labourers boarding steam vessels lying off the coasts *ibid*, pp. xxvi, and presumably vessels leaving the small ports.
104. The corn area in Scotland was never large - in 1854/5 it totalled 1.33m acres and in 1868/9 only 1.37m acres. G. Houston, 'Agricultural Statistics in Scotland before 1866', Ag. Hist. Rev. IX (1961), p. 94. This compares with 6.6 m acres in England in 1873 and in counties served by the Liverpool entrants, almost 1.4m acres in the three counties Lincs, Notts and Yorks alone. As we shall see (*infra* pp 270-1 it was the high density of Irish workers in Scotland which allowed the sickle and reap hook to survive there far later than in most other regions. In 1852, 12,000 'strangers', most of them from Ireland, descended regularly into the East Lothians and sometimes as many as 100 were at work in a single field. C. Stevenson, 'Farming of East Lothian', JRASE, XIV(1853), p. 305. In Roxburgh and Berwick, around 1860, large areas were still reaped by the 'great' migrations of Irish 'who are singularly expert in the use of the reaping hook'. J. Sanderson, 'On the Agriculture of Berwickshire and Roxburghshire', Trans. Highland Soc. (1862-3), p. 345. The scythe was hardly used at all in the Border Counties prior to 1850. Significantly its use became more general as the Irish dried up.
105. Redford, op.cit, p. 146.
106. See, Johnson, loc.cit, pp. 102-3; Kerr, loc.cit, pp. 371-2.
107. Handley, op.cit, p. 44; J. Wilson, 'Half a century as a border farmer', Trans. Highland Soc, 5th ser, XIV(1902), p. 39; R.C. Labour (1893), III, pt. II, p. 99; P. McConnell, Diary of a Working Farmer (1906), p. 238; R.C. Employment (1867), Second Report (1869), App. pt. II, pp. 417-8; Wages and Conditions of Employment in Agriculture (1919), II, p. 58; Reading Mercury, 1 Aug 1868; S.C. on Irish Vagrants (1833), p. 40.
108. Johnson, loc.cit, p. 108; Handley, op.cit, pp. 55-6; R.C. Employment (1867), Second Report (1869), App. pt. II, pp. 417-8; Oral Communications, Mr. R. Spalding, Gt. Baddow, Essex, 30 May 1968; T. O'Rourke, Earley, Reading, 10 Sept 1968.

109. Census (Ireland) 1841, op.cit, pp. 450-1; Irish Agricultural Statistics 1880-1914. See also infra, pp. 148-9 fn.

110. Information kindly provided by Irish Folklore Commission, Dublin (Sheridan); V. Bell, To Meet Mr. Ellis (1956), pp. 142, 145; W. Marshall, Rural Economy of the Southern Counties (1796), p. 27; G. Gooch, General View Cambs (1811), p. 125; W. James and J. Malcomb, General View Surrey (1794), p. 55; Clapham, op.cit, I, p. 57; T. Stone, General View Lincs (1800), p. 307; ed. B. Hargreaves, Diary of a Farmer's Wife (1964), pp. 59, 177. Ireland had its 18th century famines - 1727 and 1739-41, which presumably increased the rate of harvest migration. Irish labourers, whether resident or migrant it is not quite clear, were harvesting in the London area in 1736 when their presence occasioned a serious riot. Coxe's Life of Sir Robert Walpole, III, p. 348 cited, Report on the State of the Irish Poor op.cit, pp. 167-8.

111. Report on the State of the Irish Poor, op.cit, pp. IV-xlviii, passim.

112. Handley, op.cit, p. 37; Evans and Ruffy's Farmers Journal, 7 Sept 1812.

113. Redford, op.cit, p. 138; Farmers Magazine, Nov 1816, p. 487; Nov 1817, p. 476; Nov 1818; Nov 1821, p. 493; Nov 1822, p. 511.

114. G. O'Brien, Economic History of Ireland from the Union to the Famine (1921), p. 209; Redford, op.cit, pp. 139, 142; Kerr, loc.cit, p. 368. Glasgow Chronicle, 15 Aug 1828, cited Handley, op.cit, p. 51.

115. Ibid, p. 51.

116. For steamship travel, see, ibid, pp. 23-6; H.S. Irvine, 'Some aspects of passenger traffic between Britain and Ireland, 1820-1850; J. Trans. Hist. IV (1960), pp. 224-41; Kerr, loc.cit, pp. 370-2.

117. 2nd Annual Report, Poor Law Commissioners, App. B. No. 20, p. 419.

118. R.C. Poor Laws (1834), App. E, pp. 23-4. Irish Vagrants were few in Dorset, Herefs, Nfk, Sfk, Ruts and Sx and numerous in Berks, Lancs, Staffs, Warks, Wilts and Yorks (i.e. counties for the most part heavily dependent on Irish harvesters).

119. Redford, op.cit, p. 145.

120. S.C. on the Poor Laws 1830-1 (1831), p. 203; British Husbandry, I, p. 115. For the late 20's and early 30's, see, Clapham, op.cit, I, p. 58; Redford, op.cit, pp. 145-6; Kerry, loc.cit, p. 373; Report on the Irish Poor, op.cit, p. 165.

121. Handley, op.cit, p. 213. By the mid 1840's, 25,000 were entering Glasgow via the Clyde steamers, whereas according to the 1841 Census statistics numbers visiting Scotland were fewer than 20,000, ibid, p. 38; Census (Ireland) 1841, pp. 450-1. Redford, op.cit, pp. 156-7; Farmers Magazine, Sept 1847, pp. 290-1; Oct 1848, p. 374. The incentives to seasonal migration were very strong in the late 1840's. No less than 816,783 persons were receiving poor relief in Ireland in the first week of July 1848. By 1851 numbers had fallen to 19,482. Return of Persons in Receipt of Relief (1851), p. 493.
122. Mitchell and Deane, op.cit, p. 21; S.G. Checkland, The Rise of Industrial Society in England (1964), p. 34; C. Woodham-Smith, The Great Hunger (1962), passim; S.H. Cousens, 'The Regional Variations in Population Changes in Ireland, 1861-81', Ec. Hist. Rev., 2nd ser, XVII (1964), p. 301; Redford, op.cit, pp. 170-1.
123. Cousens, loc.cit, pp. 308-9, 312.
124. Of the ¹⁰most important source counties, 9 were in north and west Ireland. Their combined population declined from 2.812m in 1841 to 2.113m in 1851 and to 1.794 in 1871. Emigration here was very closely correlated with crop failure. See Cousens, loc.cit, pp. 308-13.
125. Agricultural Gazette, 24 Aug 1867, pp. 891-2; R.C. Labour (1894), V, pt. II, Section III-A, pp. 335-40. In 1872, according to T. Brassey, it was extremely difficult to obtain the necessary labour to complete the Fermoyr-Lismore Railway. Work and Wages (3rd edn, 1872), p. 202. Really serious labour shortages in Ireland were delayed until the 1890's.
126. J.C. Morton, Hand Book of Farm Labour (edn 1868), pp. 72-3.
127. Agricultural Gazette, 30 Apr 1860, p. 392.
128. Lawson's Merchants Magazine, I (1852), p. 325; Agricultural Gazette, 15 Jan 1853, 10 Nov 1856, p. 745; Mark Lane Express, 8 Aug 1853, p. 2; J.E. Handley, The Irish in Modern Scotland (Cork, 1947), pp. 165-8. See also, O. Anderson, 'Early experiences of Manpower Problems in an Industrial Society at War, Great Britain 1854-6', Politic. Sc. Quarterly, LXXXII (1967), p. 541, which notes the difficulty of raising Irish troops for the Crimean War.
129. Farmers Magazine, Sept 1859, p. 190; Oct 1859, pp. 313-4.
130. Farmers Magazine, Oct 1859, pp. 283-4; J.C. Clutterbuck, 'On the Farming of Middlesex', JRASE, 2nd ser, V (1869), pp. 10-11; Agricultural Gazette, 10 Oct 1866, p. 934.
131. R.C. Employment (1867), op.cit, Second Report (1869), App. pt. II, p. 222.

132. Ibid, Second Report (1869), Culleys Report, p. 112; Appr. pt. II, p. 422.

133. Reading Mercury, 29 Aug 1863; S.G. Kendall, Farming Memoirs of a West Country Yeoman (1944), p. 228; farm accounts relating to a farm at Fulbourne, Cambridgeshire, c.1840-80 (held by Mr. J. Newman of Fulbourne).

134. T. MacLelland, 'On the Agriculture of the Stewartry of Kirkudbright and Wigtownshire', Trans. Highland Soc. 4th ser, VII (1875), p. 26; R.C. Agriculture (1867), Fourth Report (1870), App. pt. I, pp. 32-136 passim, esp. 51, 55.

135. Agricultural Gazette, 11 May 1867, p. 500.

136. We will not enter here into detailed discussion of post 1870 Irish seasonal migration. The supply position in 1900 is well treated by Johnson, loc.cit, pp. 103-9 and Report, Maps and Tables and Appendices Relating to Migratory Irish Agricultural Labourers (Cmd 341, Dublin, 1900). Irish were still entering in fairly large numbers in the 1890's, but most flows had disappeared by 1914. Even so, some 3,500 still came across in 1949-51. Johnson, loc.cit, p. 111, fn. 7. By the late 1890's almost all were working in north and north Midland England, and only a very few perambulated south of the Fens. This northwards contraction was of course already apparent in the 1860's. Journal of the Board of Agriculture, V (1898-9), p. 375. For a good general summary of post-1870 movements, see, Handley (Modern Scotland), op.cit, pp. 169-90.

137. Census (Ireland), 1841, p. XXV. An attempt by the Railway Commissioners of Ireland to estimate the volume of migration in 1837 was frustrated by the refusal of many steamship companies to forward statements. Kerr, loc.cit, p. 372.

138. Handley, op.cit, p. 38.

139. Handley (Modern Scotland), op.cit, pp. 169-72; W.N. Hancock, 'Migratory labourers from Mayo to England', J. Stat and Soc. Inq. Soc. of Ireland, VIII (1885), cited ibid, p. 169. See also, Report by Wilson Fox on the Wages and Earnings of Agricultural Labourers in the U.K. (1900), pp. 104-5.

CHAPTER VIII

THE CHRONOLOGY OF HARVEST LABOUR SUPPLY: 1790-1870.

The extreme diversity of local and regional experience renders it impossible, except in the very broadest terms, to analyse trends in the national harvest labour market. But for purposes of analysis we can assume four reasonably discrete phases of the long-run supply curve; discrete, that is, less in terms of experience, as of the supply and demand factors then operating within and upon the harvest labour market. The four phases are as follows:-

- (a) 1790-1814 (tight market)
- (b) 1815-1833 (well-supplied market)
- (c) 1834-51 (deteriorating market)
- (d) 1852-70 (rapidly deteriorating market)

Period 1790-1814.

Shortages of harvest labour occurred in 17 of the 26 years, 1790-1814.⁽¹⁾ By 1800, at least two, and by 1814, a further half dozen attempts had been made to develop a reaping machine.⁽²⁾ In 1801, the Annals of Agriculture were bemoaning the fact that no-one had yet discovered a more expeditious means of getting in the harvest.⁽³⁾ In 1805, an Essex farmer, with his corn spilling on the ground for want of timely cutting, was convinced that there was then not an agriculturist in the county who believed that,

'the invention of a machine for reaping corn would be an injurious discovery'.⁽⁴⁾ In the barn operations of threshing and winnowing improvements in work output were obtained through mechanization. In harvesting, however, the means were less conspicuous: more subtle technological change, higher labour participation ratios and a greater supply of effort.⁽⁵⁾

The deterioration of the harvest labour market was reflected by increasing harvest wage rates. According to the Board of Agriculture's 1804 farm-wage survey (summarized below), harvest wages and per acre labour costs increased much faster than corn prices over the period 1790-1803/4.

HARVEST LABOUR COSTS AND HARVEST WAGES IN ENGLAND AND SCOTLAND, 1790 & 1803.⁽⁶⁾

Harvest Labour Costs (in shillings per acre)

		<u>Reaping Wheat</u>	% Change	<u>Mowing Barley</u>	%Change
<u>England</u>	1790	6.3		2.1	
	1803	9.8	+ 54	3.3	+ 59
<u>Scotland</u>	1790	8.7		6.0	
	1803	12.4	+ 42	8.3	+ 39

Harvest and Winter Wages (in shillings per week)

		<u>Winter Wages</u>	% Change	<u>Harvest Wages</u>	% Change
<u>England</u>	1790	7.0		12.2	
	1803/4	9.8	+ 37	18.0	+ 44
<u>Scotland</u>	1790	5.0		8.1	
	1803/4	7.7	+ 39	12.6	+ 56

July-September wheat prices were 6 per cent lower and oats prices only 2 per cent higher in 1803 than in 1790, which meant, assuming wheat and oats as the respective bread corns of England and Scotland, that real costs increased by c. 60 per cent in England and c. 40 per cent in Scotland, and that real wages increased by c. 48 per cent in England and c. 53 per cent in Scotland. The increases were greatest in the expanding industrial counties of northern England and the specialist corn-growing counties of eastern England. Wages doubled in Rutland and Westmoreland and rose by over 70 per cent in Cambridgeshire, Derbyshire, Lincolnshire and Nottinghamshire. Nor can these wage increases be attributed to freak harvest weather conditions, for winter wages too were substantially (37-39 per cent) higher in 1803-4 than in 1790.

The following series of average daily wage rates paid at Berwick hiring fair suggests that harvest wages increased further after 1804. It would appear, however, that they stabilized in 1808, and that subsequently as corn prices increased, their real value fell and never again exceeded the levels of 1803-7. In some years, notably 1800, 1806, 1808 and 1810, wages temporarily exceeded the stated average; in 1806, for example, reaching 3s. 6d. a day during the second week of the harvest.

AVERAGE DAILY WAGE RATES RULING AT BERWICK HARVEST HIRING FAIR, 1799-1815. (7)

1799	1s 9d	1806	2s 6d	1813	-
1800	1s 2d	1807	2s 10d	1814	2s 6d
1801	1s 9d	1808	2s 8d	1815	2s 7d
1802	-	1809	2s 9d		
1803	2s 1d	1810	2s 10d		
1804	-	1811	-		
1805	-	1812	-		

II

Harvest labour shortages occurred neither in every year nor in every region. There was, however, a tendency for the labour-scarce years to run together, thus discounting the possibility that the shortages were purely weather-induced. The two main waves were; 1790-6, coinciding with the 'canal mania' and the beginning of the Revolutionary Wars; and, 1803-8, coinciding with the re-opening of the war (following the breakdown of the Peace of Amiens 1802-3), and a run of above-average harvests. (8)

The deterioration of the harvest labour market resulted from the convergence of a number of different, though often inter-related, factors operating within and without agriculture, which, first, raised harvest labour demand, second created a more regionally imperfect harvest labour market, third, increased rural migration rates, and fourth, made for a contraction in the supply of casual, part-time industrial and migrant harvesters. Indeed, the war decades provide perhaps the classic example of a 'young' industrial economy operating at the extreme parameter of its labour resources. As early as 1795 it was found necessary to relax the Settlement Laws so as to increase the geographical mobility of labour and to distribute it more evenly relative to demand. (9)

Perhaps the most significant features of the labour history of this period were that most improvements in productivity were secured not through radical technological change, but rather by a more intensive and more efficient utilization of manpower, and that a large proportion of the national male workforce, the bulk of

young able-bodied agricultural workers, was engaged in unproductive warfare (in 1811, the 465,000 men under arms represented perhaps 15 per cent of the national male workforce in the 19-44 year age group).⁽¹⁰⁾

The effects of reclamation and tillage conversion on harvest labour demand and its regional distribution have already been discussed.⁽¹¹⁾ A further factor influencing crop demand was that there occurred between 1790 and 1814 an abnormally large number of summers with July - September rainfall low enough to promote rapid and convergent crop ripening.⁽¹²⁾ Meteorological data suggest that in south Britain, the years 1793-6, 1800-1, 1803, 1805, 1807-8 and 1812-13, and in north Britain, the years 1791, 1793-6, 1798, 1800-4, 1806 and 1810-14, fell into this category. But for the abnormally high incidence of deficient harvests during the war years, it is almost certain that labour shortages would have been both more frequent and more severe. As it was, average or above-average yields largely coincided with the low rainfall years, 1791-9 and 1802-7. Between 1790 and 1814 harvest labour scarcity was associated with dry summers in 14 years, with above-average yields in 8 years, and with dry summers and above-average yields in 7 years.

The apparent failure of harvest labour supply to expand at a rate commensurate with the growth of crop demand was not, after all, surprising if we consider that the rural labour market was already tight before the Revolutionary Wars began. In the late 1770's William Marshall offended Dr. Johnson by suggesting that Sunday working be permitted at harvest-time. In 1790 it was observed that, 'the business of harvest, formerly the work of 3 fine weeks, cannot now be finished in six weeks'. Serious harvest labour

shortages occurred in 1792 at the peak of the textile and canal-building booms. (13)

From 1793 the rapid expansion of the armed forces resulted in a further and very substantial thinning of the ranks of full-time agricultural workers. Enlistment increased from less than 100,000 in 1792 to 345,000 in 1802 and to an absolute peak of 465,000 in 1811. (14) The majority of naval recruits were probably drawn from the littoral counties of southern and eastern England. Already by 1793 naval recruitment was interrupting harvest labour flows; migrant harvesters en route from south-west England to the Isle of Wight had to be provided with special passes to protect them from the press gangs. (15) The army, on the other hand, looked more to Ireland and the Scottish Highlands for its additional manpower, with the result that Lowland Britain may have lost fewer resident farm labourers than total enlistment figures otherwise suggest. But the losses were, even so, very considerable, and were of such an order that in many areas of Lowland Britain farmers were obliged to substitute female labour over the whole range of farm operations. (16) Yet it can still be argued, that but for the very substantial manpower contribution of the Celtic zone to the armed forces, agricultural production in Lowland Britain could not have been sustained over the war period.

The effects of military service on agricultural labour supply were felt most keenly in the years 1793-6 and 1803-5, that is, at the very beginning of the war, and immediately following the Peace of Amiens when, with Napoleon encamped at Boulogne, large numbers of farm labourers were hastily embodied into the militia. Between 1803 and 1806 regular soldiers increased from 101,000 to 173,000, 'embodied' militiamen from 50,000 to 85,000,

'non-embodied' militiamen from 60,000 (1802) to 418,000, and sailors from 70,000 to 120,000.⁽¹⁷⁾ Within just a few months of the re-opening of the War, farm workers in Essex were reported able to ask 'what price they please', while in some instances as much as £50 was offered to men willing to serve for those balloted into the army reserves.⁽¹⁸⁾ Some farmers were seriously inconvenienced by the militia levys, In 1812, for example, a north Devon farmer was complaining because, 'in the midst of summer when every nerve should be exerted in cleansing the soil and preparing for Turnips, there are between 2,000 and 3,000 men (chiefly servants in husbandry and labourers) taken from their work for upwards of a fortnight, in this district alone'.⁽¹⁹⁾ It is improbable, though, that militia training programmes were allowed to overlap the harvest. Fortunately, it was sometimes possible for 'embodied' militiamen to assist with the harvest, as they did in Berwickshire, Cardiganshire, Cumberland and Hampshire.⁽²⁰⁾ A detailed study of regimental records would probably reveal many more instances of home-based troops being given special harvest furlough, or of commanding officers placing their units at the disposal of local farmers. However, in view of the very high proportion of the armed forces stationed abroad or on the high seas, it appears unlikely that their contribution to harvest work output was ever very great, although admittedly it may in some areas have been of critical importance. Conversely, large scale demobilization, such as occurred after the signing of the Peace of Amiens, resulted in a much increased supply of harvest labour. In Kent farm wages fell in 1802-3, while in Hampshire, farmers were claimed unable to absorb all the extra harvest workers suddenly available. The respite, however, was short-lived; and it was soon discovered that only a 'settled

peace' could make 'hands a plenty'.⁽²¹⁾

Canal building was another activity which, like the armed forces, absorbed large numbers of male agricultural labourers. Of the 2825 miles of canal way operating in Britain in the 1840's the majority were constructed between 1780 and 1797.⁽²²⁾ Just how many men were involved is impossible to determine. Conceivably, average (per canal mile) labour requirements were as high as in railway building, in which case perhaps as many as 60-70,000 men were thus employed during the 1790's, and this exclusive of those engaged in the linkage industries of brick-making, (cyclical peak 1792-3), haulage and timber supply. There is abundant evidence that at the height of the 'canal mania' many young agricultural labourers left the land for the diggings, to result in numerous and locally sometimes very acute harvest labour shortages. In fact, an attempt was made in 1793 to obtain a parliamentary act forbidding the cutting of canals during the harvest season.⁽²³⁾ In Leicestershire the 'rage for canals' so depleted the resident harvest workforce that migrant workers had to be introduced into the county.⁽²⁴⁾ The 'rage' abated in 1797, but even though levels of canal-building activity were never again to approach those of the early 1790's, in 1804 one farmer was still demanding government legislation as a safeguard against the possible recurrence of the labour shortages of the previous decade.⁽²⁵⁾

It has become almost an axiom of modern British economic history that the Napoleonic Wars, per se, stimulated growth and employment in manufacturing industry. The extent to which they did so is, however, still very uncertain. Deane contends that the French Wars retarded national economic development.⁽²⁶⁾ Indeed, it can be argued, first, that much of the alleged war-activity was

simply an extension of the strong industrial upswing which had begun in the mid-1780's and which reached its initial peak in 1793,⁽²⁷⁾ and second, that in overall terms manufacturing industry was less successful in generating new employment for male agricultural labourers than the armed forces, or transiently, even canal-building.

The pattern of industrial growth over this period is complicated, first, by the lack of detailed and comprehensive production statistics; second, by the extreme disparity of regional experience, and third, and most critically, because warfare stimulated growth in some industries but curtailed it in others, especially those heavily dependant on European export markets. A crude distinction can be made between the 'war-industries' proper, such as armaments, ship-building and barrack-building, and the more conventional industries, such as textiles, mining and iron. The former were very much dependent on government contracts and the fluctuations of war, and tended to be located in south Britain. The latter depended more on the tide of domestic demand, and were mostly located in the 'new' industrial areas of north Britain.

The chief difficulty, however, is to decide whether, and to what extent, the Napoleonic Wars seriously affected the longer-run pattern of British industrial development. Important industries in south Britain (excluding South Wales) had been losing ground long before the age of steam and canals. Many failed to survive the vicissitudes of the war years, particularly the slumps of 1797 and 1811-12, but others, such as the Norwich and West Country textile industries, experienced a temporary revival.⁽²⁸⁾ Moreover, in some cases it was possible to divert resources of capital and manpower out of ailing industries into the more buoyant 'war industries'. The Channel, Thames, Medway and Severn shipyards claimed

the lion's share of the 1.5 million tons of naval shipping contracted for during the period 1793-1810.⁽²⁹⁾ Hampshire farmers complained about the large numbers of men defecting to Portsmouth town and dockyard, while on the Isle of Portsea male labour was so scarce that the whole harvest was performed by women.⁽³⁰⁾

It is indisputable that the major industrial expansion occurred in north Britain and South Wales.⁽³¹⁾ The market for Lancashire cotton and West Riding rough-stuffs expanded more rapidly than for East Anglian and West Country fine-cloths. The spectacular expansion of cotton hand-loom weaving in Lancashire and central Scotland may not, for reasons already explained, have seriously reduced the supply of harvest labour, although in some years, in the West Riding in 1792, and here and there in Scotland in 1802-15 the supply of part-time industrial harvesters became inelastic when trade was especially brisk.⁽³²⁾ The ratio of male to female workers would have been rather lower in the hand textiles trades than in, say, mining or metallurgy, but even so, the growth of employment in textiles, especially cotton, was so dramatic as seriously to reduce the supply of male agricultural workers in a number of areas. In Lancashire, for example, many were induced 'to foresake the loom for the shuttle'. Those who remained behind enjoyed a buoyant market for their services; they would be 'tied down by no rule their demands vary from day to day they fly from place to place and from job to job'. Around Macclesfield and Stockport (Cheshire), it was claimed, 'as difficult to get a boy to drive the plough as a man to hold it'. In 1792, at the height of the canal boom, harvest wages there soared to the unprecedented height of 3s. 6d. and more a day, in addition to food and drink - a level of remuneration which was barely exceeded even in the 1850's.⁽³³⁾

Wages also increased sharply in Staffordshire, and in the coal and iron districts of north-east England. (34)

III

Harvest labour shortages tended to be most acute in areas of vigorous tillage extension, e.g. eastern England and the southern Chalklands, in arable farming districts adjacent to large and expanding industrial areas, e.g. the Border Counties, the Lothians, and the north-west Midlands, and in areas heavily dependent on migrant harvest workers whose supply curve was more discontinuous than that of resident labourers and more influenced by changes in the level of off-farm labour demand, e.g. the East Anglian Fens, the London area and southern Scotland.

The earlier suggestion that the harvest labour market became easier after 1807 is confirmed by demographic and trade cycle evidence. Recent estimates suggest that the population of the 15 English 'agricultural' counties increased by 1.2 per cent and 1.7 per cent per annum in the decades 1801-11 and 1811-22, compared to only .55 per cent between 1781 and 1801. (35) By 1805-10 the delayed effects of the population upsurge of the 1780's and 1790's on farm labour supply were beginning to be felt. In Hampshire, for example, the population of the 148 Downland parishes ('recently enclosed and of wonderfully thin population in comparison with their culture') grew by 8724 in the decade 1811-21 as against only 2740 in 1801-11. (36) For what it is worth, the Gayer, Rostow, Schwartz trade cycle index, which relates business activity in each year from 0 (deep depression) to 5 (major cycle peak),

suggests that the incentives to rural migration weakened after 1810. The index averaged 1.95 per annum in 1791-1800, 2.6 in 1801-10 and 1.6 in 1811-15. After 1810 industrial unemployment increased and was exacerbated by the run-down of the armed forces which began in early 1814, total enlistments falling from 462,000 in 1813 to 283,000 in 1815. (37)

The influence of the trade cycle on the rural labour market would have been considerably weaker in south than in north Britain. Rather, the chief factors governing the southern labour market were warfare, canal-building and agriculture itself. In harvesting the problem is to relate the effect on labour demand of the stepping-up of reclamation and tillage expansion after 1800 with the facts, one, that employment opportunities in canal building waned perceptibly after 1796-7, and two, that both relatively and absolutely numbers in the armed forces increased much more slowly in the period 1802-1810/11 than in the earlier period 1793-1801. Our evidence suggests that after a long lag, supply eventually caught up with demand after 1807.

1. The Napoleonic War period is now generally recognized as having been one of labour scarcity in agriculture, See, H. J. Habakkuk, American and British Technology in the Nineteenth Century (Cambridge, 1962), pp. 132-6; A. H. John, 'Farming in Wartime: 1793-1815', in E. L. Jones & G. E. Mingay, eds, Land, Labour & Population in the Industrial Revolution (1967), pp. 33-5; E. L. Jones, 'The Agricultural Labour Market in England, 1793-1872', Econ. Hist. Rev., 2nd ser. XVII (1964), pp. 323-5; E. J. T. Collins, 'Labour Supply & Demand in European Agriculture 1800-1850', in E. L. Jones & S. J. Woolf, eds, Agrarian Change and Economic Development: The Historical Problems (1969), pp. 67-8. For trends in real and farm wages, see, A. D. Gayer, W. W. Rostow & A. Schwartz, The Growth & Fluctuation of the British Economy, 1790-1850 (Oxford, 1953), I, pp. 10-57, 81-2, 108-9; B. R. Mitchell & P. Deane, Abstract of British Historical Statistics (Cambridge, 1962), pp. 348-9 (Bowley & Wood indices). For incipient agricultural trade unionism and strikes, see, A. F. J. Brown, Essex at Work (Chelmsford, 1969), p. 132; G. Houston, 'Labour Relations in Scottish Agriculture before 1870', Agric. Hist. Rev., VI (1958), pp. 34-5.
2. G. E. Fussell, The Farmer's Tools (1952), pp. 115-19. See also, Farmers Magazine, Dec. 1810, pp. 521-3; Nov 1812, p. 441; Nov 1813, p. 397.
3. Cited in D. G. F. Macdonald, Hints on Farming (10th edn, 1868), pp. 127-8.
4. A. Young, General View Essex (1805), I, pp. 372-3.
5. For technological change, see infra, pp. 167-174.
6. Derived from 'Comparison of the Expenses of Arable Land in 1790 and 1804', Communications to the Board of Agriculture, V, pt I (1806), pp. 18-38. The harvest data appear in most cases to relate to 1803 and not, as suggested by the title of the report, 1804.
7. Compiled from the harvest reports for Berwickshire which appeared annually in the Farmers Magazine (Oct - Nov issues). The Board of Agriculture Reports confirm the increase in real harvest wages which took place after 1790. See data reproduced in W. Hasbach, A History of the English Agricultural Labourer (1908), pp. 120-3.

8. The contemporary literature abounds with references to labour scarcity. Some key references are documented below.

1790-6: T. S. Ashton, Economic Fluctuations in England, 1700-1800 (Oxford, 1959), pp. 173-4; Comm. Board of Agric, V, pt.I (1806), pp. 17-121 (very detailed); J. Boys, General View Kent (1796), pp. 165-6; T. Stone, General View Lincolnshire (1800), pp. 306-7; J. Holt, General View Lancaster (1795), p. 179; T. Wedge, General View Cheshire (1794), p. 26; J. Tuke, General View North Riding (1800), p. 285; J. Monk, General View Leicester (1794), p. 49; Jones, loc.cit, p. 324.

1803-10: 'Furness Diary', Countryman, LV (1958), No 1, pp. 33, 37; Comm. Board of Agric, V, pt I (1806), pp. 17-121; Farmers Magazine, Feb 1803, p. 115; Nov 1803, pp. 488, 493, 494; Nov 1804, p. 489; Nov 1805, pp. 496, 498, 503, 505-6; Nov 1806, pp. 537, 541; Sept 1808, p. 410; Dec 1808, pp. 534, 541; Dec 1810, p. 536. Virtually all the Board of Agriculture reports comment on the tightness of the farm labour market.

Other less direct evidence of labour shortages can be found infra, Chapter XV, which examines the course of technological change during this period.

9. A. Redford, Labour Migration in England, 1800-1850 (Manchester, 2nd edn, 1964), p. 87. Surprisingly, Redford appears to have missed the labour shortages of the Napoleonic War. He commented upon the 'curiously mild' nature of the 1795 Poor Removal Act which he attributed not to the need for increased labour mobility within an expanding labour market but rather to 'the increased burden of pauperism due to the war against France'. ibid, p. 87.
10. This estimate is, of course, a crude one: statistics of age-distribution are available only from 1841. I have had to assume that the ratio of males aged 19-44 years to total population was the same in 1811 as in 1841.
11. supra, pp. 38-40.
12. From rainfall data for England & Wales kindly provided by L. P. Smith of the Meteorological Office, Bracknell, Berks, and for Scotland, contained in R. C. Mossman, 'The Meteorology of Edinburgh', Trans. Royal Soc. Edin, XXXVIII, pt III, p. 143. In England & Wales the critical months were July & August: in Scotland, where the harvest was later, August & September. I define a 'dry' summer as one in which average monthly rainfall in the harvest months is less than 2 inches.

13. Catalogue, Beeleigh Abbey Books (Foyles, London), BA/5 (1970), p. 20. The offending sections were subsequently deleted from Marshall's mss. (Min. of Agriculture, 1778); C. B. & F. Andrews, eds, The Torrington Diaries [of John Byng] 1781 and 1794 (1954), p. 259 (1790); Ashton, op.cit., p. 167. See also supra, p. 163 fn 8.

14. Statistics derived from; A Comparative Statement of the Military Forces and Population of the British Empire 1801-1860 (War Office, n.d.) and W. James, The Naval History of Great Britain (new edn, 1837), 6 vols. I have been unable to locate accurate army returns prior to 1801. However, total numbers enlisted appear not to have exceeded 100,000 in 1792. A major difficulty, and one which has resulted in the numbers of actual Britishers engaged in the Napoleonic Wars being consistently overstated (the inflated estimates appear to derive from N. W. Ackworth, Financial Reconstruction in England, 1815-22 (1925), p. 23), is to distinguish between the different categories of military personnel. The key distinctions are between 'regular troops enlisted in the UK', colonial and European troops, 'embodied' (i.e. full-time) militia, and non-embodied (i.e. part-time, emergency-reserve) militia. If we include only naval personnel, UK regulars and embodied militia we find that the numbers of British subjects under arms in 1815 were only 283,000 compared to Ackworth's 534,000.

15. A. & W. Driver, General View Hampshire (1794), p. 65.

16. In Monmouth, for example, so many men left to join the navy and to work in Bristol that 'nobody had a man to spare'. C. Hassall, General View Monmouth (1815), pp. 96-7. For the substitution of female for male labour, see, supra, pp. 79-80.

17. Statement of Military Forces, op.cit.; James, op.cit.

18. Farmers Magazine, Nov 1803, p. 493; Comm. Board of Agric, V, pt I (1806), p. 51.

19. Evans & Ruffy's Farmers Journal, 27 July 1812; 24 Aug 1812.

20. E. L. Jones, 'Eighteenth Century Changes in Hampshire Chalkland Farming', Ag. Hist. Rev., VIII (1960), pp. 5-12; W. Dickinson, 'The Farming of Cumberland', JRASE, XIII (1852), p. 232; Farmers Magazine, Dec 1808, p. 541; W. Davies, General View South Wales (1815), I, p. 426. For Scotland, see, W. Handley, The Irish in Scotland, 1815-1845 (Cork, 1945), p. 51.

21. Jones (Labour Market), loc.cit, p. 325; J. Boys, General View Kent (1805), p. 194; Comm. Board of Agric, V, pt I (1806), p. 51. According to Mitchell & Deane (op.cit, p. 7) only an estimated 30 per cent of the army and navy were home-based in the census year 1811.

22. C. Hadfield, The Canals of Southern England (1955), pp. 77-8; R. Dudley Baxter, 'Railway Extension and its Results', J. Stat. Soc, XXIX (1866), reprinted in E. Carus-Wilson, ed, Essays in Economic History, III (1962), p. 39; C. Hadfield, British Canals (1959), pp. 116 ff. Sums authorised for canal construction increased from £.12 million in 1788 to £3.2 million in 1793 and slumped to £.2 million in 1797. Gayer, Rostow, Schwartz, op.cit, I, pp. 14, 35.

23. Comm. Board of Agric, V, pt I (1806), pp. 113-4.

24. J. Monk, General View Leicestershire (1794), p. 49. See also F. M. Eden, State of the Poor (new edn, 1966), II, p. 302 (Liverpool-Kendal Canal); W. Pitt, General View Staffordshire (1796), p. 156 (Black Country canals).

25. Comm. Board of Agric, V, pt I (1806), p. 114.

26. P. Deane, The First Industrial Revolution (Cambridge, 1965), p. 222. P. Deane & W. A. Cole, British Economic Growth, 1688-1959 (Cambridge, 2nd edn, 1967), pp. 80-1, 280-1. See also, Hoffmann's 1790-1815 index of industrial activity in Gayer, Rostow, Schwartz, op.cit, I, pp. 354-5.

27. ibid, I, pp. 7, 354-6; Deane & Cole, op.cit, pp. 75-82.

- 28.* Redford, op.cit, pp. 42-4.

29. The tonnage of naval vessels under construction or on order increased from 31,000 tons in 1793 to 120,000 tons in 1808. James, op.cit, annual surveys, passim. Naval shipbuilding also stimulated the timber supply industry in southern England.

30. C. Vancouver, General View Hampshire (1813), pp. 384-5; W. Stevenson, General View Dorset (1812), pp. 236-7. See also, Irish Farmers' Journal, 11 Sept 1813 for labour shortages in coastal areas of Devon.

31. For an account of rural migration in northern England during this period, see, Redford, op.cit, Ch. III; D. Bythell, The Handloom Weavers (Cambridge, 1969), Ch. III.

32. R. Brown, General View West Riding of Yorkshire (1799), p. 225; Farmers Magazine, Nov 1805, p. 503.
33. J. Holt, General View Lancaster (1795), p. 210; Comm. Board of Agric, V, pt I (1806), p. 42; T. Wedge, General View Cheshire (1794), p. 26; H. Holland, General View Cheshire (1808), p. 296.
34. Comm. Board of Agric, V, pt I (1806), p. 65; J. Bailey, General View Durham (1810), p. 263; Pitt, op.cit, pp. 156-7. For= Yorkshire, see, Comm. Board of Agric, V, pt I (1806), pp. 73-4; H. E. Strickland, General View East Riding of Yorkshire (1812), p. 258.
35. Deane & Cole, op.cit, p. 103; Mitchell & Deane, op.cit, p. 20.
36. Jones (Hampshire), loc.cit, pp. 5-19.
37. Gayer, Rostow, Schwartz, op.cit, I, p. 356. For unemployment from 1810, see, ibid, I, pp. 99, 108-9, 111, 124. Unfortunately there exists no continuous series of real poor law expenditure before 1812 (see, J. D. Marshall, The Old Poor Law, 1795-1834 (1968), pp. 26-7),.

CHAPTER IX

THE CHRONOLOGY OF HARVEST LABOUR SUPPLY: 1815-1833.

The rural labour market during the two decades following the end of the Napoleonic Wars is, for the economic historian, well-travelled ground, owing to the numerous and extensive studies which have been made of the Old and New Poor Laws and the social unrest of the early 1830's.⁽¹⁾ In many areas of Britain the agricultural labour supply position had already improved by 1810, but it was not until after 1815 that a recognizable rural labour surplus developed, and that complaints of labour scarcity, so frequent in wartime, gave way to doubts about agriculture's capacity to absorb the rural population increase. Between 1815 and 1834 supplies of harvest labour were in most cases adequate for farmers to meet comfortably all but the exceptional seasonal demand. In the early 1830's, a Hampshire farmer freely admitted that he could now secure his harvest within ten days where previously it had taken three weeks.⁽²⁾ It is even possible that in some years the harvest was unable to absorb all the labourers available. In the summer of 1830, for example, the Middle Marsh district of Lincolnshire, many resident labourers were reported not 'half employed', and because of the large influx of Irish and other migrant workers, unable to find employment in other parts of the county.⁽³⁾ Significantly, the early 1830's saw many violent clashes between resident harvest labourers and visiting migrant harvesters.⁽⁴⁾ As

early as 1815, at Yarnton in Oxfordshire, an attempt to introduce 'foreigners' from other parishes for the hay harvest occasioned a riot.⁽⁵⁾

This improvement in harvest labour supply was reflected by falling harvest wage rates. At Berwick, the wages of resident workmen were at least 20 per cent lower, and those of migrant workers, perhaps 50 per cent lower, in 1816-25 than in 1806-15.⁽⁶⁾ Large and increasing numbers of migrant harvesters were reported in central and southern Scotland in the years, 1816, 1817, 1818, 1820, 1821, and 1823, their weekly wage in 1816 and 1823 being only 6s. per week, compared with an average 15s. in 1806-15.⁽⁷⁾ One suspects that in some areas employers deliberately chose not to allow the harvest wages of their resident labourers to fall as low as the market permitted. In the Risborough Hundred of Suffolk, harvest wages were fixed according to the price of the corn.⁽⁸⁾ Where additional labour was required the low wages of male agricultural labourers and the depressed state of many rural trades and industries enabled farmers to obtain very cheaply the services of village tradesmen, cottage industrial workers and country housewives.

The technological evidence is similarly indicative of an overstocked harvest labour market.⁽⁹⁾ Not only did farmers' interest in labour-saving methods wane perceptibly after 1815, but there is also evidence for a shift into more labour-intensive techniques. Interest in reaping machinery now tended to be technical rather than economic. It was lamented of Mann's reaper that, 'for want of hope on the part of the proprietor [and] encouragement on the part of leading and influential agriculturists [it] is going to rust along with its predecessors'.⁽¹⁰⁾ In fact,

in many areas, standards of harvest labour productivity may have fallen because of the adoption of more labour-consuming technologies, the dampening effect of low wages on the degree of effort, and the substitution of day-work for piece-work. Except in a few areas, notably the north-east of Scotland and parts of the East Midlands and East Anglia, where either corn output was expanding very rapidly and the supply of resident and migrant harvesters was insufficient, the demand for labour-saving was weak.⁽¹¹⁾

During the period 1815-33 shortages of harvest labour were reported in only four years, compared with 17 years in 1790-1814, and 8 years in 1834-51. The supply of harvest labour appears to have increased more rapidly after 1825, and to have been most abundant between 1830 and 1833. In the period, 1815-25, labour shortages developed in three years, 1819, 1822 and 1825. In 1819 labour shortages were reported in Cumberland, Glamorgan and Berwick, while in the Lothians migrant harvest labour flows were seriously disrupted by the near coincidence of ripening in the 'high' and 'low' districts.⁽¹²⁾ In 1822, the shortages were confined mainly to Scotland. Here, a vigorous textile boom and rapid crop-ripening coincided to reduce seriously the supply of part-time industrial harvest labour in Perth and to result in serious crop losses in Kincardineshire.⁽¹³⁾ The harvest of 1825 was the most difficult and most expensive of the decade, and the only one in which the degree of labour scarcity matched that of the Napoleonic War years. One of the driest Julys of the century coincided with the crest of a cyclical boom. Even in southern England, extra field labour was scarcely to be had, and wages ran as high as in the last years of the war.⁽¹⁴⁾ In north Britain, where farmers were more heavily dependent on part-time and casual labour and where the incentives

to rural migration were stronger the crisis assumed more serious proportions. In Scotland, 'the drain of labourers and artisans to the great towns' was reported so great, 'as to render it difficult, and at times impossible, to get forward operations in season; and a very great loss was sustained in many districts for want of a sufficient number of hands'. In Forfar hand-loom weavers could scarcely be induced to turn out for the harvest, while in Berwick, such was the demand for hands, that the old and infirm had to be recalled into the harvest field; one woman, aged 76, was stated to have reaped for eight successive days from morn to night. (15)

II

The relative slackness of the post-war harvest labour market was in part a function of structural changes in the demand for harvest labour. (16) Neither the Corn Market Returns nor the Cropper-Benson-Sandars yield series suggests spectacular growth in national corn output between 1815 and 1833. Whether in fact, output increased as fast as population is another matter, but it is clear that the extent of land reclamation and tillage conversion was much less than in wartime, and that the first really significant breakthrough in corn yields did not occur until after 1835. The key factor, however, was that the bulk of increased corn production was secured within the lightland sector of British farming. Grigg's 'paradox and progress' model (17) demonstrates the continuous expansion of output on the light-soils of the Yorkshire and Lincolnshire uplands, the East Anglian Fens, the north Nottinghamshire Forestlands, the Cotswolds and the southern Chalklands, with

the static, and possibly even contracting output of the heavylands. The growing regional disparity in harvest labour demand was offset not by a permanent shift of population from the clays to the lightlands, but rather, by the expansion of existing and development of new migrant harvest labour flows, particularly the Irish, whose numbers increased spectacularly after 1815 and whose contribution to harvest work output had become very substantial by 1830.⁽¹⁸⁾

If, in many areas of Britain, harvest labour demand failed to increase during this period, so conversely, and in south Britain particularly, rural migration rates slowed down and the full-time agricultural labour force increased. The population of the 'agricultural counties' of England rose 27 per cent between 1811 and 1831, from 2.2 millions to 2.8 millions,⁽¹⁹⁾ but the occupational censuses suggest a very much slower growth rate for the full-time agricultural labour force. They assert that the numbers of families occupied in agriculture in Britain increased by only 9 per cent between 1811 and 1821 and declined by 2 per cent between 1821 and 1831.⁽²⁰⁾ Yet in view of the high birth rate and the slow expansion (and in south Britain a possible contraction) of non-agricultural employment, these values cannot be taken very seriously. Yet Deane and Cole have gone so far as to suggest that numbers employed in agriculture, forestry and fishing remained more or less constant between 1811 and 1831, a conclusion which is difficult to reconcile with the 17 per cent increase which they claim for 1831-51.⁽²¹⁾

The factors governing supply and demand within the farm labour market during this period were:-

- (a) that in most leading manufacturing industries, notably textiles, production grew faster than employment, or at least,

faster than male employment.

(b) the final collapse of manufacturing industry in south Britain, with the conspicuous exception of a few handiwork trades such as straw-plaiting and button-making.

(c) that the expanding industries of north Britain drew their labour not from the overpopulated agricultural districts of southern and eastern England, but from local sources or from the Celtic Zone (Ireland and the Scottish Highlands).

(d) the relatively slow growth of heavy (iron, steel, engineering) and non-manufacturing (mining, construction, trade, transport) industries and the lack of activities akin to warfare and canal-building (1790-1815) or railway building (1833-50), which could offer large-scale alternative employment for male agricultural labourers.

Under such conditions we would expect a far greater increase in the size of the farm labour force than either the census figures, or after them, Deane and Cole, otherwise suggest. It is inconceivable that only 83,000 extra families entered agricultural employment between 1811 and 1831. Between 1813 and 1819 no less than 338,000 demobilised servicemen re-entered civilian employment, a large proportion of whom were originally taken from the countryside.⁽²²⁾ To these must be added an uncertain, but possibly large number of persons, who had migrated to the towns during wartime but who returned to their native parishes during the depression years 1815-16.⁽²³⁾ Admittedly, rural migration rates recovered again after 1820 and urban growth rates were for a time very spectacular, but evidence suggests that they slowed down again following the great cyclical slump of 1825-6.⁽²⁴⁾ Gayer, Rostow and Schwartz have demonstrated persistently low

levels of industrial activity throughout the period 1826-32, and it would appear that rural migration did not properly pick up again until 1833-5.⁽²⁵⁾ Correspondingly, average and real average poor relief expenditure in Blaug's 'non-agricultural' counties increased considerably after 1826 and fell only in 1833.⁽²⁶⁾ Alex Somerville recollected that before 1825 'everybody seemed to be going to Edinburgh' but that in 1826 'everybody was coming back again and were obliged to take work at any wages which were offered'.⁽²⁷⁾

In the agricultural counties of southern and eastern Britain the decay of rural and cottage industry tended to augment the agricultural labour force. Kerr, for example, has described the extreme congestion in the Dorset rural service trades during this period. It was reported in 1834, that, in Lavenham, Suffolk, 'Shoemakers, tailors, carpenters, masons and co. are without sufficient employment [that] not only agricultural labourers, but most of the woolcombers, are constantly, and many of the lower classes of tradesmen are occasionally, driven to the necessity of seeking employment from the farmer, or relief from the overseer'.⁽²⁸⁾ On the other hand, the collapse of domestic hand-loom weaving in north Britain often meant no commensurate increase in the resident agricultural labour force, because in many cases unemployed weavers transferred to the factories or migrated to the industrial towns.⁽²⁹⁾ However, here, as in many of the expanding agricultural areas any gaps in the harvest field were usually filled by migrant workers. A further important source of harvest labour during this period were vagrants and itinerant labourers, whose numbers grew dramatically after 1815. At Royston, Hertfordshire, on a main road from London to the Fens and the North, numbers of 'vagrants on pass'

increased from 1014 in 1811-12 to 7000 in 1820. (30)

We may conclude, therefore, that harvest labour was abundantly supplied during the period 1815-33, that the demand for labour-saving factors was weak, and that most harvest labour requirements were met either from within the existing local labour pool or by the employment of migrant workers.

1. E.g. W. Hasbach, A History of the English Agricultural Labourer (1908); A Redford, Labour Migration in England, 1800- 1850 (Manchester, 1926); E. Hobsbawm & G. Rudé, Captain Swing (1969); J. D. Marshall, The Old Poor Law (1969); J. D. Marshall, 'The Lancashire Rural Labourer in the early nineteenth century', Trans. Lancs. Chesh. Antiq. Soc., LXXI (1961); M. Blaug, 'The Myth of the Old Poor Law and the Making of the New', J. Econ. Hist., XXIII (1963); M. Blaug, 'The Poor Law Report Re-examined', J. Econ. Hist., XXIV (1964).
2. Report of the S.C. on Agriculture (1833), p. 187. A Gloucestershire Cotswold farm claimed that sometimes as many as 100 hands were employed in reaping wheat alone, in addition to those engaged in mowing spring corns. Farm Reports for Selected Farms (bound as Vol.III, British Husbandry), 'A Gloucestershire Hill Farm', p. 20. See also, S. Jonas, 'On the Farming of Cambridgeshire', J R A S E, VII (1846), p. 49, which report probably relates to the 1830's.
3. Report & Min. of Evid. H. of Lords S.C. on the Poor Laws (1831), p. 203.
4. Especially in the early 1830's. See, infra, pp. 167-174.
5. E. L. Jones, A Note on the History of Yarnton West Mead, Oxfordshire (Mimeo, Dept. of Agriculture, University of Oxford, 1964), p. 5.
6. Data extracted from harvest reports for Berwickshire, Farmers Magazine, 1806-25 (Oct-Nov issue). In 1828 migrant harvest labour was so abundant at the Edinburgh hiring market that wages fell to 7s per week. J. E. Handley, The Irish in Scotland (Cork, 1945), p. 51.
7. Farmers Magazine, Nov 1816, p. 487; Nov 1817, p. 475; Nov 1818, p. 491; Nov 1820, p. 490; Nov 1823, p. 499. See also, Alex Somerville, The Autobiography of a Working Man (1845), p. 100.
8. W. & H. Raynbird, On the Agriculture of Suffolk (1849), p. 139.
9. See, infra, pp. 167-174.
10. J. Wilson, Rural Cyclopedia, IV (Edinburgh, 1851), p. 29. Bell's reaping machine, probably the best of the pre-1851 designs, met a similar fate. For a detailed summary of the early history of the reaping machine, see, G. E. Fussell, The Farmers Tools (1952), pp. 119-27.

11. For labour-saving innovations in these areas, see, infra, pp. 298-300.
12. Farmers Magazine, Nov 1819, pp. 449, 508, 515.
13. Farmers Magazine, Nov 1822, pp. 491, 498-9.
14. W. Smart, Annals of the Nineteenth Century, II (1917), p. 301. In south Britain the July rainfall averaged only 0.3 inches.- Data supplied by L. P. Smith, Meteorological Office, Bracknell, Berks. For the trade cycle and employment in the period 1822-26, see, A. D. Gayer, W. W. Rostow, A. Schwartz, The Growth and Fluctuation of the British Economy, 1790-1850 (Oxford, 1953), I, pp. 174-210, esp. pp. 208-10.
15. Farmers Magazine, Nov 1825, pp. 482, 485, 490.
16. For corn production and harvest labour demand during this period, see, supra, pp. 40-3.
17. D. Grigg, The Agricultural Revolution in South Lincolnshire (Cambridge, 1966), pp. 117-36 and passim. See also, A. Harris, The Rural Landscape of the East Riding of Yorkshire, 1700-1850 (1961); E. J. T. Collins & E. L. Jones, 'Sectoral Advance in English Agriculture, 1850-1880', Ag. Hist. Rev., XV (1967); M. Compton & G. E. Fussell, 'Agricultural Adjustments after the Napoleonic Wars', Ec. Hist., IV (1939), pp. 184-204.
18. For Irish seasonal migration, see, supra, pp. 122-33.
19. B. R. Mitchell & P. A. Deane, Abstract of British Historical Statistics (Cambridge, 1962), p. 20.
20. ibid, p. 60
21. P. Deane & W. A. Cole, British Economic Growth, 1688-1959 (Cambridge, 2nd edn, 1967), p. 143.
22. Mitchell & Deane, op.cit, p. 60. There has been a tendency to overstate the demobilization after Waterloo. E. L. Jones, and Gayer, Rostow, Schwartz (op.cit, I, p. 136), for example, put it as high as 400,000 whereas in fact total numbers of UK servicemen released between 1814 and 1819 were only 270,000. 'The Agricultural Labour Market in England, 1793-1872', Ec. Hist. Rev., 2nd ser. XVII (1964), p. 325. As we have already argued the run-down began in late 1813. Data based on: A Comparative Statement of the Military Forces of the Population of the British Empire (War Office, n.d.) and W. James, The Naval History of Great Britain (new edn, 1837).

23. For examples of these reverse flows, see, A. H. Dodd, The Industrial Revolution in North Wales (Cardiff, 1933), pp. 381-2; Redford, op.cit, p. 90.

24. There was clearly a close correlation between the level of industrial activity and the rate of rural outflow. Gayer, Rostow, Schwartz suggest that following the slump of 1815-16, industrial activity revived temporarily in 1817-18, faltered again between 1819-21 and from 1822 went through a phase of increasing prosperity culminating in the great boom of 1825. op.cit, I, p. 356.

25. ibid, I, pp. 211-2, 356; S. G. Checkland, The Rise of Industrial Society in England, 1815-1885 (1964), p. 14.

26. Blaug (1963), loc.cit, p. 180. Over the country as a whole 'real' poor relief expenditure was 10 per cent higher in 1826-32 than in 1815-25. ibid, p. 180.

27. Somerville, op.cit, p. 100. See also Marshall (Lancashire), loc.cit, p. 193. This does not, of course, imply that there was no urban growth over the 1820's or that the gains before 1825 were cancelled out by the losses afterwards. Indeed, the 1820's was for many areas of Britain a decade of extremely rapid urban expansion. I am merely trying to suggest that the expansion was uneven, and that its effects on agricultural labour supply were more disruptive during the first half of the 1820's than the second. Particularly significant is that this urban growth was much less spectacular in south and east than in north Britain. Mitchell & Deane, op.cit, pp. 24, 26. However, it is worth stressing that a high proportion of northern migrants came either from the Celtic zones (north Wales, the Scottish Highlands and Ireland) or from local cottage industry. The effect of urban expansion on the supply of resident farm workers may have been rather less serious than the crude population statistics suggest. Redford, op.cit, pp. 35-61, 150-64. In 1824 local poor law authorities were asked whether the number of unemployed labourers had increased or diminished within the previous few years. The results of the enquiry are instructive. No diminution or an increase were reported from the following counties, Beds, Berks, Cambs, Cornwall, Hants, Herts, Hunts, Kent, Lincs, Nfk, Northants, Oxon, Sfk, Sussex, Wilts, (i.e. chiefly in east and south England); diminution was reported from Bucks, Cheshire, Cumbs, Derbs, Devon, Dorset, Durham, Ex, Glos, Herefs, Lancs, Leics, Middx, Mon, Northd, Notts, Salop, Somerset, Staffs, Surrey, Warks, Worcs, Yorks, (i.e. chiefly in the industrial areas of midland and north England). However, most counties stated that the diminution had occurred only very recently (i.e. since upturn of trade cycle). Abstract of Returns on Labourers Wages (1824), in B.P.P. 1825, XIX, pp. 363-449.

28. B. Kerr, Bound to the Soil (1968), pp. 69-89, 123-145, passim; R.C. Poor Laws (1834), App. D, p. 213a.
29. See, supra, pp. 87-96.
30. S.C. Emigration (1826), App. E, pp. 249-50e. Clearly, numbers of vagrants and itinerant workmen continued to increase over the 1820's. Numbers of Irish and Scottish paupers 'passed' in the counties, Berkshire, Cambridgeshire, Cheshire, Cumberland, Essex, Herts, Middlesex and Wiltshire increased from 10,427 in 1826 to 28,355 in 1831. R.C. Poor Laws (1834), App. E, pp. 23-24e. What proportion of them was prepared to engage in harvest work is difficult to estimate, but presumably this varied inversely with the trade cycle. At this stage a very high proportion of them had probably been born and raised in the countryside and therefore understood farm work.

CHAPTER X

THE CHRONOLOGY OF HARVEST LABOUR SUPPLY: 1834-1851.

This chapter will try to show that the initial post-war deterioration of the harvest labour market occurred not, as is generally assumed, in the 1850's, but rather in the mid-1830's. Thus the 1850's rank not as a watershed but rather as a further, albeit more active, phase of a longer-run trend beginning in 1834-5. The conventional view assumes that up to 1850 factor proportions in both agriculture and industry favoured labour-deepening and capital widening.⁽¹⁾ Habbakuk, for example, tends to the view that because manufacturers (and farmers) had 'a very elastic supply of labour at the ruling wage' there was little incentive to adopt labour-saving technologies, and that such labour shortages as did develop were 'local and temporary', those in the mid-1830's, for example, being a result of the Factory Act of 1833 which happened to occur on the eve of a large increase in capacity in the textile industry.⁽²⁾ On the surface the cards seem heavily stacked against the possibility of a substantial tightening up of the farm labour market before 1850. For one thing, the census evidence suggests that the national agricultural labour force grew faster between 1841 and 1851 than in any other decade of the nineteenth century, while, Chartism, the Anti-Corn Law League and the Famine would seem to imply that working class standards of living fell during the 1840's.⁽³⁾

Perhaps because so little is known of the detailed economic history of the period there has been a tendency to extrapolate forwards from the 1834 Poor Law Reports and backwards from the economic depression of the late 1840's, to assume a weak labour market throughout. But if such was the case, then how do we explain the anomalies, one, that many industries underwent radical structural and technological transformations during this period to alter significantly the shape of the industrial production function (higher capital/labour and capital/output ratios). And two, that during this period agriculture too experienced a minor technological revolution in the shape of off-farm fertilizers and feeding stuffs, and more critically, the adoption of labour-saving factors over a wide range of farm operations, from hoeing and threshing, to livestock-feed preparation and harvesting.⁽⁴⁾ Indeed, the period 1830-50, stands out as one of unprecedented growth in the British agricultural engineering industry.⁽⁵⁾

However, before presenting the evidence for the deterioration of the harvest labour market it must be emphasised that it was in no way as drastic as in the third quarter of the century; that although in some areas actual physical shortages of labour developed, in others it amounted only to fuller employment. In some cases the deterioration was of such an order as to require technological change, in others the short-fall was met by a more intensive use of local labour, by the taking-in of more migrant workers, or, at the lowest level, by simply extending the period of cutting where this could be done without risking serious crop loss.

It has been claimed, though, that the lot of the agricultural labourer failed to improve and may even have deteriorated after 1834, the argument being that the New Poor Law forced large

numbers of women and children onto the farm labour market thereby depressing average wage levels.⁽⁶⁾ This assumes higher labour participation as a function of supply, but the alternative view, favoured by this thesis, is that it was more a function of increased demand. This is to suggest that even though male weekly wage rates may have failed to improve, more constant employment, more piecework, and not least, higher family labour participation ratios, combined to raise average household incomes. This is the conclusion reached by Curtis in his detailed study of the effects of the Poor Law Amendment Act on living standards and employment in the counties of Bedfordshire, Norfolk and Suffolk in the period 1834-8. Curtis demonstrated:-

- (a) that the chief effect of the Act was to increase the overall level of farm employment,
- (b) that there was no large, irreducible surplus of labour in southern and eastern England,
- (c) that due chiefly to the higher earnings of women and children, household incomes in many cases increased.⁽⁷⁾

Similarly indicative of a more buoyant labour market is that 'real' and 'real average' Poor Law expenditure were respectively 16 per cent and 30-40 per cent lower in 1846-50 than in 1830-4.⁽⁸⁾ The reduction must partly reflect the greater stringency of the New Poor Law in the granting of outdoor relief, but the fact remains that the majority of agricultural unions reporting in 1836-8 on the workings of the Amendment Act attributed it chiefly to increased employment.⁽⁹⁾ Moreover, the rural employment position in 1850 was by most accounts, much more satisfactory than in the early 1830's. In Northamptonshire a notorious Old Poor Law blackspot, it was reported in 1851 that 'men were [now] anxious to find work and farmers more prepared to give it', and that although some young

labourers were still unemployed in winter there were no longer, as was often the case in the larger villages, 30-40 families permanently on the Poor Rate.⁽¹⁰⁾ In 1849, the Raynbirds attested to the much improved condition of the Suffolk labourer compared to the 'ruinous times' of the '20's and '30's, when 'farmers were just unable to pay for more men'.⁽¹¹⁾ In 1851 there were admittedly still many areas of southern and midland England where the position was far from satisfactory. But even so, Caird believed that farmers tended to exaggerate the over-supply, and cited an actual example of them deliberately employing less labour so that by filling the workhouses they might convince Parliament of agricultural distress.⁽¹²⁾

Harvest labour shortages occurred in two waves: 1834-41 and 1845-6, and afflicted not only north Britain but also many agricultural counties of south and east Britain. Already in 1834, farmers were discovering that the labour surplus was by no means as great as they had led themselves to believe.⁽¹³⁾

In the boom year of 1836 the Poor Law Commissioner described the employment position thus:-

'the price of provisions is still reasonable; the demand for labour in the manufacturing districts unprecedented; railroads are constructing in every part of England; the iron founders are all seeking additional hands to keep pace with their enormous orders, and there is an increased desire on the part of the weakened portion of the community to assist their poorer neighbours to seek their fortunes in the colonies.' (14)

The revival of manufacturing prosperity in the textile industry created such a demand for extra hands that the Poor Law Commissioners were put upon by manufacturers to organize a scheme of 'home-migration' to transfer labour from the more labour-flush southern and eastern counties to the northern manufacturing districts.⁽¹⁵⁾ Yet in 1837 East Anglia was itself able to report a very substantial reduction in unemployment. 'The young men', it was said, 'go about the county looking for and obtaining work, quite in a different manner to what they had used.... there used always to be 20 or 30 men standing about'.⁽¹⁶⁾ In Hoxne Union (Suffolk) there was a 'totally altered spirit If work is not to be found at home they [the farm workers] are both ready and anxious to seek it elsewhere'.⁽¹⁷⁾ In the decayed industrial town of Lavenham where formerly 50-60 men had been without work after harvest, there was now no one.⁽¹⁸⁾ Confronted with this new situation local officials were sometimes at a loss to explain how it had come about. 'Where the men are we do not know, month after month may pass without our having a single application of any of them for work, where sometimes we had hundreds'.⁽¹⁹⁾ Much of the labour surplus was absorbed by local agricultures, but it is also clear that the improvement was partly due to increased geographical mobility among young agricultural workers. 'Farmers', it was said, 'now employ labourers with less regard to their place of settlement. Many single men have gone to the railroads now in progress or have obtained situations in or near London', others were simply gone, to places 'not known where'.⁽²⁰⁾ So also in southern England. In the Penhurst District of Sussex, for example, wages of 15s. a

week could not attract sufficient labourers to dig the hopyards, while in the south of the county men who used to be on the roads were now 'dispersed into different parts'.⁽²¹⁾

The tightening of the harvest labour market after 1834 is reflected by the fact that by 1838 much of the former 'jealousy and ill-feeling' between Irish and native labourers had evaporated, and apart from a passing spell after the Famine it never again approached the dangerous heights of the early 1830's.⁽²²⁾ This was particularly true of northern industrial districts, where the growth of factory employment and the rapid decline of hand-loom weaving reduced the level of competition for harvest work.

In some areas the effects of industrial expansion on harvest labour supply were already apparent in 1834.⁽²³⁾ By 1836 a Sussex landowner was complaining that, 'before many years we shall find a great difficulty to get the harvests in and I do not know whether we shallnot this year'.⁽²⁴⁾ Similarly, in Hertfordshire, farmers were unable to obtain sufficient hands for their key summer operations, while in Bedfordshire, local labour became so scarce on the Duke of Bedford's estate that, and for the first time, Irish had to be introduced to help with the hay harvest.⁽²⁵⁾ In one corn growing district of Wiltshire local labour supplies had become inadequate to the point at which farmers would soon be requiring the assistance of migrant workers from the pastoral areas around Devizes.⁽²⁶⁾ Labour shortages were also reported from Lincolnshire and Yorkshire.⁽²⁷⁾ 1839 was a notoriously difficult harvest, wet and long drawn out, described in Berkshire as the most awkward since 1816 and with reports of adversity coming in from counties as far apart as Banff, Cornwall and Cumberland. In the Lincolnshire Fens the situation was especially critical

because the hay and corn harvests overlapped: 'so much [corn] being cut, so much ready to cut and so little carried'. (28)

1840 was uneventful, while 1841, although it saw some areas very abundantly supplied with labour, in Ayr, reapers were reported 'much in request', while in Leicestershire wages reached the unprecedented heights of 30s. per week for good reapers and mowers. (29)

The market eased temporarily between 1842 and 1844, (30) but economic revival and the peak of the railway boom led to renewed, and in many areas, a very dramatic deterioration in 1845-6. In May 1847 the following leader appeared in the Agri-cultural Gazette:-

'time was when the supply of labourers in the country exceeded the demand and the farmer was urged by a mode of appeal totally unconnected with the natural and commercial relations of the question, to afford employment to the unemployed But this question has passed away and has given place to its exact reverse an understocked labour market due to a combination of circumstances perhaps unexampled in modern times'. (31)

Shortages of harvest labour were reported over a wide area; from Berkshire, Cumberland, Durham, Hereford and Northumberland. (32) In 1847 the pendulum swung back again towards labour abundance, with resident harvest workforces augmented, often very heavily, by 'swarms' of Irish and by large numbers of unemployed industrial and railway workers. (33)

II

The deterioration of the harvest labour market can be explained on the demand side by the substantial increase in harvest labour requirements over the period 1834-46, and on the supply side by the effects of railway building and industrial expansion

in absorbing much of the conspicuous labour surplus. The demand factors have already been examined (supra, pp.40ff), so we will here be chiefly concerned with the supply factors. Within industrial expansion the most significant features were, one, the more rapid growth after 1833 of heavy manufacturing industry and the mining, transport and construction sectors, and two, the considerable broadening of the geographical base of British industry attending economic development in the East and West Midlands, north-east England, South Wales and west-central Scotland. (34)

The 1830's saw, in fact, the beginnings of a new phase of British economic growth which was to alter profoundly the structure of the national product and with it, the industrial distribution of the national labour force. (35) Not only were the 'new' industries able to tap the rural labour pool more effectively than the 'old', their chief demand being for unskilled manual workers, but also their more even geographical spread brought them closer to the rural labour surpluses of south and east Britain. Between the early 1830's and late 1840's coal output increased by an estimated 80 per cent (1835/50), pig iron production by 300 per cent (1830-4/1845-9), and brick production by 60 per cent (1830-4/1843-7), while simultaneously the national railway mileage increased from less than 300 to over 6500 miles (1834/50). (36)

The textile industries of Lancashire, the West Riding and central Scotland were no longer the chief generators of non-agricultural employment for adult males. Rather, after 1835, as production became more highly mechanized, the ratio of males to females employed in textiles declined dramatically. In cotton, for example, male employment increased by only 16 per cent between 1841 and 1851 compared with a near 75 per cent increase in female employment. (37)

Moreover, the factors determining cycles of activity in the 'new' industries, producing mainly capital goods for the home market, were different from those in the 'old' industries, producing mainly consumer goods and geared more to the export market. The Gayer, Rostow, Schwartz indices of industrial activity suggest that railway construction enabled the 'new' industries to weather the storms of 1837-41 more successfully than the 'old'. Matthews was firmly convinced that the post-1837 depression was more illusory than real, (c.f. Checkland, who described the years 1836-42 as ones of 'critical depression'), that the real strain was taken on prices and profits, while output increased in virtually all sectors, especially railway linkage industries, and employment held steady.⁽³⁸⁾ In assessing the effects of the trade cycle on employment, it is essential, therefore, to distinguish carefully between different industries, different regions and different categories of worker. Harvest labour supply, for example, appears to have followed trends in railway construction, iron production, coal mining and brick-making much more closely than textiles.

III

The greatest single force acting upon the rural labour market during this period was undoubtedly railway building; first, because most areas of Britain were affected by it; second, because it created a large demand for casual unskilled labour, and third, and indirectly, because it stimulated growth in the mining, iron, heavy engineering, brick-making and haulage industries. In railway building, the 'mania' proper began in 1835, reached its first peak

in 1840, and revived again in 1844 to reach its historic peak in 1847.⁽³⁹⁾ In much the same way as did canal-building and military service during the Napoleonic Wars, it unsettled many rural labour markets and whetted young men's appetites for higher wages and increased mobility. Norfolk labourers, for example, having helped build the Great Eastern Railway, then followed it back to its source, and found employment on London building sites.⁽⁴⁰⁾ It also seriously disrupted the agricultural economies of many areas through which it passed, causing large temporary increases in population and stimulating the growth of linkage industries. In the early 1870's, during the construction of the Kettering-Manton line, upwards of 3000 workmen descended upon neighbouring villages, while to meet the demand for 90 million bricks, existing brickyards were extended and three new ones established.⁽⁴¹⁾

The effects of the coming of the railways on national and rural labour markets can be analysed only in the most general terms, but perhaps the most critical factor was that the ratio of unskilled to skilled workmen was extremely high in railway construction. In 1846 it stood at 5:1 on the Hawick Line.⁽⁴²⁾ Predictably, railway building temporarily inflated agricultural wage rates. In 1846, the average navvy wage exceeded 20s. per week compared with the average agricultural wage of only 10s. During the building of the Furness railway, agricultural wages rose 50 per cent between 1840 and 1846, from 1s. per day to the 'dizzy height' of 1s. 6d. Admittedly, 1846 was in most respects an exceptional year and these rates held for only a few months, but even in average years the navvy wage normally exceeded 15s. per week. As a young boy, William Taylor, the navvy preacher, gladly exchanged his 3d. a day on the farm for 1s. a day on the

railroad. (43)

Just how many agricultural labourers entered railway construction is another matter. In construction alone, the labour force increased from a few thousand in the early 1830's, to around 50,000 in 1840, to over 250,000 in mid-1847. (44) Tooke estimated that in 1847-8, railway building and its linkage industries provided work for at least 300,000 persons. (45)

The cash incentives for agricultural labourers to migrate to the 'diggings' were, as we have already seen, compelling enough for us to be able to predict a high volume of defection. But it has been suggested that few of them in fact did so. Clapham is cautious on this point, and implies that this was only so initially, during the 1830's. Coleman on the other hand is rather bolder and contends that even at the height of the railway boom few ex-agricultural labourers were involved. (46) Coleman's error is that he has failed to distinguish properly between his 'professional navvies' who, like the gypsies and bargees, were a distinct social caste, and the more purely casual railway labourer, whose allegiance was often only very temporary, and who went elsewhere when the supply of work ran out. (47) The evidence suggests that in 1845-7 at least, if not earlier, the greater part of the railway labour force was comprised of this second category of worker, of which, and more to the point, a very high proportion originated from agriculture.

As early as 1836 large numbers of farm workers in the Midlands were engaged in railway construction. (48) Lecount was adamant in his belief that in the late 1830's relatively few professional navvies were employed on the London-Birmingham line, and that the workforce was chiefly recruited from the surrounding

countryside.⁽⁴⁹⁾ By 1839 Cambridgeshire, Cumberland, Glamorgan, Kent, Lincolnshire, Norfolk, Northamptonshire, Suffolk and Yorkshire had also reported migrations of agricultural labourers to the railway works.⁽⁵⁰⁾ In the mid-1840's, the numbers of agricultural labourers entering railway construction must have increased considerably in order to meet the unprecedented demand for hands - the railway labour force expanded by over 150,000 over the brief two year period, mid-1844 - mid-1847. In 1845, the Farmers Magazine drew startled attention to the way in which railway building and the flourishing state of trade were disrupting the agricultural labour market.⁽⁵¹⁾ In the construction areas there developed sometimes very serious shortages of harvest labour.⁽⁵²⁾ In northern England farmers complained that most of their men had gone to the railways but that the demand there was still unsatisfied.⁽⁵³⁾ In some areas contractors planted look-outs on the roads to intercept men tramping, and take them to the nearest beer shop to be treated and induced to start work.⁽⁵⁴⁾

The collapse of the railway boom in 1847 had an immediate and perceptible effect on the harvest labour market. Following the cessation of work on the Oxford-Rugby line in the August of that year, many labourers sought harvest work in the surrounding countryside.⁽⁵⁵⁾ In 1851 the railway work force barely exceeded 50,000, where a few years earlier it had stood at over a quarter of a million.⁽⁵⁶⁾

IV

The problem, however, is to relate harvest labour shortage and the more rapid adoption of labour-saving methods with the occupational census evidence, which suggests that the national

agricultural labour force remained static over the 1830's, and increased by 24 per cent over the 1840's. The inadequacies of the pre-1851 occupational data are, of course, well known, but their inconsistencies have not yet been fully exposed. How, for example, is it possible to reconcile the extraordinary 24 per cent expansion of the male agricultural labour force with the only very meagre 8 per cent increase in the population of the 17 English 'agricultural' counties.⁽⁵⁷⁾ Undoubtedly the decade saw large numbers of young men, born in the 1820's, and now of working age, thrown onto the labour market. But we may ask, in view of the fact that population grew as fast in the 1810's as in the 1820's, why did the agricultural labour force fail to increase as dramatically during the 1830's as in the 1840's: indeed, the census evidence implies that the adult male agricultural labour force actually declined between 1831 and 1841.

Clearly, no great reliance can be placed on the occupational census. Rather, any increase would have been more evenly phased between the two decades 1831-41, 1841-51 than these data suggest, being of the approximate order 15-20 per cent, a figure which is much more consistent with the population growth of the agricultural counties. The phasing of the increase is also important. Trade cycle and other evidence suggest that the rural migration rate accelerated sharply after 1834, slowed down about 1840, increased again in 1844 and became negative following the collapse of the railway boom in 1847. Thus it would appear that the agricultural labour force grew faster over the 1840's than the 1830's, and that the greater part of this increase was recorded after 1846. Between 1847 and 1851 the railway labour force fell by 200,000, of which conceivably a very high proportion, perhaps 60-70 per cent, returned temporarily to agriculture.⁽⁵⁸⁾ To these must be

added the large numbers discharged from building sites, mines, quarries and iron-works and the dramatic increase in Irish immigrants in the years immediately following the Famine. (59)

The period 1834-51 ended therefore with harvest labour plentifully supplied. This was, however, merely a lull before the storm which was to break in the early 1850's. Before 1847, many farmers had already experienced a taste of things to come. But for the Irish, whose increasing numbers helped offset the slow-down of Scottish Highland and Welsh harvest migrations and the reduction of part-time industrial and casual harvest workers, it is probable that the labour shortages would have been more serious and more prolonged.

1. See, for example, J. D. Chambers & G. E. Mingay, The Agricultural Revolution, 1750-1880 (1966), pp. 136-47, 187 ff.; C. S. Orwin & E. H. Whetham, British Agriculture, 1846-1914 (1966), pp. 68-90; W. Hasbach, The English Agricultural Labourer (1908), pp. 218-35. Even, E. L. Jones, who has taken a less sanguine view than most about the condition of the agricultural labourer in the 30's and 40's, believed that the first significant and then only very temporary tightening up of the farm labour market occurred at the height of the railway boom in the mid-1840's. 'The Agricultural Labour Market in England, 1793-1872', Econ.Hist. Rev, 2nd ser, XVII (1964), pp. 327-8.
2. H. J. Habakkuk, American & British Technology in the Nineteenth Century (Cambridge, 1962), pp. 136-159, esp. p. 139.
3. Census data detailed in B. R. Mitchell & P. A. Deane, Abstract of British Historical Statistics (Cambridge, 1962), p. 60.
4. This conclusion is borne out by the most cursory expansion of the large and comprehensive collection of trade catalogue material relating to the agricultural implement and machinery industry recently assembled by the Museum of English Rural Life, University of Reading. The evidence for technological change in harvesting is presented infra, pp. 301-5.
5. In 1830 the agricultural engineering industry was largely small-workshop based. Subsequently, many of the technologies developed in the non-farm engineering industry were introduced, the scale of operation was enlarged, and a sizeable number of large firms entered the international market. The maturity of the industry in 1851 is evidenced by trade catalogue material produced by firms represented at the Great Exhibition (Reading University Library: Great Exhibition Collection). The expansion of the industry over this period will be examined in greater length in, E. J. T. Collins & E. L. Jones, 'The Agricultural Processing & Servicing Industries', in G. E. Mingay & J. W. Y. Higgs, eds, Cambridge Agrarian History of England, VI (forthcoming).
6. Orwin & Whetham, op.cit, pp. 69-74; Hasbach, op.cit, pp. 218-35.
7. W. M. Curtis, Poor Law Administration (B.A. diss. Dept. of Economic History, University of Nottingham, 1952), pp. 100-102, and Ch. I, III, IV, passim. Curtis takes the view that factors making for higher labour input were first the saving in poor rates occasioned by the cessation of outdoor relief and its transfer to the Wages Fund, and second, that because the costs of maintaining a family in the workhouse were high, farmer ratepayers now found it more profitable to provide employment than to pay for relief. ibid, pp. 100-101. The Report on the Employment of Women & Children in Agriculture (1843) details the very extensive use of child and female labour in the 1840's. The Report stresses that only in very few cases was male labour displaced, that it was only supplemented. See also, supra, pp. 80-1.

8. G. R. Porter, Progress of the Nation (edn, 1851), p. 90.
In Bedfordshire and Huntingdonshire numbers of able-bodied labourers relieved fell from 3250 in 1829 to 837 in 1851. Report on the State of Pauperism in Bedford & Huntingdon (1852), B.P.P. 1852, XLV, pp. 582-4.
9. Report from the House of Commons Select Committee on the Administration of the Poor Law Amendment Act (1837-8).
10. W. Bream, 'Farming of Northamptonshire', J R A S E, XIII (1852) pp. 89-90.
11. W. & H. Raynbird, On the Agriculture of Suffolk (1849), p. 286.
12. J. Caird, English Agriculture in 1850-51 (1852), pp. 472, 518.
13. For the 'major cycle', 1832-7, see, A. D. Gayer, W. W. Rostow, A. Schwartz, The Growth & Fluctuation of the British Economy, 1790-1850 (Oxford, 1953), I, pp. 242-76, 356; R.C.O. Matthews, A Study of Trade Cycle History 1833-1842 (Cambridge, 1954), pp. 202 ff.
14. Second Annual Report of the Poor Law Commissioners (1836), p. 299.
15. A. Redford, Labour Migration in England, 1800-1850 (new edn, Manchester, 1964), pp. 97-111.
16. Second Annual Report of the Poor Law Commissioners (1836), pp. 190-1; Report from S.C. on the Poor Law Amendment Act, XV (1838), pp. 21-4.
17. ibid, p. 22; see also, pp. 21-4.
18. Second Annual Report of the Poor Law Commissioners (1836), p. 190.
19. Mark Lane Express, 24 Dec 1839, p. 10.
20. Report from S.C. on the Poor Law Amendment Act, XVIII (1838), pp. 533-6.

21. Second Annual Report of the Poor Law Commissioners (1836), p. 202; Report from the S.C. on the Poor Law Amendment Act, XX (1837), p. 15. For other areas, see, Report S.C. of H. of L. on the State of Agriculture (1836), Min. of Evid, p. 108 (Staffs); ibid, p. 269 (Yorks); ibid, p. 238 (Salop); Second Annual Report of the Poor Law Commissioners (1836), pp. 197-8 (Kent); ibid, p. 543 (Herts); Fifth Annual Report of the Poor Law Commissioners (1839), p. 10 (South Wales); Report from S.C. on the Poor Law Amendment Act, XX (1837), pp. 54, 64 (Wilts); S.C. of H. of C. on the Andover Union (1846), Q 9812-4, 17200-4, 18042-5 (Hants); Report from S.C. on the Poor Law Amendment Act, XVIII (1838), pp. 533-6 (Suffolk); Farmers Magazine, June 1839, pp. 480-1 (Derbs, Glam, Notts, Oxon).
22. Farmers Magazine, Sept 1838, p. 378.
23. J.E. Handley, The Irish in Scotland, 1798-1845 (Cork, 1945), p. 45.
24. Report S.C. of H. of L. on the State of Agriculture (1836), Third Report, p. 88.
25. ibid, p. 291; Second Annual Report of the Poor Law Commissioners (1836), pp. 542-3.
26. Report from S.C. on the Poor Law Amendment Act, XX (1837), p. 64.
27. Report S.C. of H. of L. on the State of Agriculture (1836), p. 269.
28. Mark Lane Express, 14 Oct 1839, p. 10.
29. Mark Lane Express, 31 Aug 1840, p. 10; 27 Sept 1841, p. 12; 25 Oct 1841, p. 10; Farmers Magazine, July 1841, p. 8; Sept 1841, pp. 231-2.
30. For instances of labour abundance during the years 1842-4, see, Farmers Magazine, Aug 1843, p. 150; Oct 1843, p. 309; Aug 1844, p. 183.
31. Agricultural Gazette, 1 May 1847, p. 289.
32. Jones, loc.cit, p. 328; Farmers Magazine, Aug 1845, p. 185; Sept 1846, pp. 278, 288.

33. See, Farmers Magazine, Oct 1848, p. 374; Nov 1848, p. 466; Sept 1850, p. 266, and supra, pp.131-2 (Irish), and infra, pp.190-2 (general farm labour market and unemployed-industrial harvest workers).
34. See, Mitchell & Deane, op.cit, p. 60.
35. For general discussion, see, P. Deane & W. A. Cole, British Economic Growth, 1688-1959 (2nd edn, Cambridge, 1967), pp. 144-5, 158-73.
36. ibid, pp. 215-6; Mitchell & Deane, op.cit, pp. 225, 235; J. R. T. Hughes, Fluctuations in Trade, Industry & Finance (Oxford, 1960), p. 197. Other major growth areas were shipbuilding, docks and heavy engineering.
37. Mitchell & Deane, op.cit, p. 60. Indeed, even prior to 1835, textiles provided much more employment for females than males. In cotton, for example, adult males comprised only 26 per cent of the total workforce in 1835; Deane & Cole, op.cit, p. 190. In wool, the position was little better, the percentage here being just over 20 per cent in 1835. Mitchell & Deane, op.cit, p. 199. Between 1835 and 1850, numbers of male employees in the industry increased by 27,000 and female employees by 43,000. ibid, p. 199. In silk, adult males made up less than 3 per cent of the total workforce in 1835 and in linen 13 per cent. ibid, pp. 204, 211.
38. Gayer, Rostow, Schwartz, op.cit, I, pp. 289-96; S. G. Checkland, The Rise of Industrial Society in England, 1815-1885 (1964), p. 17; Matthews, op.cit, pp. 209-12, 219, and also, 113-18 (building), 119 (shipbuilding), 137-8, 144-8 (cotton), 155-6 (coal).
39. Additional railway mileage opened: Hughes, op.cit, p. 197; Mitchell & Deane, op.cit, p. 225.

	miles		miles		miles
1835	338	1841	1775	1847	3945
1836	403	1842	1939	1848	5127
1837	540	1843	2044	1849	6031
1838	743	1844	2236	1851	6621
1839	970	1845	-	1852	6890
1840	1498	1846	3674		
40. D. M. Springhall, Labouring Life in Norfolk Villages (1936), pp. 48-9.

41. D. W. Barrett, Life and Work among the Navvies (1883), pp. 15, 16, 23. Brick making tended to follow railway construction, i.e. peak 1840, trough 1843, peak 1847 (Shannon's index in Mitchell & Deane, op.cit, p. 235).
42. Report on Railway Labourers (1846), p. 25.
43. J. D. Marshall, Furness in the Industrial Revolution (Barrow in Furness, 1958), pp. 179-80, 241-2; T. Coleman, The Railway Navvies (Penguin, 1968), p. 67; W. J. Taylor, The Life and Work of William Taylor (Glasgow, 1892), pp. 9-25.
44. Deane & Cole, op.cit, p. 32; Redford, op.cit, p. 131.
45. T. Tooke & W. Newmarch, A History of Prices, V (1857), pp. 356-7.
46. J. H. Clapham, An Economic History of Britain, I (1926), p. 405. Coleman, op.cit, p. 26.
47. T. Brassey reckoned that it took a man a year to get thoroughly accustomed to the rigours of navvy work. Work & Wages (3rd edn, 1872), pp. 231-2. Agricultural labourers used to the heavy work of ditching and draining may have got away with rather less. The adjustment may have been no more difficult than in other heavy construction work, which we know was employing many ex-agricultural labourers in the 1860's. Coleman, op.cit, p. 25, notes that 'a navvy was not a mere labourer, though a labourer might become a navvy'. In his view, though, 'navvies' were highly specialised workmen: big drinkers, big eaters, moleskin-trouserred, canvas-shirted, velveteen-jacketed, felt-hatted, itinerant, sometimes internationally so, and godless, ibid, pp. 25-34. The 'true navvies' probably originated in the canal era. After 1835 they were swamped by the sudden influx of outsiders into what may up till then have been an exclusive preserve.
48. Coleman, op.cit, p. 26.
49. ibid, p. 26.
50. Redford, op.cit, pp. 105-6; 2nd Annual Report of the Poor Law Commissioners (1836), pp. 415, 459-60; S.C. of H. of L. on State of Agriculture (1836), Second Report, pp. 228-9, 269, 422-3; 15th Report on Poor Law Amendment Act (1836), pp. 21-4, 37, 271, 533-6; Farmers Magazine, June 1839, p. 480; 20th Report on Poor Law Amendment Act (1837), p. 31; 18th Report on Poor Law Amendment Act (1838), p. 37.

51. Farmers Magazine, Nov 1845, p. 474. See also, Report on Railway Labourers (1846), pp. 39-40, 128, 155, 174.

 52. E.g. Jones, loc.cit, pp. 327-8. And similarly in areas adjacent to the linkage industries. In 1845, for example, within a few weeks of the wage increases at Merthyr, servants in far off Pembrokeshire were breaking their engagements and like many other of the poor were 'flocking to the ironworks'. A. H. John, The Industrial Development of South Wales (1950), pp. 64-5.

 53. Coleman, op.cit, p. 68.

 54. ibid, p.68.

 55. A. M. Taylor, Gillett's, Bankers at Banbury and Oxford (Oxford, 1964), p. 105.

 56. Deane & Cole, op.cit, p. 232. See also, P. W. Kingsford, Railway Labour, 1830-70 (unpub. Ph.D. thesis, University of London, 1951), p. 13. The falling demand for railway labour after 1847 was fully reflected by wage rates. On Brassey's works, weekly wages for shovellers and pickmen fell from 22s6d - 24s in 1846 to 16s.6d - 18s in 1849 and 14s - 15s in 1851. Coleman, op.cit, p. 67. Brassey noted how men who had earned 3s6d a day on the North Staffordshire line obtained only 2s6d on the Royston and Hitchin Railway. op.cit, pp. 37-8.
- Numbers employed in Railway construction work (mid-year)

1847	257,000	1850	59,000
1848	188,000	1851	43,000
1849	104,000		
-
57. Ex, Mitchell & Deane, op.cit, pp. 20, 60.

 58. Deane & Cole, op.cit, p. 232.

 59. Most industries went through bad times in 1847-8: see, Gayer, Rostow, Schwartz, op.cit, I, pp. 306-40. For building, see, J. P. Lewis, Building Cycles & Britain's Growth (1965), p. 62. In 1848 an estimated one third of iron-founders were out of work, ibid, p. 85. Activity picked up in some industries in late 1848, but in others recovery was delayed until the early 1850's. Numbers of able-bodied adult paupers relieved in England & Wales grew from .296 million in 1847 to .425 million in 1849. For Irish 'Famine' immigration, see, Redford, op.cit, pp. 128, 157-8, and J. E. Handley, The Irish in Modern Scotland (Cork Univ. Press, 1947), pp. 20-46.

60. The effects of the depression on the agricultural labour market were still being felt in 1851. In 1850, the Morning Chronicle painted a depressing, if rather exaggerated, picture of rural social distress, while in 1851, it was again being asked whether the agricultural population could exist without poor law relief. Agricultural Gazette, 20 Sept 1851, p. 617. However, as already argued, the situation in the late 1840's never approached the desperate levels of 1830-33.

CHAPTER XI

THE CHRONOLOGY OF HARVEST LABOUR SUPPLY: 1852-70.

It is not going too far to describe the period 1852-70 as one of almost uninterrupted industrial and agricultural expansion. The farm labour market entered its most critical phase of deterioration, the chief problem being no longer to absorb a labour surplus but to obtain sufficient labour for the key summer operations. Throughout Western Europe agricultural populations at last began to stabilise, and in Britain, the most economically advanced nation, to decline.⁽¹⁾ Numbers of full-time farm workers in Britain declined by 15-20 per cent between 1851 and 1871 compared with the 15-20 per cent increase of 1831-51. Correspondingly, the rate of labour-saving innovation increased sharply after 1851. By 1870, the majority of barn operations and a high proportion of field operations had been transformed by the use of machines and improved implements. In harvesting, most farmers were forced to adopt higher working-capacity methods, the most conspicuous of which was the reaping machine.⁽²⁾

Before the 1850's were out, the majority of farmers had learnt the truth of Caird's warning, given only in 1851, that, 'as labourers begin to withdraw, employers will soon discover, under the pressure of higher wages, that the [labour] surplus was not so great as they had led themselves to believe'.⁽³⁾ They discovered that the supply of harvest labour was inelastic,

and that in certain years, even much advanced wages did not automatically guarantee them enough workers to avert heavy crop losses by shedding and spoilage. Increasingly, harvest wage bargainings were marred by strikes and bitter wrangling. As the market advantage shifted towards the labourers, so at hay and corn harvest they could display a spirit of independence such as would have been inconceivable to the previous generation of farmers. By the early 1870's the situation in Berkshire had deteriorated to the point at which, 'if anything does not suit [the labourers] they are off elsewhere in search of work, little thinking hay-making and harvest do not last all the year'.⁽⁴⁾

As labour became a more costly factor of production, so the susceptibility of high cost/high output farming to diminishing marginal returns was soon revealed. Already by the late 1850's some farmers had begun to doubt the wisdom of 'high farming' and were predicting that rising labour costs would eventually check increased production.⁽⁵⁾ It was asked, 'Whether the tillage farmer, in his desire to extort from the soil an excessive produce, has not involved himself in a procedure in which the enhanced returns are more than counter-balanced by greater cost in obtaining them'.⁽⁶⁾ A Kent farmer doubted whether in 1859 one farmer in a hundred had been able to get his work done at a seasonable and proper time 'The Labour Market', he forecast, 'will ultimately beat us all'.⁽⁷⁾ The tide of rustic grumblings swelled again in the mid-1860's, and reached its high water mark in the early 1870's. The root of the problem was that as long as product prices continued to favour the extension of mixed farming, increased output could be achieved only by a more intensive use of labour and at the risk of more rapidly diminishing

marginal returns. One difficulty was that not all farm tasks lent themselves to mechanization, with the result that the demand for manual labour, and with it labour costs, continuously increased. A Suffolk farmer best summed up the dilemma when he called for a machine, 'to elevate a little more money into farmers' pockets.'⁽⁸⁾ A Scottish farmer clearly had another, much more sinister solution in mind, when he said in 1871, that, 'things are tending towards the importation of Chinese coolies as labourers for field work'. It is indicative of the rate of deterioration of the farm labour market during this period that despite extensive mechanization, labour shortages were as acute in the mid-'60's and early '70's as they had been in the '50's. It has been estimated that between 1850 and 1869-70 average weekly earnings in agriculture rose by 30 per cent in England and Wales and by 36 per cent in Scotland. By the early 1870's average weekly wages stood 60 per cent higher than in 1850-1 compared with only a 40 per cent increase in agricultural prices.⁽⁹⁾

I

The deterioration is reflected by a marked upward trend in harvest wage rates between the late '40's and late '60's. We are fortunate in that there exist for three years, 1849, 1859 and 1867, detailed wage statistics collected by the Agricultural Gazette,⁽¹⁰⁾ which constitute a unique body of information about not only wage rates, but also unit cost, methods of payment and the state of the art. As they stand the three surveys are not directly comparable: the number of returns in 1859 was much smaller

than in 1849 and 1867, while although total reports for all three years exceeded 250, in only 13 instances did the same correspondent report in all three years, only 25 in the two years 1849 and 1859, and only 29 in the two years 1859 and 1867. An additional drawback is that the geographical distribution of reports is extremely uneven. Reports from south-west England numbered 20 in 1849 but only 4 in 1859, while in 1867 there were 23 reports for northern England compared to 8 for south-east England.

Nonetheless the surveys are deserving of detailed analysis, and indeed, in view of the almost total lack of alternative data, demand it. For the purposes of analysis all payments in kind have been given a (nominal) cash value and total payments have been expressed as an average weekly (c.f. daily or monthly) wage. The data have been sampled in two ways. Analysis I includes only the reports of those individual correspondents reporting in two or more years. The sample is too small to permit a regional breakdown of reports: its value lies more in its average comparability. Analysis II, on the other hand, utilizes all reports, groups them by region, and attempts only to establish gross magnitudes.

HARVEST WAGES AND COSTS PER ACRE FOR REAPING WHEAT IN GREAT BRITAIN
IN 1849, 1859, 1867.

Analysis I

A = average weekly male harvest wages

B = costs per acre for reaping wheat (in shillings)

	<u>1849</u>		<u>1859</u>		<u>1867</u>	
(1) <u>Correspondents reporting in 1850, 1860 and 1867</u>	A	B	A	B	A	B
	(13 reports)	(12 reports)	(13 reports)	(12 reports)	(13 reports)	(12 reports)
	15.5	9.75	19.0	12.5	20.5	12.0

Analysis I (continued)

<u>1849</u>		<u>1859</u>	
(2) <u>Correspondents reporting in 1850 and 1860</u>			
A	B	A	B
(25 reports)	(23 reports)	(25 reports)	(23 reports)
15.3	9.0	18.5	12.0

<u>1859</u>		<u>1867</u>	
(3) <u>Correspondents reporting in 1860 and 1867</u>			
A	B	A	B
(29 reports)	(28 reports)	(29 reports)	(28 reports)
18.0	12.0	19.0	12.0

Percentage Changes in Harvest Wages and Per Acre Costs

	<u>1859/49</u>		<u>1867/59</u>		<u>1867/49</u>	
	A	B	A	B	A	B
Sample (1)	+22.6	+28.2	+7.9	-4.0	+32.2	+18.7
Sample (2)	+17.2	+33.3	-	-	-	-
Sample (3)	-	-	+5.6	-	-	-

Analysis II

REGIONAL CHANGES IN WEEKLY HARVEST WAGE RATES IN GREAT BRITAIN, IN 1849, 1859, 1866.

(Wages in shillings, numbers of reports in brackets)

<u>REGION</u>	<u>1849</u>	<u>1859</u>	<u>1866</u>
Scotland	13.5 (19)	18.7 (13)	22.5 (13)
N. England (a)	16.2 (26)	22.1 (14)	23.6 (23)
E. England (b)	21.5 (15)	27.5 (8)	31.9 (18)
S.E. England (c)	17.7 (10)	19.6 (5)	22.3 (8)
S. Central England	16.3 (8)	19.2 (9)	19.0 (9)
S. West England (e)	12.9 (20)	18.3 (4)	18.9 (8)
Midland (f)	16.7 (11)	16.8 (6)	22.6 (12)
Average of Regions	16.7 (110)	20.3 (59)	23.0 (91)

<u>PERCENTAGE CHANGE</u>	<u>% Change 1859/49</u>	<u>% Change 1866/59</u>	<u>% Change 1866/49</u>
Scotland	+ 39	+ 20	+ 67
N. England	+ 36	+ 7	+ 46
E. England	+ 28	+ 16	+ 48
S.E. England	+ 11	+ 14	+ 26
S. Central England	+ 18	- 1	+ 17
S. West England	+ 42	+ 3	+ 47
Midland	+ 1	+ 35	+ 35
Average of Regions	+ 22	+ 13	+ 38

(a) = Cheshire, Cumbs., Derbs., Durham, Lancs., Lincs., Northumbld., Yorks., Westld.

(b) = Cambs., Essex, Hunts., Nfk., Ruts., Sfk.

(c) = Hants., Kent, Surrey, Sussex.

(d) = Berks., Bucks., Oxon., Herts.

(e) = Cornwall, Devon, Dorset, Somerset.

(f) = Beds., Leics., Northants., Notts., Warks., Worcs.

Both analyses clearly demonstrate that between the late 1840's and mid-1860's harvest wage rates increased substantially in all areas of Britain, and faster in Scotland and northern and eastern England than in south-east and south-central England. Analysis I implies a significant improvement in harvest labour productivity over this period, for while wages increased by 32 per cent between 1849 and 1867, per acre costs increased by only 19 per cent.

However, it must be emphasised that between individual areas there existed no direct correlation between wage movements and either (a) changes in the size of the harvest labour force, or (b) changes in labour productivity. The relationships were in practice extremely complex, varying according to changes in the composition of the workforce, the supply price elasticity of labour and the technology mix.

III

The speed with which an apparently well-stocked agricultural labour market could tighten up was brought home to British farmers in 1852-3. In 1853 it was observed how:-

'Scarcely a year ago, agricultural labourers, starving and weakened by the poor rates, constituted one of the nightmares that haunted the dreams of some of us. Now the tables are turned, and we hear from all quarters of a scarcity of labourers. Even Wiltshire witnesses the marvellous Phenomenon of a strike among that class for an advance of wages'. (11)

By September of that year the screw had tightened further:-

'The state of our labour market is daily becoming more and more engrossing topic at public and private meetings; the more so

probably in agriculture than in any other industry'.⁽¹²⁾ Industrial recovery, the 'findings of California', the 'diggings of Australia' and the great Irish emigrations now threatened 'the most ruinous consequences to the cause of British Agriculture'.⁽¹³⁾ The contraction took many farmers by surprise. In late 1852, "Falcon" of the Agricultural Gazette was advocating 'economic piety' as a means of stemming the tide of rural migration; advising farmers to 'retain men and treat them liberally'.⁽¹⁴⁾

In Durham, the harvest of 1853 was described as the most expensive in memory, in which it was impossible to procure hands fast enough to keep pace with the speed of ripening.⁽¹⁵⁾ The following year brought temporary relief to Berkshire, where in the middle of the harvest some labourers were unable to find work, but in other counties, in Kent and Herefordshire for example, men were still scarce.⁽¹⁶⁾ 1855 passed quietly but 1856 and 1857 saw another peak.⁽¹⁷⁾ 1859 was outstanding as the first year in which really large quantities of corn were lost for want of timely cutting. The Farmers Magazine described this 'as an event foreseen for some years', and was generally unsympathetic of those 'unobservant farmers' who had failed to anticipate it. In Oxfordshire for example, panic ensued, and with most of the corn badly beaten down and much overripe, there was employment for all prepared to do a 'fair day's work'. In Leicestershire, some farmers were even obliged to advertise for harvesters, in some instances offering as much as 30s. an acre for cutting wheat. Employers were recommended to use unemployed building labourers to break strikes and, as a more permanent solution, to introduce machinery.⁽¹⁸⁾ By comparison, 1860 was an uneventful year, the harvest being later and the ripening process more gradual. Derbyshire farmers were then actually con-

gratulating themselves that men could be got for money, while on the Isle of Ely migrant harvesters were much more plentiful than previously. (19) The improvement lasted through 1861 and 1862.

In the East Riding harvesting was reported 'easy work in comparison to what it frequently is; hand reapers have been abundant'. In Berkshire 1862 promised 'more moderate terms [wages] than for some time past', while in Lincolnshire Irish labourers were reported to be again very numerous. (20)

The market tightened again in 1863. A spell of fine weather at the start of the harvest created scarcities in Yorkshire and compelled Berkshire farmers to give 'full prices' where earlier they had anticipated wages being lower than in previous years. (21) 1864 was another crisis year, in which an exceptionally dry summer coincided with an upswing of the trade cycle. (22) In most respects, the harvest of 1866 resembled those of 1859 and 1864, with many reports of rapid and convergent crop ripening, shedding corn, too few labourers, strikes and high wages. Oxfordshire farmers discovered yet again that to keep their young men in summer they had to provide them with more employment during winter. In Norfolk the general complaint was less about the price of labour than its physical scarcity, an apparent contradiction explained by the facts that the harvest 'contract' was agreed two months before the harvest, that the harvest was chiefly performed by resident workmen and their families and that during the harvest itself there was not, as in other areas, a large reserve supply of 'floating' and migrant labour on which to draw during emergencies. (23) In 1867 the labour supply position improved in north Britain but was still tight in the south and east. Hands were scarce on the East Anglian Fens, in Berkshire ('scorched and shrivelled' corn and much shedding),

and in Surrey (serious crop lodging). In this year the Commander in Chief of the Horse Guards created a precedent by allowing the rank and file to assist in the harvest, should local farmers require their services.⁽²⁴⁾ The same broad regional pattern obtained in 1868 - labour being well-supplied in the north but scarce in the south. In Surrey and Hampshire workhouse inmates were drafted into the harvest field.⁽²⁵⁾ The period ended, however, on a quiet note with smooth and unhurried harvests made possible by kinder weather conditions and much increased supplies of labour.⁽²⁶⁾

During the Napoleonic Wars and between 1834 and 1846 the chief factor making for deterioration had been increased crop demand rather than any actual diminution in harvest labour supply. Now, however, pressure was exerted from both directions. The demand factors have already been examined (supra, pp.43-51), and it was demonstrated that although the national corn acreage may have declined slightly between 1846 and 1870, harvest labour requirements continued to increase, due partly to rising yields but largely to the 'compression' effects of larger acreages of root, fodder and vegetable crops on harvest work schedules. Weather was now able to raise harvest labour requirements in two ways. For not only did dry hot weather continue to promote rapid and convergent ripening, but also, and as a consequence of higher yields and more prolific straw growth, wet windy weather was now more often able to lodge and tangle the crop. Particularly significant is that harvest labour shortages during this period were as often attributed to poor crop condition as to rapid ripening.⁽²⁷⁾

Fairlie's contention that British corn output fell sharply between the Repeal of the Corn Laws and 1870 must be rejected, not only because of the weight of directly conflicting evidence (supra pp.43-51)

but also, and more crucially, because it fails to account for the recurrent harvest labour shortages and the high volume of labour-saving innovation which occurred during this period. For if, as Fairlie implies, harvest labour requirements fell by upwards of 25 per cent, and if, harvest labour productivity improved by say 30 per cent (In 1870 25 per cent of the national corn area was cut by machine [a post 1850 innovation] and perhaps 35 per cent by the only very recently introduced scythe and heavy hook), then it can be calculated that between 1846 and 1870 the national harvest labour force must have declined by at least 40 per cent, a degree of deflection which is quite untenable.

The national harvest labour force probably reached its peak in the late 1840's. Till then, any reduction in the numbers of part-time industrial harvest workers had been more than offset by the expansion of other categories of harvest worker, notably full-time male agricultural workers, part-time female and child workers, and not least, Irish migrant workers. After 1850, however, all categories of worker began to shrink. The full-time agricultural labour force declined by 15-20 per cent between 1850 and 1870. The reduction in numbers of casual and migrant harvest workers was of an even greater order. There has already been noted (supra, Chapters V VI, VII) the very substantial slowing down of Irish migrant harvest labour flows after the Famine, the growing disinclination of country women to participate in field work, the increasing preference of casual workers for summer work outside agriculture, and the rapidly diminishing supply of urban and part-time industrial harvest workers. (28)

Many factors contributed to this decline. Most were already operative in the '30's and '40's, but after 1851 their influence on rural migration became more positive and their effects on the structure of employment more decisive. The key exogenous factor was emigration. Statistics of emigration, especially for the first half of the nineteenth century, are unsatisfactory, but it is clear that between 1845 and 1855 emigrants almost exceeded the natural population increase, and that even discounting the Irish component, the volume of outflow over the third quarter of the century was wholly unprecedented.⁽²⁹⁾ Including Irish, total numbers leaving Britain are estimated to have increased from .75 million in 1835-45 to 2.75 million in 1845-55, while between 1853 and 1870 numbers of English emigrants alone exceeded 1.0 million.⁽³⁰⁾ What proportion of the emigrant host was comprised of agricultural workers is difficult to determine. Before 1835 their contribution may have been small relative to that of small farmers, tradesmen and artisans, but the situation had changed radically by 1850. As contemporaries complained, the chief demand in the New World was for brute strength, for simple 'clodhoppers', and it was at this category of emigrant that the free and assisted passages were especially aimed. New South Wales, for example, offered to transport farm labourers and their families for £1, compared to £5 for mechanics and tradesmen.⁽³¹⁾ According to one estimate the agricultural class made up at least half of the emigrant host between 1847 and 1857. In the last year, of the 35,000 emigrants assisted by the Emigration Commissioners, 22,00 came off the land.⁽³²⁾

The most important factor, however, was the continuing

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rapid expansion of the 'new' industries, which now came into their own as the leading sectors of economic growth, assuming the role which, until the 1830's, had lain with the 'light' manufacturing industries. The effect of this development on the industrial distribution of the national workforce is shown below.

OCCUPATIONAL STRUCTURE AND JOB FORMATION IN GREAT BRITAIN, 1851 - 71 (33)

(in millions)

	<u>MALES</u>							<u>FEMALES</u>						
	1851	% of total work-force	1871	% of total work-force	% change 1871/51	No. of new jobs created	% of new jobs created	1851	% of total work-force	1871	% of total work-force	% change 1871/51	No. of new jobs created	% of new jobs created
Domestic Service	.193	3.0	.230	2.8	+19.2	.037	2.2	1.135	40.0	1.678	46.0	+47.8	.543	66.4
Mining & Quarrying	.383	5.9	.517	6.3	+35.0	.134	8.0							
Metal Manufacture	.536	8.2	.869	10.6	+62.1	.333	19.9							
Building & Construction	.496	7.6	.712	8.7	+43.6	.216	12.9							
All Transport	.433	6.6	.694	8.4	+60.3	.261	15.6							
Railways	.029	.4	.096	1.2	+31.0	.065	3.9							
Roads	.139	2.1	.229	2.8	+64.8	.090	5.4							
Sea, docks & canals	.153	2.3	.191	2.3	+24.8	.038	2.3							
Conventional * industry group	1.465	22.4	1.480	18.0	+ 1.0	-.015	-1.0	1.174	41.5	1.417	38.8	+20.7	.243	29.7
Total Occupied	6.545		8.220		+27.5	1.675		2.832		3.650		+29.5	.818	

* = Textiles, clothing, ceramics, wood products, paper and printing, skins, hair, leather, chemicals.

Thus after 1850 both the range and geographical spread of suitable alternative employment opportunities for agricultural workers grew apace. In the South Wales metallurgical industries, for example, the ratio of unskilled workers to skilled workers was about 4:1.⁽³⁴⁾ In the Midlands, coal output, chiefly from new mines, almost doubled between 1854 and 1870,⁽³⁵⁾ while further north in the Cleveland district of the North Riding, iron ore expanded at an average rate of 20 per cent per annum between 1856 and 1870, a development which profoundly affected the rural labour market between the Tees and Humber.⁽³⁶⁾

The third quarter of the nineteenth century witnessed a dramatic increase in social overhead investment, chiefly in building and public works. According to Lewis's 'all towns' index, numbers of new houses constructed rose by almost 50 per cent from 1850-59 and 1860-69.⁽³⁷⁾ Investment in non-residential building and in public works was even more vigorous. During this period many town and city centres were redeveloped (the landscape of Central London, above and below ground, was virtually transformed by the Embankment, a new Palace of Westminster, new city office blocks and by the underground railway), while there occurred, too, a tremendous expansion in the public utility industries (gas, water and sewerage), all of which required large numbers of unskilled manual workers. There was similarly impressive activity in dock and harbour development.⁽³⁸⁾

The railways continued to generate employment. Numbers engaged in construction never again exceeded their pre- 1850 levels, but in most years they averaged 40,000 and greatly exceeded this figure during the 'extension boom' of 1864-7 when over 2,000 miles of new line were opened. More important, however, was the

growth of permanent railway employment, which expanded from 47,000 in 1847 to 127,000 in 1860. Outside the footplate and workshop grades agriculture provided most of the operating labour. In 1867, Sir Rowland Hill claimed that at 15s. per week commencing wage, the railway could obtain from the low-wage agricultural districts as many men as it required, but it is clear that the supply was decidedly less elastic than it had been a decade earlier. (39) For the brighter village lads the police force offered an attractive alternative career. (40) The less ambitious often capitalised on their farm experience to obtain work in town stables or as dray men. For country girls, domestic service offered the best and surest escape route. Between 1851 and 1871 the number of female domestic servants grew by more than half a million; in the latter year over 17 per cent of 'general servants' were employed in London. (41)

The impact of these developments was felt, albeit unevenly, in all areas of Britain. In western and northern Britain, the chief source areas of migrant harvesters, absolute depopulation set in soon after, and in parts of Wales and the Scottish Highlands even before 1850. (42) South Britain, the Midlands, South Wales and the London area provided new focal points for migration. Between 1851 and 1871 the combined population of Birmingham, Leicester and Nottingham increased by 175,000, that of Glamorgan by 166,000 and that of London by a massive 845,000. (43) The tables below demonstrate the dramatic increase of the rural migration rate of southern and eastern England after 1850.

LOSSES BY MIGRATION OF RURAL 'RESIDUES' IN ENGLAND AND WALES, 1841-1871. (44)

	<u>1841/51</u>	<u>1851/61</u>	<u>1861/71</u>
Northern Counties	158770	229368	235510
Southern Counties	284400	513205	429529
TOTAL	443170	742573	683031

PERCENTAGE INCREASE IN RURAL MIGRATION RATES, 1841-1871.

	<u>1851/61</u> <u>cf 41/51</u>	<u>1861/71</u> <u>cf 41/51</u>	<u>1851/71 - 61/71</u> <u>cf 41/51</u>
Northern Counties	44.4	48.3	46.3
Southern Counties	80.5	51.0	65.8
TOTAL	67.9	54.1	61.0

A more detailed regional breakdown of these data reveals, predictably, that the rate of defection was higher in northern than insouthern England. Most surprising is that it was highest of all in eastern England despite the region's relative remoteness from large centres of population. A further interesting feature is that over the country as a whole migration was rather faster in the '50's than in the '60's. This trend was reversed, however, in extreme south-west England (due perhaps to the decline there of the mining industry), the east and west Midlands, the English

Marcher Counties and south-west Wales.

REGIONAL RURAL MIGRATION RATES, 1851/71 cf. 1841/51

	%
National Average	61
Northern England	79
Eastern England	145
West Midland England (Marcher Counties)	61
South Central England	58

IV

A very important feature of the mid-Victorian farm labour market was its increasing sensitivity to seasonal and cyclical fluctuations in the level of off-farm employment. Improved communications; the railways, the penny post and later the electric telegraph; greater literacy, and with the abolition of the stamp duty, the increased circulation of local newspapers, all made for a speedier diffusion of knowledge about job opportunities in the urban and industrial areas.⁽⁴⁵⁾ The chief determining factors of the volume and direction of rural migration flows were, over the shorter run, the high summer demand for labour in the fast-growing 'outdoor' industries, e.g. building, construction and transport, and over the longer run, the trade cycle, which regulated the stock of employment opportunities in the industrial sector. There was a growing tendency for the young farm labourer to choose his area

of employment, agriculture or industry, according to the season and the state of the trade cycle. Jefferies said of him, disparagingly;

'The young labourer, who knows that he can get good wages wherever he likes to go, has become a bit of a wanderer. He roams about, not only from village to village, but from scounty to county....He does not care to marry and to settle and tie himself to the routines of labour....he prefers to be free, so that when harvest comes he may go where wages chance to be highest.(46)

In Warwickshire and Oxfordshire there were many young men who eschewed 'regular work', who went away each summer to the coal mines and iron works or to the railways. By the mid-1860's Oxfordshire farmers, having experienced at least two harvests in which large quantities of corn had been lost for want of hands, were trying to check the seasonal outflow of labour.(47) Better, it was said, to spend £100 extra on wages in winter than to risk the losing of £200 of corn in summer.(48) Such measures were not, however, always effective. Wiltshire farmers complained bitterly that they had been made a convenience of, the man staying for the winter when his services were of little use, and leaving in the summer when he was most required.(49)

Upswings of the trade cycle had the predictable, but now more accentuated effect, of speeding up the outflow of all categories of rural migrant, the seasonal, the temporary and the permanent. In the downswings not only was the outflow checked, but large numbers of 'temporary' migrants returned home. The discontinuities were exacerbated by the slow up-take of labour saving methods during the upswings and by technological unemployment during the downswings. Most seriously affected, of course, were those farmers who depended heavily on casual and migrant harvest

workers. (50) Harvest labour supply tended to fluctuate with, though to lag slightly behind, the movements of the trade cycle. Hughes has postulated for the 1850's the following periods of high-activity: mid-1852 - late 1853, early 1855 - late 1857, early 1859 - mid-1860. (51) The labour supply situation was aggravated in 1853-6 by the Crimean War, which at its peak absorbed over 125,000 men. Indeed, throughout the war, a large gap yawned between the numbers of men budgeted for and the army's actual strength, while the militia were even more seriously below establishment. 'Our prosperity', complained Prince Albert, 'is our undoing'. (52) The '60's are more problematical, first, because the trade cycle history of the decade has not yet been properly worked out, and second, because it is difficult to assess the effects of the building and railway construction booms (1862/3 - 1867/8) on temporary migration and cyclical unemployment. (53) The easier harvests of 1860 - 62 and the hurried harvests of 1863 - 66 appear to have followed the movements of the trade cycle, but with the difference that after the 1866 crash the harvest labour supply position in south Britain did not improve until 1868-9, compared with 1866-7 in north Britain. The lag can only be explained by the fact that activity in building and railway construction, industries which had a greater influence on temporary migration in south than in north Britain, held up longer than that in mining and manufacturing industry.

The operation of a two-way flow of labour between agriculture and industry is especially well documented for the years 1864-70. Many young farm labourers who had migrated to industry in the boom years 1864-66, returned to their villages during the slump of 1867-70 'sadder and wiser men'. (54) Yet though glad of extra

labour, probably few farmers regarded it as permanent. Rather they saw it as a temporary phenomenon which would hold only until the next 'revival of speculation will again drain the agricultural districts of their labour supply'.⁽⁵⁵⁾ The slump in London resulted in labour being more abundantly supplied in south Norfolk in 1867 than in any year since 1862, while in the Horsford district some labourers may have returned from as far away as northern England.⁽⁵⁶⁾ In Berkshire, where previously young men had often broken their hiring contracts to find work 'up the country', it was reported in 1868 that, 'since the stoppage to a great extent of engineering works, the discharge of soldiers and the railway companies not being very prosperous, there has been rather a reaction, and this winter we have seen more young men out of employ than for some time past'.⁽⁵⁷⁾ The turning of the 'labour current' similarly resulted in a relative abundance of labourers in Surrey, while in Worcestershire, in 1870 there were reportedly 'more young men standing idle about the streets than were ever seen at this season [mid-summer] of the year'.⁽⁵⁸⁾

V

As the numbers of casual and migrant workers diminished so the national harvest workforce became more exclusively comprised of resident full-time agricultural workers and their families, to the extent that by 1870 they were responsible for all but a small proportion of total harvest work output. So far, though, we have suggested only that the full-time national agricultural labour force declined substantially between 1850 and 1870.

According to the official Census the total hired farm workforce in Britain fell by 22 per cent (by .313 million) between 1851 and 1871, but such are the inconsistencies of the data that this figure cannot be taken at face value. There exists, for example, such extreme disparity between the trends shown by the Scottish and English Censuses that we can only assume the bases of enumeration to have been quite different. Similarly inexplicable is the doubling of shepherds and the halving of female indoor farm servants in England and Wales between 1851 and 1861. Most disturbing of all is that numbers of male outdoor labourers are stated to have increased between 1851 and 1861 but to have declined by 16 per cent between 1861 and 1871, a chronology which is wholly at variance with the overall trend of rural migration, which, according to Cairncross, was actually higher (by 9 per cent) in 1851-61 than in 1861-71. (59)

It has often been claimed that the census statistics seriously exaggerate the decline. Ogle, writing in the 1880's, went a full stage further by suggesting that the male agricultural labour force of England and Wales did not decline at all between 1851 and 1871, a contention which while easily enough dismissed still serves to expose a further, and indeed, very fundamental weakness of the occupational census returns. (60) The basis of Ogle's argument is that in 1871 a large number of agricultural labourers were wrongly enumerated under the non-agricultural head of 'labourers branch undefined' (i.e. casual labourers), thereby artificially deflating the numbers of male agricultural workers in 1871 and wrongly suggesting that they declined between 1861 and 1871 (the decade in which the whole of the 1851-71 decline was recorded). For, he argued, how else was it possible to reconcile a sudden

190,000 reduction in male agricultural labourers with an equally sudden 203,000 increase in casual labourers. The point is well made. Indeed, the Census Commissioners themselves were of the view that, 'notwithstanding the implicit instruction on the subject to householders and enumerators, it is not impossible that many agricultural labourers returned themselves simply as [branch undefined] labourers'.⁽⁶¹⁾

However, against the possibility of a really serious error of classification in the 1871 Census, there are the following objections:-⁽⁶²⁾

(a) that as both categories of labourer, agricultural and 'branch undefined' had appeared on every enumeration schedule since 1841, there would appear no random reason why men who had apparently described their occupation correctly at three previous counts should have failed to have done so in 1871.

(b) that casual [branch undefined] labourers were much more numerous in the industrial counties than in the agricultural counties. In 1861, for example, London, the Home Counties, South Wales, Staffordshire and northern England (excluding the North and East Ridings) contained 60 per cent of casual labourers as against only 25 per cent of agricultural labourers.

(c) that over half the 203,000 increase in casual labourers between 1861 and 1871 was recorded in the industrial counties. If, as Ogle has suggested, all casual labourers were agricultural labourers this would mean:-

(i) that the male agricultural labour force increased between 1851 and 1871

and (ii) that in 1871 the male agricultural labour force in Lancashire, an industrial county, with 750,000 cultivated acres, 65 per cent of them under grass, was 48 per cent larger than in Norfolk, an agricultural county, with over 1.0 million cultivated acres, 75 per cent of them under arable. (63)

Moreover, in 10 of the 17 English 'agricultural' counties the increase in casual labourers between 1861 and 1871 was below the national average, and in one, Huntingdonshire, their numbers declined.

So much than for Ogle. But there still remains to be explained the 65 per cent increase in casual labourers and the 16 per cent reduction in male agricultural labourers between 1861 and 1871. The root of the problem, and the factor which possibly explains the whole anomaly, is that in 1871, a large number of agricultural (and industrial) labourers, when asked to define their employment more precisely, deliberately described themselves as labourers 'branch undefined'. A further pointer is that the occupational censuses record an actual fall in numbers of branch undefined labourers between 1841 and 1861, whereas we would normally expect that the rapid post-1840 growth of the 'casual employment' industries (building, construction etc.) would have resulted in their increase. Indicatively, their numbers rose 10 per cent between 1871 and 1881 and by a further 8 per cent between 1881 and 1891. My suggestion is that in 1871 labourers were prompted to define their occupation more on a basis of status than of the industry in which they were currently employed. This would mean that men who were in agriculture in April but who at other times of the year worked as casual labourers in other industries described themselves as labourers 'branch undefined' rather than as agricultural

labourers. By similar logic, non-agricultural workers transferred from a specific into the general category. The conclusion, therefore, is that the 1871 census figures are approximately correct but that the 1851 and 1861 figures require adjustment. The rest of this chapter will be given to making these adjustments. The 'official' and 'adjusted' estimates are detailed in Appendix I.

My first suggestion is that the census statistics do not, after all, seriously overstate the overall reduction in the size of the full time male agricultural labour force in England and Wales between 1851 and 1871, but rather that the decline was more evenly phased over the two decades 1851-61 and 1861-71 than the census figures indicate, in a ratio commensurate with that of the net rural migration rate, i.e. 10 (1851-61) : 9 (1861-71). The Scottish figures leave much to be desired, but the more even spread of the decline of the male 'outdoor' labour force between the two decades suggests that they do not require the same drastic revision.

Two other categories of agricultural worker, female 'outdoor' labourers and indoor farm servants similarly require adjustment. The recorded 49 per cent decline of the British female agricultural labour force between 1851 and 1871 is by any standards an overstatement. It appears, however, to be yet another statistical illusion, in that in 1861 farm 'domestic' servants were more properly distinguished from farm 'agricultural servants' and the former removed from occupational category VIII (Agricultural) and enumerated under occupational category V (Domestic) thus giving the impression of a massive 75 per cent decline of the farm servant class between 1851 and 1871. But it is also clear from the literary evidence that the 'indoor' agricultural servant class was diminishing rapidly, or at least, more rapidly than 'outdoor'

labourers (see, supra, pp.82-3), and that young single girls particularly, preferred domestic work to farm work and town life to country life.⁽⁶⁴⁾ I am going to suggest therefore that the female 'indoor' agricultural labour force in England and Wales fell by 30 per cent between 1851 and 1871 (that is c.30 per cent faster than the outdoor labour force), and that the 1851 census total is adjusted downwards to a point 15 per cent below the 1861 total. Again, the Scottish statistics appear reasonable and will be taken therefore as approximately correct.

We have so far been primarily concerned with the hired farm workforce, but it seems worthwhile to take advantage of the relative completeness of the occupational census statistics for this period to measure change in the size of the total 'active', that is, hired and on-farm, workforce. Notionally, all farmers, farmers' relatives and farm bailiffs were able to engage in the physical work of the harvest, although in practice the proportion which did so may not have been large. This was because:-

- (a) Most larger farmers and farm bailiffs were supervisors rather than manual workers.
- (b) Most small farms were engaged in pastoral and vegetable farming thus most 'working' farmers and their families had limited opportunity to engage in harvest work.
- (c) That most farmers' wives and female relatives would have engaged chiefly in domestic duties, in indoor farm work (e.g. cheese and butter making).

Numbers of farmers remained more or less constant between 1851 and 1871 at about 250,000. 'Farmers' relatives' (sons, daughters, nephews, nieces etc.) were so heterogeneous as to render it

extremely difficult to generalise about their exact status within the farmhouse. In England and Wales their numbers declined by 17 per cent between 1851 and 1871, which is not unreasonable in view of the likelihood that increasing numbers of them preferred employment outside agriculture, particularly those attached to the smaller farm. Rather surprising, though, is that the decline was so much greater in 1851-61 (19 per cent) than in 1861-71 (4 per cent), which suggests that in 1861 large numbers of farmers' relatives, like indoor farm servants, were removed to another more domestic category. The Scottish figures are even more anomalous, for after a slight fall between 1851 and 1861, numbers of farmers' relatives increased by a spectacular 180 per cent between 1861 and 1871. Again we must assume a reclassification of status. Similarly difficult to explain is that the ratio of farmers' relatives (including wives) to farmers in 1871 was twice as high in Scotland as in England and Wales. The England and Wales ratio of 1.3:1 seems the more realistic, as also does a 17 per cent decline in farmers' relatives (excluding wives) between 1851 and 1871. I will assume, therefore, that in 1851 farmers/farmers' relatives ratios, both male and female, were the same in Scotland as in England and Wales, and subsequently declined at the same rate.

A summary of changes in the size of the 'hired' and 'active' farm workforces is tabulated below. These by no means represent an exhaustive revision, which is outside the terms of reference of this thesis. Many minor anomalies remain unexplored, while some of the revisions, particularly that for farmers' relatives, are so crude that they can do little more than advance us to a point further along the line between absurdity and elusive statistical truth. My revised estimates suggest that between 1851

and 1871 the total hired farm labour force in Britain fell by c. 17 per cent and the total 'active' farm workforce by c. 14 per cent. (66)

When contrasted with the rapid growth of the previous half-century these reductions must be regarded as very substantial. The effects on harvest field populations was of critical importance, as was too, their effect on total supply of effort, for it was labourers rather than farmers and young rather than old who headed the rural exodus.

CHANGES IN THE SIZE OF 'HIRED' AND 'ON FARM' WORKFORCES IN BRITAIN, 1851-1871, Revised Estimates.

SUMMARY TABLE (from Appendix I)

	<u>% Change 1871 cf. 1851</u>
'Hired' males	-17.3
'Hired' females	-24.7
<u>TOTAL 'HIRED' WORKFORCE</u>	-18.0
'On-farm' males	-11.0
'On-farm' females	+2.6
<u>TOTAL 'ON-FARM' WORKFORCE</u>	-5.0
 <u>TOTAL 'ACTIVE' WORKFORCE</u>	 -13.2

1. E. J. T. Collins, 'Labour Supply and Demand in European Agriculture, 1800-1880', in E. L. Jones & S. J. Woolf, eds, Agrarian Change & Economic Development: The Historical Problems (1969), pp. 71-4.
2. As already pointed out, reaping machinery was at the experimental stage in the 1780's, but despite the high standards of mechanical reliability reached by some of the post-war designs (notably Bell's and Mann's) it failed to catch the popular imagination. The machines on view at the Great Exhibition were, in fact, American (Hussey and McCormick) and not British.
3. J. Caird, English Agriculture in 1850 & 1851 (1852), p. 518.
4. Reading Mercury, 10 Aug 1872. Contrary to the conventional view there were a number of noteworthy agricultural labourers' strikes prior to 1872: Farmers Magazine, April 1853, p. 353; Sept 1853, p. 201; Nov 1853, p. 431; April 1866, p. 334; Agricultural Gazette, 28 May 1866; Mark Lane Express, 8 Aug 1853, p. 2; R.C. Employment (1867), First Report (1868), App. pt II, p. 11; Second Report (1869), App. pt II, p. 528; R. C. Russell, The Revolt of the Field in Lincolnshire (n.d. Lincs. County Comm., NUAW), p. 7; Countryman LVI (1959), pp. 622-4; Reading Mercury, 28 May 1859. Interestingly, James Edwards, the farm workers' M.P. left his employers in 1866 because they were unwilling to give him more for his harvest. From Crow Scaring to Westminster (1922) pp. 27, 29.
5. The contention is that between 1853 and 1875 British arable farming experienced a 'costs squeeze' from which it attempted to escape by the classical response of increased output at lowering unit cost. This did not, of course, go altogether unnoticed. E.g. Farmers Magazine, March 1860, p. 220; Aug 1866, p. 170; 26 Nov 1866, p. 1127; 2 Aug 1873.
6. A. Burnett, 'The Comparative Economy of Grazing & Corn Growing', J. Bath & West, IX (1861), p. 318 and passim, esp. pp. 346-7.
7. Agricultural Gazette, 12 Dec 1859, p. 1000.
8. Farmers Magazine, July 1874, p. 47; R.C. Agriculture (1867), Fourth Report, App. pt I, p. 55. For a detailed account of the labour market in the early 1870's, and farmers' responses to the threat of trade unionism, see, F. Clifford, 'The Labour Bill in Farming', J R A S E, 2nd ser, XI (1875), pp. 98-111. For conditions in Scotland, see, R.C. Agriculture (1867), Fourth Report, App. pt I, pp. 32-136 passim.

9. B. R. Mitchell & P. Deane, Abstract of British Historical Statistics (Cambridge, 1962), pp. 348-50; W. Hasbach, A History of the English Agricultural Labourer (1908), pp. 251, 254; R.C. Labour (1894), V, pt II, pp. 303-4 (for Scotland). Other evidence for the tightening labour market after 1850 can be found in E. L. Jones, 'The Agricultural Labour Market in England, 1793-1872', Econ. Hist. Rev., 2nd ser, XVII (1964), pp. 327-38; Agricultural Gazette, 21 July 1856, p. 493; 11 Nov 1871, p. 1468; 28 June 1873, p. 900; C. S. Read, 'Recent Improvements in Norfolk Farming', J R A S E, XIX (1858), pp. 291-2; Farmers Magazine, Sept 1859, p. 265; April 1860, p. 354; R.C. Employment (1867), Second Report (1869), App. II, pp. 227, 523; C. Cadle, 'The Agriculture of Worcestershire', J R A S E, 2nd ser, III (1867), p. 449.

10. Agricultural Gazette, 27 April 1850, pp. 266-7; 30 April 1860, pp. 392-3; 17 Aug 1867, p. 863; 28 Aug 1867, pp. 888-92. The 1850-1860 surveys were retrospective, the 1867 survey because of its timing probably refers chiefly to that same year. See also, J. C. Morton, Hand Book of Farm Labour (edn, 1868) which summarizes the wage trends derived from this data.

11. Farmers Magazine, Feb 1853, pp. 134-40; and also, April 1853, pp. 353-8; May 1853, pp. 391-2; June 1853, pp. 517-9.

12. Farmers Magazine, Sept 1853, p. 201.

13. ibid, Sept 1853, p. 201. It was claimed in Sept 1853 that 'There is no longer a merit in employing labourers. The difficulty is where to find them', loc.cit, p. 211. For other 1853-3 comment, see, T. Tooke & W. Newmarsh, History of Prices, V (1857), p. 284-5; Farmers Magazine, Feb 1852, pp. 136-9; Sept 1853, pp. 200-06, 277; Agricultural Gazette, 15 Jan 1853; Mark Lane Express, 8 Aug 1853; 26 Dec 1853, p. 9; Lawson's Merchants Magazine, I (1852), p. 325.

14. Agricultural Gazette, 15 Jan 1853.

15. Farmers Magazine, Oct 1853, p. 53. [see also, supra, fn.13]

16. Berkshire Chronicle, 12 Aug 1854; 2 Sept 1854; Hereford Journal, 30 Aug 1854.

17. Berkshire Chronicle, 12 Sept 1857; Farmers Magazine, Sept 1856, p. 266; Oct 1857, p. 368.

18. Farmers Magazine, Sept 1859, p. 190; Reading Mercury, 6 Aug 1859; Farmers Magazine, Sept 1859, p. 265. See also, Agricultural Gazette, 12 Dec 1859, p. 1000; 2 Jan 1860, p. ; 16 Jan 1860, p. 34; Farmers Magazine, Aug 1859, p. 172; Sept 1859, p. 263; Oct 1859, pp. 313-4; Reading Mercury, 13 Aug 1859; 27 Aug 1859; 10 Sept 1859.

19. Farmers Magazine, Nov 1860, p. 406; Sept 1860, p. 278. See also, Reading Mercury, 15 Sept 1860.
20. Reading Mercury, 7 Sept 1861; 16 Aug 1862; 13 Sept 1862. See also, Reading Mercury, 10 Aug 1861.
21. Reading Mercury, 5 Sept 1863; 12 Sept 1863. See also, Reading Mercury, 8 Aug 1863; 15 Aug 1863.
22. Agricultural Gazette, 13 Aug 1864; Farmers Magazine, Oct 1864, p. 359; Reading Mercury, 20 Aug 1864.
23. Agricultural Gazette, 1 Oct 1866, p. 934; Farmers Magazine, Nov 1866, pp. 367-8. See also, Farmers Magazine, June 1867, p. 473; Reading Mercury, 28 July 1866; Agricultural Gazette, 11 May 1867, p. 500.
24. R.C. Employment (1867), First Report (1868), App. pt II, p. 293; Reading Mercury, 14 Sept 1867; Farmers Magazine, Sept 1867, p. 269; D. G. F. Macdonald, Hints on Farming (10th edn, 1868), p. 126. See also, Cadle, loc.cit, p. 449, which notes that in the hay harvest mowers were so scarce that not only were wages high, but they 'insisted on being conveyed in a fly to their work'.
25. Reading Mercury, 15 Aug 1868. See also, Farmers Magazine, Aug 1868, pp. 169, 172; Sept 1868, p. 268; Reading Mercury, 22 Aug 1868.
26. Reading Mercury, Aug 13, 20, 27, 1870; Farmers Magazine, Aug 1869, p. 176. However in 1869 during a fine spell in early September, there were reports of labour scarcities in Suffolk. Reading Mercury, 4 Sept 1867.
27. See, infra, pp. 255-256.
28. See, supra, Chapters V, VI, VII.
29. S. G. Checkland, The Rise of Industrial Society in England, 1815-1885 (1964), pp. 33-5.
30. Checkland, op.cit, pp. 34-5; Mitchell & Deane, op.cit, pp. 47-8.
31. E. Spender & T. W. P. Isaac, 'The Labourer', J. Bath & West, new ser, VI (1858).

32. 'The Present Position of Agriculture', Quarterly Journal of Agriculture, XXI (1857-9), pp. 547-8. For other comment, see, S. C. Johnson, A History of Emigration (1913), pp. 47-9; W. A. Carrothers, Emigration from the British Isles (1929), pp. 212, 216-8 (for 1850's and 1860's); C. T. Smith, 'The Movement of Population in England & Wales in 1851-1861', Geographical Journal, CXVI (1951), p.205; J. Mortimer, 'The Agriculture of Devon', J. Bath & West, XVIII (1870), pp. 94-5. In 1850-1 Caird noted 'a prevalent desire for emigration' on Salisbury Plain, op.cit, p. 85. Farmers came eventually to dread the word 'emigration', e.g. R.C. Employment (1867), Second Report (1869), App. pt II, p. 22.

33. As calculated from Census data reproduced in Mitchell & Deane, op.cit, p. 60. The changing industrial distribution of the national labour force is noted by P. Deane & W. A. Cole, British Economic Growth, 1688-1959 (Cambridge, rev. edn, 1967), but its full implications appear to have been missed.

34. A. H. John, The Industrial Development of South Wales (1950), p. 59. In coal the ratio was 3.5:1 but I am informed by Dr. M. Woodhouse (University of Reading) that ratios increased further as mines became deeper and seams more inaccessible.

35. Mitchell & Deane, op.cit, p. 116. Numbers employed in the Midland-Coalfield doubled between 1864 & 1874 and more than doubled in the South Wales field, ibid, p. 118. In Leicestershire the opening up of new seams in the late 1860's soon had farmers complaining of manpower shortage, as also in Derbyshire. Agricultural Gazette, 30 Nov 1867, p. 1229; Farmers Magazine, May 1867, p. 438.

36. Mitchell & Deane, op.cit, p. 129.

37. J. P. Lewis, Building Cycles & Britain's Growth (1965), pp. 316-7. Alas for non residential construction, the brick manufacturing series stops in 1849.

38. A. K. Cairncross reckoned that London's growth was big enough to dominate urban development in the south. 'Internal Migration in Victorian England', Manchester School, XVII (1949), p. 73. The 1850's and 1860's seem to have seen a building heyday in the market towns - note for example the many corn exchanges erected during this period. Certainly the third quarter of the nineteenth century marked the initial expansion of many of our public utility industries. Consumption of gas increased rapidly after 1850. Clapham estimated that coal used in gasworks increased from .6 million to 8.4 million tons between 1850 & 1885; J. H. Clapham, An Economic History of Britain, II (Cambridge, edn, 1963), p. 105. In dock and harbour development half of government spending in the period 1800-75 occurred between 1850 & 1870. Deane & Cole, op.cit, p. 236. For the expansion, see, Clapham, op.cit, II, pp. 520-4.

39. ibid, II, pp. 201-2; Deane & Cole, op.cit, pp. 232-3; R.C. Railways (1867), Hill's Report, p. 14; E. Hobsbawm, Labouring Men (1964), p. 145; P. W. Kingsford, Railway Labour (unpub. Ph.D. thesis Univ. of London, 1951), pp. 28-9. See also, Clapham, op.cit, II, pp. 129, 234-5.

40. The author seems to recollect Dr. Jessop (source forgotten) stating that in one Norfolk village 303 young men had left to join the police force in as many years, c. 1855-85.

41. Census 1871. R. Jefferies said of country girls, 'their aim is domestic service and they prefer to be engaged in the towns and so it has become quite a complaint among farmers' wives, in many places, that servants are not to be obtained'. Hodge & His Masters (uniform edn, 1949), pp. 234-6, and also, pp. 240-1, 244.

42. In Scotland and Wales, Argyll, Kinross, Perth and Radnor reached their peak populations in 1831, Inverness and Montgomery in 1841, Anglesey, Kirkudbright, Ross & Cromarty, Sutherland and Wigtown in 1851, and Berwick, Brecknock, Caithness, Orkney, Pembroke, Roxburgh and Shetland in 1861. All Irish counties reached their peak populations in 1841. In England, few agricultural counties showed an absolute decline although growth rates were very sluggish. Cambs, Cornwall, Norfolk, Ruts and Wilts showed inter-censal declines. Mitchell & Deane, op.cit, pp. 20-1.

43. ibid, pp. 20-1, 24-7. South Wales exerted a very strong pull on rural populations over a wide area from Pembrokeshire in the west to Gloucestershire in the east. See, T. M. Hodges, 'The Peopling of the Hinterland & Port of Cardiff, 1801-1914', Econ. Hist. Rev., XVII (1947), pp. 62-72; B. Thomas, 'The Migration of Labour into the Glamorganshire Coalfield, 1861-91', Economica, X (1930), pp. 275-94; John, op.cit, passim.

44. Derived from data in Cairncross, loc.cit, p. 83 and passim.

45. One is reminded here of Clapham's memorable statement about the 'thousands of new "Railway Inns", in which, 'the chances of life in the towns where the railway ended, or even across the seas to which the railway led, could be seriously threshed out', op.cit, I, p. 475. Regarding the 'Penny Post', a major argument for its introduction was that it would help iron-out some of the regional imperfections in the labour market: 'We often see poor men travelling the country for work and sometimes they come back and it appears that they have been in the wrong direction', Philatelic Bulletin, Vol 7, no 5 (1970), p. 4. The speed with which labourers could respond to urban and industrial demand for labour was, by the 1860's, quite remarkable. Alas, little is known about the mechanisms of communication, although clearly the factors involved were many and complex. This is very impressimistic, but it would appear that whereas rural migration flows lagged perhaps a year or even two years behind the upturn of the trade cycle in the early 1830's, by the 1860's and 1870's it may only have been a matter of months.

46. Jefferies, op.cit, pp. 230, 236.
47. J. C. Morton, Hand Book of Farm Labour (edn, 1868), p. 72.
48. ibid, p. 72.
49. Jefferies, op.cit, p. 280.
50. E.g. in the London area and the industrial districts of South Wales, Lancashire, Yorkshire and the Clyde Valley where casual labour was quickly absorbed in upturns of the trade cycle, but equally quickly disgorged during the downturns.
51. J. R. T. Hughes, Fluctuations in Trade, Industry & Finance (1960), pp. 28-30. For a less formal summary, see, Checkland, op.cit, pp. 35-51. For building, see, J. P. Lewis, op.cit, pp. 94, 129-36, 316-7. For individual production series (cotton, coal, iron, etc), see, Mitchell & Deane, op.cit, passim.
52. O. Anderson, 'Early Experiences of Manpower Problems in an Industrial Society at War, Great Britain 1854-56', Political Science Quarterly, LXXXII (1967), pp. 527, 539, 541, and passim. For figures of enlistments, see, A Comparative Statement of the Military Forces and of the Population of the British Empire since 1801 (War Office, 1866), pp. 10-13. The navy too was having its difficulties, Checkland, op.cit, p. 35.
53. J. P. Lewis, op.cit, pp. 129-36. Almost 4,500 railway miles were completed between 1860 and 1870, Mitchell & Deane, op.cit, p. 225.
54. Farmers Magazine, Aug 1866, p. 170; R.C. Employment (1867), Second Report (1869), App. pt II, p. 230.
55. C. S. Read, The Education & Wages of the Agricultural Labourer (Norwich, 1867), p. 71.
56. R.C. Employment (1867), First Report (1868), App. pt. II, p. 32.
57. ibid, Second Report (1869), Culley's Report, pp. 401, 406.

58. H. Evershed, 'Report on the Farming of Kent, Sussex and Surrey', J. Bath & West, 3rd ser, III (1871), p. 17; Farmers Magazine, Aug 1871, p. 191. For other examples, see, R.C. Employment (1867) First Report (1868), p. 170; Second Report (1869), pp. 358, 451.
59. Cairncross, loc.cit, p. 83. For general treatment of rural migration trends, see, J.Saville, Rural Depopulation in England & Wales, 1851-1951 (1957), Ch. II, passim.
60. W. Ogle, 'The Alleged Depopulation of the Rural Districts of England', J. Stat. Soc, LI (1889), pp. 205-32. For other criticisms, see, Lord Eversley [Shaw-Lefevre], 'The Decline in the Number of Agricultural Labourers in Great Britain', J. R. Stat. Soc, LXX (1907), pp. 270-6; A. D. Bowley, 'Rural Depopulation in England & Wales', J.R. Stat. Soc, (1914), pp. 609-28.
61. 1871 Census, I, xlv. It notes however that reliable authorities such as C. S. Read and J. Caird, believed there had been a diminution since 1861, ibid, xlv.
62. All subsequent statistical data is derived from the 1871 Census. All original and revised figures are detailed at the end of this section and this tabulation should be referred to.
63. Agricultural Returns 1870.
64. See, supra, Ch. V. Eversley noted of the 1861 Census that he considered it unlikely that as many as 164,000 women were permanently (cf. casually) employed in British agriculture. loc.cit, p. 270.
65. In 1851, out of a total of 225,000 farmers, 92,000 appear to have employed no labour at all and 79,000 less than four (full-time) labourers. Moreover, usually the smaller the farm the smaller the proportion under cereal crops. Included in the 'farmer' total are (a) a small number of 'retired' farmers, who were removed into a separate category in 1881, and (b) farm bailiffs, whose function was in most cases supervisory.
66. The overall figure of 13 per cent is rather lower than Mitchell & Deane's and Deane & Cole's 15-20 per cent.

PART II

TECHNOLOGICAL CHANGE

CHAPTER XII

THE MEANS TO HIGHER LABOUR PRODUCTIVITY: LABOUR DEEPENING:

TECHNOLOGICAL CHANGE.

To have bridged the gap between labour supply and demand there must have occurred over the nineteenth century a very considerable improvement in harvest labour productivity. But equally obvious is that mechanization played only a small part in this process. Reaping machines entered the fray only after 1851, and by 1860 had conquered less than 7.0 per cent, and by 1870 less than 25 per cent of the British corn area.⁽¹⁾

How then without machines, were the labour and labour-cost savings obtained? The first and most obvious shift was to exploit more thoroughly local sources of labour, such as women, children, village tradesmen and industrial workers. The next shift, and one resorted to only when resident workmen and their families were fully employed, was to import labour from other areas. The substitution of piece-work for day-work was a standard device for expanding the supply of effort of the harvest workforce and stabilising and perhaps even lowering costs per unit of work output.⁽²⁾ Piecework was much resorted to during the Napoleonic War years, when Farey condemned the 'thoughtless drones who usually work by the day'. In Scotland, where time-work had been the invariable rule, the practice of 'thraving', that is payment by the sheaf,

was tried out in many areas between 1800 and 1820. In Kincardineshire some farmers went so far as to introduce penalty clauses into the piecework contract. By 1818 many were convinced that 'thraving' was better than the old method of hiring just a limited number of reapers for the whole harvest, because now, they claimed, all within the community, 'young and old', could be put to work.⁽³⁾ After 1815, piecework appears to have lost some of its wartime favour, but already by the late 1830's, it was again extending. McCulloch and Chevalier recommended it as a means of increasing work output, while in the mid-1840's, Raynbird spelt out the advantages of 'measure work' in a detailed article in the Journal of the Royal Agricultural Society.⁽⁴⁾ Increasingly, farmers came to recognise 'the economy of higher wages', the dampening effect of small reward on the degree of effort, and the power of well-paid piecework to raise work tempos and lengthen the working day. In the 1850's it was gaining ground in south and west Norfolk and was already common in the Fens.⁽⁵⁾ In some districts of East Anglia it was not unusual for the whole harvest to be done by the piece, not only the cutting and stooking, but also the carting and stacking.⁽⁶⁾

It was when these shifts had failed, when the supply of labour and effort had become too inelastic, when the offer of higher wages no longer guaranteed a sufficient supply of labour to avert crop losses, that farmers looked to technological change to raise labour productivity and reduce unit work costs. But technological change, when it appeared, took not, as might be expected, the form of mechanization, but rather of switches within hand tool technology. For, as an intermediate step, the scythe and heavy hook replaced the toothed sickle and smooth reap hook as the standard

corn harvesting tool, first for the spring grains, barley and oats, and then for wheat, the bread corn.

Perhaps the most significant feature of this transition was that for some time after 1851 many farmers still preferred to deepen their investment in a seemingly obsolescent range of hand tool techniques than to embrace the reaping machine. This is the more surprising because in 1860 the 'adoption threshold' of the reaping machine was less than 25 acres which made it an economic proposition on at least 100,000 farms. As it was, only an estimated 10,000 machines were then in use, while as late as 1870 there were still many large farms in the corn growing districts of east and south Britain harvesting by hand.⁽⁷⁾ By 1870 reaping machinery had reached a high standard of mechanical reliability, thus discounting the view that the lag was due to purely technical factors.

Why, we may ask, has this hand tool revolution been overlooked by agricultural and technological historians? Three factors may be relevant here. The first is that in this country the study of hand-tool technology had resided chiefly with historians of material culture, who have been more interested in the ethnographic than the economic aspects of hand-tool usage. The only detailed historical work on harvesting technology available in English is Axel Steensberg's Ancient Harvesting Implements, published in Copenhagen in 1843. The second factor is that the contemporary literature on agricultural hand-tools, although in toto quite large, is patchy, widely dispersed, and often of an ephemeral nature. There is for example, no British equivalent of the United States Commission of Labor Report on Hand and Machine Labor (1891), which stimulated Rogin to his classic study of farm

technology in the United States. Or of E. David's Sozialismus und Landwirtschaft (Berlin 1903), Gustav Fischer's remarkable Die Sociale Bedeutung der Maschinen in der Landwirtschaft (Leipzig 1902) or the Italian Confederazione Fascista Lavoratori Agricoltura survey of agricultural hand-tools (1939). Reflective of the strong European interest in farm labour and technology were the centres for Arbeitphysiologie set up in Germany in the 1920's to investigate the ergonomic and working-efficiencies of new and existing types of hand tools. Conversely, in Britain, only J.C. Morton's Hand Book of Farm Labour (1858) examines in detail the role of labour and technology in agricultural production. As John Orr rightly observed, 'there are 'books of the farm', and encyclopedias of agriculture [which] deal more scientifically and exhaustively with the management of a single breed of cattle than they do with the vast subject of agricultural labour, which largely embraces all other treated'.⁽⁸⁾ The contemporary farm engineering literature reinforces this view, in that it reveals on the part of the manufacturers a more or less total disregard for the economics of technological innovation.⁽⁹⁾ Not surprisingly, therefore, Britain lagged badly behind the rest of Europe in the institution of farm machinery censuses; the first detailed count being made only in 1942, as against 1862 in France, 1880 in Belgium, 1882 in Germany and Holland and 1902 in Austria.

The third factor is that perhaps most responsible for the shaping of present day attitudes towards hand-tool technologies. It is simply that the machine has been so much regarded as the chief technological indicator of economic progress that observers have been blinded to the possibilities of improved hand-tool technologies.⁽¹⁰⁾ Conventionally, it is assumed that within recent times no major

change in harvesting techniques occurred until the reaping machine appeared in the early 1850's. Taking an extreme view of inertia, one historian of material culture has concluded that, 'the sickle, scythe and hook existed side by side from antiquity [which] would seem to negative the idea that one was 'better' than the other, and would seem to indicate that the practice of according different treatment to different crops is an old one'.⁽¹¹⁾ Thus is characterised the predilection to regard hand tools rather as relics of pre-industrial cultures than as variable elements within an ever-changing spectrum of techniques. Yet it is a fact that many so-called 'traditional' hand-tool processes still surviving in British agriculture are historically not very old, many of them having originated only after 1800.

Explanations commonly put forward to explain the allegedly slow uptake of labour-saving machinery in agriculture are first, the mechanical unreliability of the early machines, and second, that farming is a conservative trade and that within rural communities resistance to change is always very strong. It can also be observed how in more recent times 'over-civilized people' have tended to regard the countryside as the last bastion against the encroachments of a machine-dominated society.⁽¹²⁾

Thus we are faced with a complex range of pro- and anti-machine prejudices symbolised in different ways by 'primitive' hand-tools. Yet none explains why, in the late 1860's, ultra-progressive farmers who ploughed and threshed by steam still harvested by hand.⁽¹³⁾ Nor can they explain many other complex method mixes in which different scales of technology co-existed side by side on the same farm. Significantly, as late as the 1930's, some 80 years after the introduction of steam ploughs and reaping

machines into British agriculture, Massingham, a lone voice in the wilderness, was demanding a range of simple and inexpensive gadgetry to meet the needs of the smaller farmer.

The notion that British hand-tool technology remained more or less static until late-on in the proto-industrial period loses much of its credibility if we compare the alleged British inertia with the rapid changes within hand-tool technology then taking place elsewhere in Europe and North America. In 1890 no continental European agriculture had yet achieved harvest mechanization ratios of higher than 10 per cent.⁽¹⁴⁾ Indeed, it would appear that except in the New World, where cheap land and scarce manpower favoured extensive farming and the substitution of machinery for hand labour, economic growth in developing agricultures was correlated neither with machines nor other high-cost technological inputs. In Britain, as over most of Western Europe and in Japan, the most successful developments in raising farm productivity were secured initially through the gradual penetration of inexpensive, chiefly biological, innovations.

Conventional attitudes towards 'traditional' work methods have tended, therefore, to detract from the possibility that significant improvements in labour productivity could be secured by the 'intermediate technology' of improved hand-tool methods and without resource to machinery, such as occurred in corn harvesting. We will go on to examine in detail the nature and chronology of hand-tool change in the British corn harvest during the period 1790-1870, starting with a survey of tools and methods followed by an analysis of the incentives and disincentives to innovation.

1. About 10,000 machines were estimated in use in UK in 1861. Assuming 60 acres per season per machine and a corn area of 8.3 million acres (1866 Agricultural Statistics), only 600,000 acres, or less than 7.0 per cent of the total corn area was then harvested by machine. By 1871 numbers of machines were estimated to have increased to 40,000 and, assuming 60 acres per season per machine, the machine-harvested area to 2.4 acres, or about 27.5 per cent of the total corn area. The figure of 60 acres per machine may be rather too high. P. A. David of Stanford University believed it was about 50 acres. If so, the machine-harvested area in 1860 reduces to 5.9 per cent and in 1870 to 23.0 per cent. The problem has been discussed in David's unpublished paper, Mechanization in Nineteenth Century Agriculture - Britain & America, read at The Centre for the Advanced Study of Italian Society Seminar, University of Reading, 20 Feb 1968.
2. For a discussion on the relationship between wage rates and the supply of effort, see, E. H. Hunt, 'Labour Productivity in English Agriculture, 1850-1914', Ec. Hist. Rev., 2nd ser, XX (1967), pp. 290-92.
3. J. Farey, General View Derbyshire (1817), II, p. 192; G. Robertson, General View Kincardineshire (1813), pp. 260-5; J. Headrick, General View Forfar (1813), pp. 316-7; Farmers Magazine, Nov 1818, p. 494.
4. H. Raynbird, 'On measure work', J R A S E VII (1846), pp. 119-42.
5. C. S. Read, 'Recent Improvements in Norfolk Farming', J R A S E XIX (1858), p. 285. And in Worcestershire, C. Cadle, 'The Agriculture of Worcestershire', J R A S E 2nd ser, III (1867), p. 463.
6. J. C. Morton, Hand Book of Farm Labour (1868 edn), pp. 89-90. See also, F. Clifford, 'The Labour Bill in Farming', J R A S E 2nd ser, XI (1875), pp. 98-111, passim.
7. P. A. David calculated that the average 'implied threshold acreage' in England & Wales in 1850-60, was 17.3 acres. The average corn acreage per farm was at least 25.0 acres, and was considerably higher in east and south-east than in north-midland and northern England (43.3 and 44.6 acres, cf. 25.1 and 27.7 acres). loc.cit., 'technical notes', p. T7.
8. J. Orr, Agriculture in Berkshire (Oxford, 1918), p. 139.
9. This suggests that the British agricultural engineering industry was more product than market-orientated. After 1880, it appears to have lost its lead in the European markets partly because of the growth of home industry, but also because it failed to understand the special demands of small-scale farming.

10. Perhaps the classic example is D. Faucher, Le Paysan et la Machine (Paris, 1945), which throughout treats the machine as 'un instrument de conquête'.
11. F. G. Payne, 'The Retention of Simple Agricultural Techniques', Gwerin, II (1959), pp. 129-31.
12. George Orwell recognized the syndrome: over-civilized people, he said, like their rustics simple, 'because they imagine them to be more passionate and primitive than themselves'. Inside the Whale and other Essays (Penguin, 1962), p. 22. Most of the volumes of rural reminiscences written since 1890 stress the more 'traditional' aspects of country life. Especially indicative is that many of them relate to small-farm districts, probably those located within 60-70 miles of London. Mansingham kept the flame alight in the inter-war years with his books on the 'yeoman farmers' of England. After both World Wars thousands of ex-servicemen took to small-holding, predictably in areas where land was cheapest, farms smallest and farm techniques most 'primitive'. This yearning for the simpler life (key phrase, 'close to the soil'), plus the literary aspirations of its adherents has done much to reinforce the view that agriculture is a primitive business. On the other hand it is equally clear that agricultural historians are disinterested in the minutiae of production techniques, while books on machine technology are much more common than those on hand tool technology, and tend to be the preserve of the technologist more than the historian.
13. As Culloy said of Berkshire and Oxfordshire farmers, 'It would certainly strike most [other] farmers with wonderment that the same men who possess the fee simple of a steam cultivator, frequently, nay I say generally in these counties, are the owners neither of a mowing nor a reaping machine'. R.C. Employment (1867), Second Report (1869), App. pt I, p. 81 ; Agricultural Gazette, 24 Aug 1867, p. 890.
14. See, E. J. T. Collins, 'Labour Supply & Demand in European Agriculture, 1800-1880', in E. L. Jones & S. J. Woolf, eds, Agrarian Change and Economic Development: The Historical Problems (1969), pp. 74-94.

CHAPTER XIII

THE COMPETING TOOLS AND METHODS.

The five basic methods of hand harvesting available during the period 1790-1870 were:-

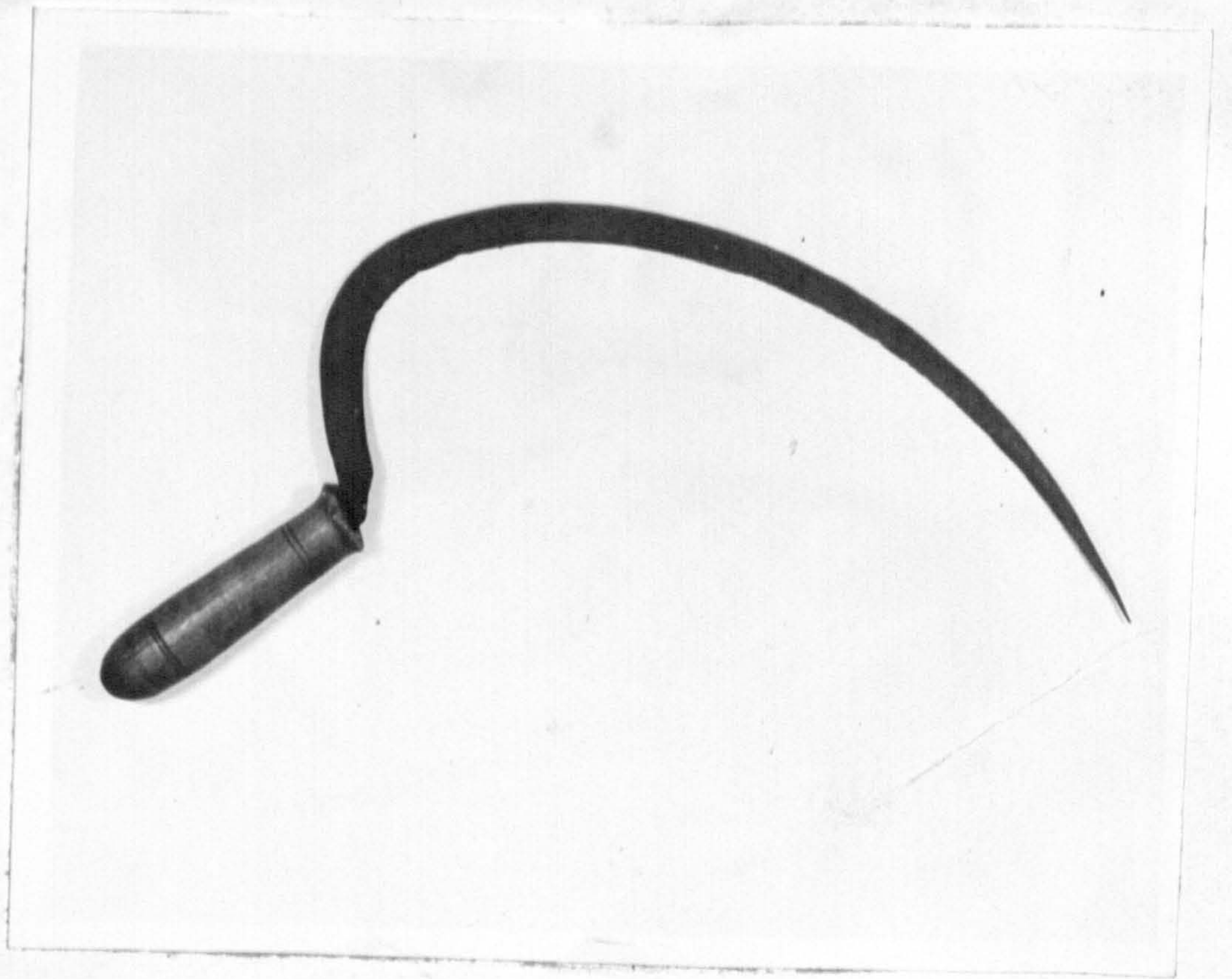
- (1) hand-reaping with (a) the sickle, (b) the reap hook.
- (2) 'bagging' with the heavy hook.
- (3) mowing with the British scythe.
- (4) mowing with the Hainault Scythe.

Each method will now be described and illustrated.

HAND REAPING (see Illustrations 1-7)

There were two basic forms of hand-reaping tool:- the serrated-edged 'sickle', and the smooth-edged 'reap hook', the blade of the former being normally lighter, narrower and more finely drawn out than that of the latter. The two forms were not, however, always properly distinguished. Not infrequently contemporaries would describe all hand-reaping tools as sickles, and all smooth hooks, irrespective of size, modus operandi and function, as reap hooks.

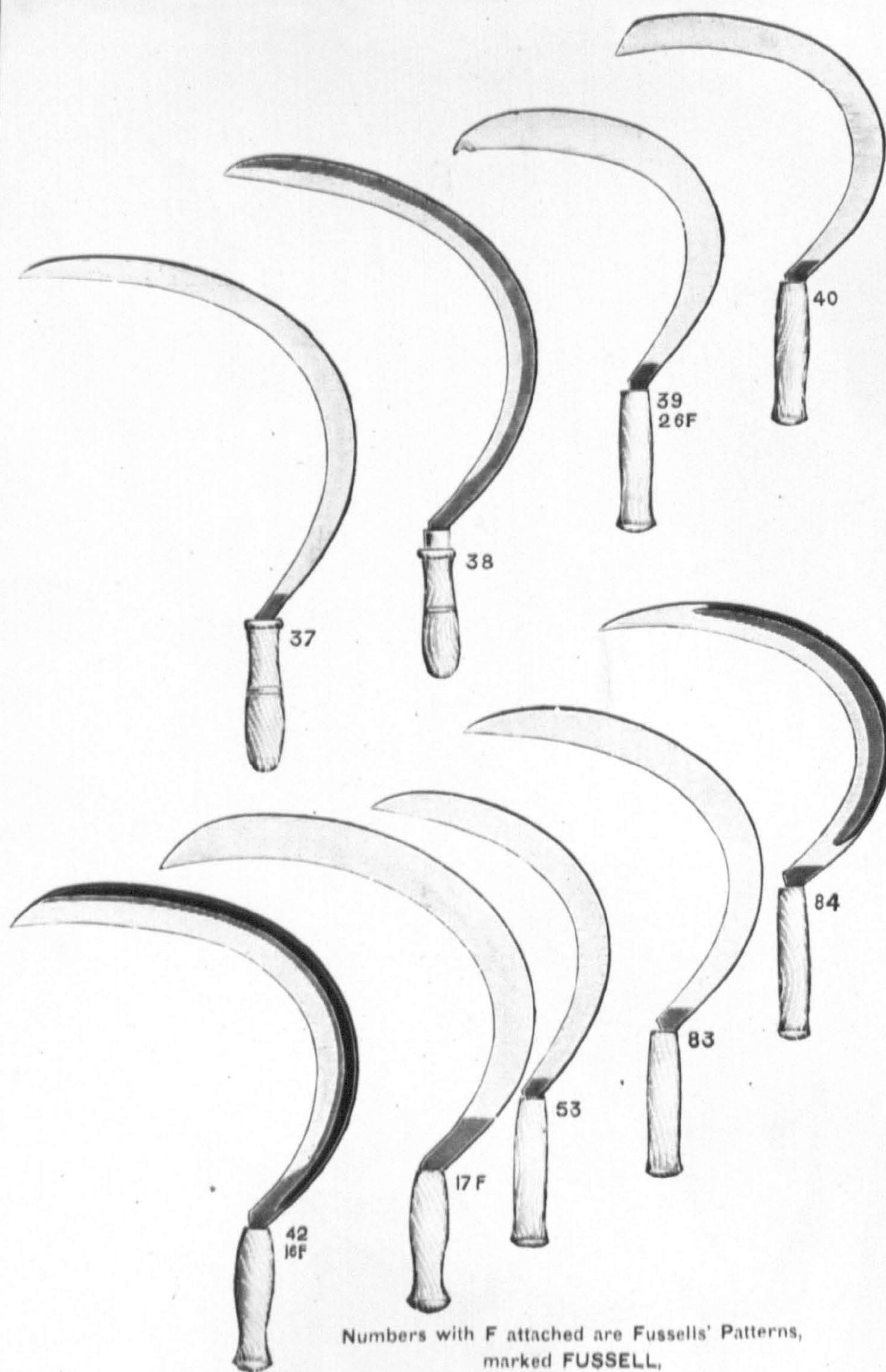
An interesting variation on conventional sickle and reap hook designs was the half-smooth, half serrated 'sickle-hook', patented by a Sheffield edge-tool manufacturer in 1807 and subsequently produced chiefly for the Irish and Scottish markets.



Illustrations 1 & 2

- Top: Serrated Sickle (Museum of English Rural Life photograph 35/61).
- Bottom: Smooth Reap Hook (Museum of English Rural Life photograph 35/3661).

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ENTD AT STATIONERS' HALL

Illustrations 3 & 4 (over)

Showing regional variations in tool design. Ex,
Isaac Nash and Sons (Sheffield) Catalogue (1899).



REAPING HOOKS.

NASH'S		FUSSELL'S												
No.		No.												
37		Bright Pipe Hook		...	...	...	...	...	...	...	...	...	19/6	per doz.
38		Half-Bright Pipe Hook, ferruled handle		...	...	...	...	...	...	...	...	...	19/6	"
				No.	00	0	1	2	3	4	5	6		
39	26	Pembroke Reaping Hook		13/-	14/-	15/-	16/-	17/-	19/-	21/3	23/9			"
40		Carnarvon Grass, broad point		...	...	...	15/-	16/-	17/-	...	...	...		"
				(Narrow Point Pattern, see No. 53.)										
42	16	Bristol Reaping Hook		...	...	...	...	...	...	...	...	...
	17	Fussell's Pattern Bright Bristol Reaping Hook		13/-	14/-	15/-	16/-	17/-	19/-	21/3	23/9			"
53		Carnarvon Grass, narrow point		...	...	...	15/-	16/-	17/-	...	...	...		"
				(Broad Point Pattern, see No. 40.)										
83		South Welsh Reaping Hook		...	...	...	16/-	17/-	18/-	...	...	...		"
84		Llanelly Reaping Hook		...	...	...	15/-	16/-	17/-	...	...	...		"





Illustration 5

Reaping with the smooth reap hook, Northern Ireland,
c. 1950. From the Ulster Folk Museum photograph
Library, WAG 278.

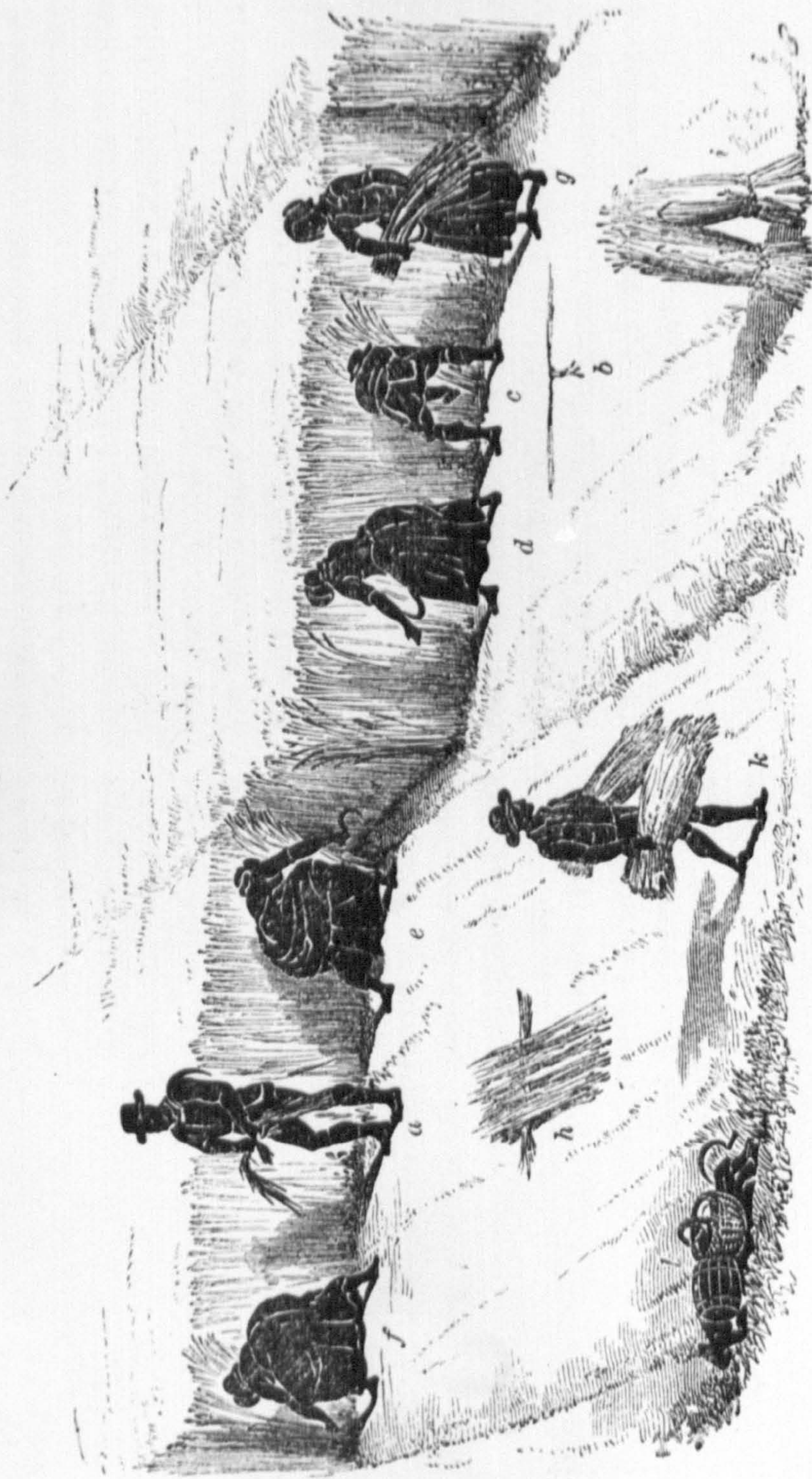


AUGUST.

Illustration 6

Reaping with the serrated sickle. From William Hone,
The Year Book of Daily Recreation and Information (1878),
p.449. (Museum of English Rural Life photograph 35/6299).

Fig. 393.



ARRANGEMENT OF THE REAPERS IN A BAND-WIN.

Illustration 7

A 'bandwin' of reapers, a field organization common in Scotland. Note (1) the two ridges (2) the six reapers (3) the ready-prepared bands at h and b, and (4) the male bandster k. H. Stephens, Book of the Farm (1851 edn.), II, 332.

The bi-form combined the best qualities of the two tools, for while the smooth-edge cut faster, the toothed-edge did not sever the stalks prematurely as it entered the corn, and so was more conserving of grain. (1)

The art of hand-reaping was easily acquired once the initial tedium and physical inconvenience of the operation had been overcome. (2) The usual mode was to crouch down on the right leg, clutch a handful of straw in the left hand, and draw the tool inwards in a cutting or sawing action, as near to and as parallel with the ground as possible. The reaper 'crept' forward into the standing corn, laying handfuls of cut corn onto a ready-prepared band until enough had accumulated to form a sheaf. The sheaf would then be tied up, either by the reaper, or by his assistant. A desideratum of hand-reaping was an even stubble, which required the reaper to bend his body low so as to avoid jerking the tool upwards at the end of each stroke. With the smooth hook there was always the risk, especially when time was short and the workforce badly supervised, that the corn would be slashed down rather than cut by the handful. The essence of hand reaping was gentle meticulousness rather than speed.

The usual practice was to cut the stem four or five inches from the ground, but in parts of Midland and southern England, more especially on the heavier soils where straw growth was more prolific, wheat was reaped high, a foot or more from the ground. (3) Here the straw was clutched underhand, but this apart, the cutting and binding operations were identical to those of low-reaping. The residual stubble or 'hauhm' was grazed off by livestock, beaten down with poles and ploughed in, but most often, mown or 'hacked off' to be carried off for thatch or litter. The

method was said to have originated from lack of barn space to house the straw, and out of anxiety to prevent weeds being bound in with the crop.

The only other variant practice of importance was that of 'swiving', a method of smooth-hook reaping which was first noted in Cardiganshire, whence it spread to other parts of South Wales.⁽⁴⁾ From Davies' brief description of the method it appears that the reaper did not clutch the corn in the usual manner, but instead, twisted a handful of ears around his left hand, drew the stalks taut, and from an upright position cut as he moved in an easy shaving manner close to the ground. Although criticised as 'unsightly', 'swiving' gave a lower stubble and was rather faster than the more conventional methods of hand-reaping.⁽⁵⁾

Labour deployment in hand-reaping admitted of much regional and local variation. The major difference was between the practices of south and north Britain; for whereas in the former region most of the actual cutting was done by men, in the latter it was done by women.⁽⁶⁾ Field organization was most highly formalised in north Britain, the standard unit of deployment being the 'bandwin' of six or eight reapers, split up three or four to a ridge, and supervised by a male 'bandster'.⁽⁷⁾ Here and there in Scotland, though, reapers sometimes worked alone, and like Wordsworth's 'solitary Highland lass' did their own binding and stooking.⁽⁸⁾ Elsewhere in Britain field organization was much more flexible. In Ireland, two women accompanied each male reaper.⁽⁹⁾ In Yorkshire two reapers often shared a ridge dividing the linkage tasks between them, the one making the bands and the other tying up.⁽¹⁰⁾ In some parts of southern England it was usual for a woman to gather and bind after three male reapers,

but for the reapers themselves to set up the stooks.⁽¹¹⁾ However, in areas where the harvest was a piecework operation and contracted out to resident male workmen, family labour - wives, children and grandparents - was freely and often indiscriminately employed in the linkage operations, the weakest making bands or collecting loose straws, and the strongest tying-up and making stooks.

BAGGING WITH THE HEAVY HOOK (see Illustrations 8-10)

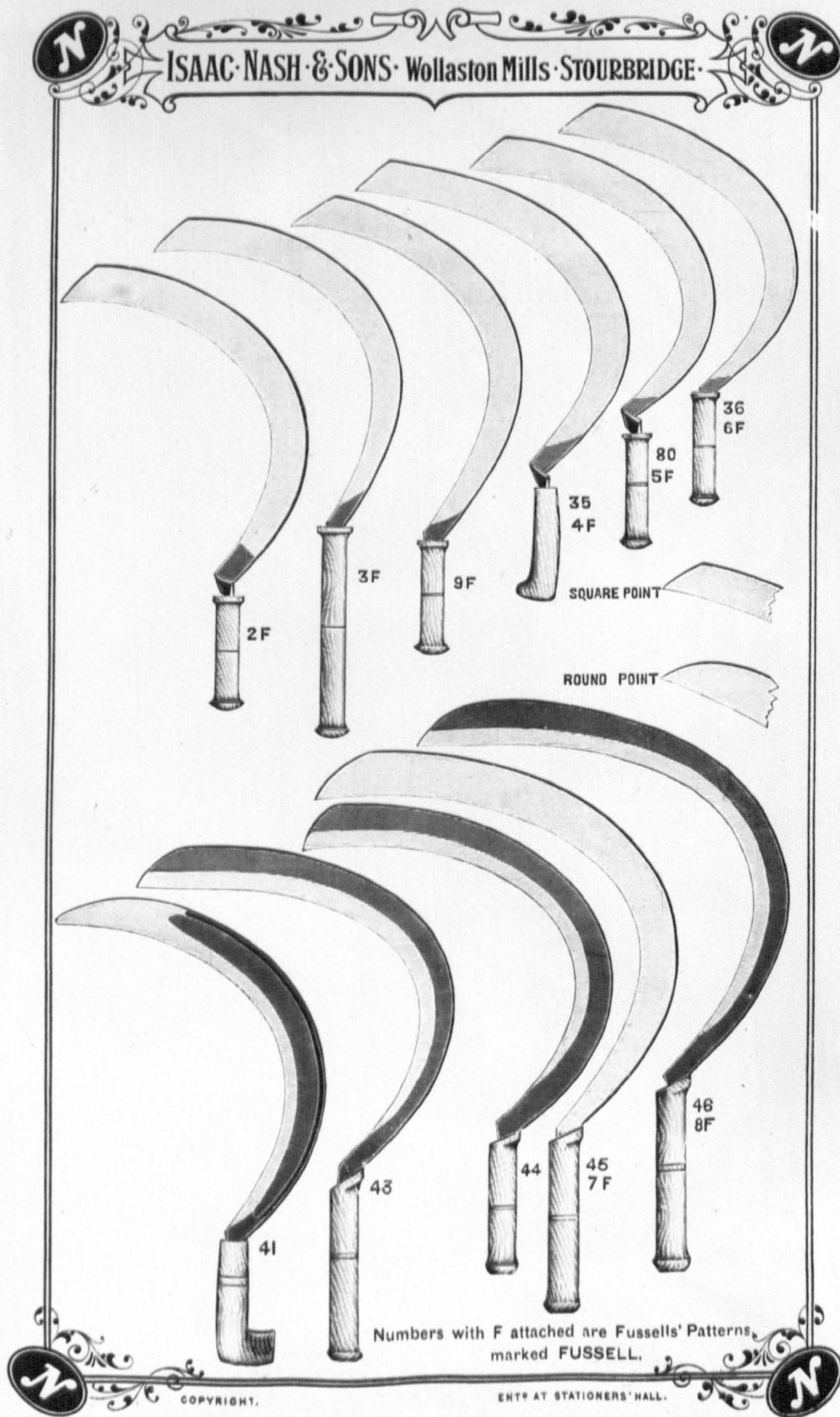
In 1790 'bagging' had not yet acquired the status of a recognised alternative technique, the term often being used loosely to describe any modus involving the slashing or chopping down of the crop with a smooth hook. A further complicating factor is the very large number of dialect terms, all of which appear to describe perhaps the same, but in some cases clearly local variations of the standard practice. It was known as 'hewing', and 'yowing' in Devon and Cornwall, 'hacking' in Hereford, 'hamming' in Dorset, 'hagging' and 'fagging' in Surrey, Berkshire and Kent, 'swapping' in Sussex and Suffolk, 'Wenlock Stroke' in east Wales and Shropshire, 'slashing', 'cuffing' and 'dinging-in' in Scotland, and elsewhere as 'badging' and 'clouting'.⁽¹²⁾ The work 'bagging' itself belongs to the northern Home Counties and the south Midlands, but was the term most frequently used in the general farming literature.

It was only in the 1830's that bagging came to be generally recognised as a method distinct in both modus operandi and tool form from hand-reaping. Up till then it had often been regarded as an unorthodox, 'slovenly' and 'wasteful' variant of



Illustration 8

Bagging with the Andre-type bagging hook and wooden 'crock', Herefordshire, c. 1900. Hereford City library photograph (Museum of English Rural Life 35/5148).



Illustrations 9 & 10 (Over)

Regional types of bagging hook; note the two forms of point (square and round), two forms of blade (cranked and plane) and two forms of handle (cranked and caulked). Isaac Nash and Sons Catalogue (1899).



BAGGING HOOKS.

NASH'S No.	FUSSELL'S No.		No.	00	0	1	2	3	4	5	6	7	
—	2	Open Pattern Cranked Fagging Hook, short round handle	{	14/3	15/3	16/10	18/4	20/6	23/-	25/9	28/9	32/6	per doz.
		...											
—	3	Open Pattern Straight Fagging Hook, long round handle	{	14/-	15/-	16/6	18/-	20/-	22/6	25/-	28/-	31/6	"
		...											
		Caulked Handles -/6 per dozen extra.											
—	9	Open Pattern Straight Fagging Hook, short round handle	{	14/-	15/-	16/6	18/-	20/-	22/6	25/-	28/-	31/6	"
		...											
35	4	Crooked Pattern Cranked Fagging Hook, caulked h'dle	{	14/9	15/9	17/4	18/10	21/-	23/6	26/3	29/3	33/-	"
		...											
80	5	Crooked Pattern Cranked Fagging Hook, short round handle	{	14/3	15/3	16/10	18/4	20/6	23/-	25/9	28/9	32/6	"
		...											
36	6	Crooked Pattern Straight Fagging Hook, short round handle	{	14/-	15/-	16/6	18/-	20/-	22/6	25/-	28/-	31/6	"
		...											

Description of points, square or round, should be mentioned in
ordering Bagging Hooks.

			16	17	18	19	20	21 inch.	
41	—	West of England Hewing Hook	22/6	24/-	25/6	27/-	28/6	30/- per doz.	
							16	17	18 inch.
43	—	Crooked Pattern Andre Bagging Hook	...	24/-	24/-	25/-	per doz.		
			No. 1	2	3	4	5	6	7
44	—	Shropshire Reaping Hook	20/-	21/-	22/-	23/-	24/-	—	— per doz.
45	7	Hereford Bright Bagging or Hook and Crook Hook, plain	16/6	18/-	20/-	22/6	25/-	28/-	31/6
								
"	"	Hereford Bright Bagging or Hook and Crook Hook, cranked	16/10	18/4	20/6	23/-	25/9	28/9	32/6
								

Ferruled Handles -/6 per dozen extra.

			19	20	21	22 inch.
46	8	Hereford or Andre Bagging Hook	25/-	26/-	26/9	27/6 per doz.



hand-reaping, allowed only by 'incorrect' farmers and practiced only by 'irresponsible' workmen. (13) By this stage the bagging hook had acquired a form quite distinct from that of the conventional reap hook. It was longer, broader and more open, carrying a square-pointed and heavily-ribbed blade, and weighing 3-4lb. The blade broadened perceptibly towards the crown to throw the balance of the tool well forward thereby increasing the momentum of the downward stroke. The blade was usually cranked at the handle to bring the handle into a higher plane than the hand, so protecting the operator against injury from brambles and large stones. Handles were generally much longer than on the reap hook, and often 'caulked' at the base to prevent the tool flying out of the hand.

The mode of operation was as follows. (14) With the standing crop on his left side, the operator would lean a breadth of corn away from him using sometimes his left arm, but more commonly a short wooden stick, 'crock', a second hook, a small rake, or just a handful of stiff straw. Then, by repeated blows aimed very low at the base of the stalk he continued cutting until enough corn had accumulated to form a sheaf, at which juncture he retraced his steps, gathered the corn together with foot or stick, tied the sheaf, jumped it to align the straw and laid it down for stooking. These linkage tasks were usually performed by ancillary workers.

To conclude then, bagging differed from hand reaping in the following respects, one, tool design; two, that the corn was not clutched in the hand; three, the slashing action; and four, that the harvester worked alongside rather than into the standing corn.

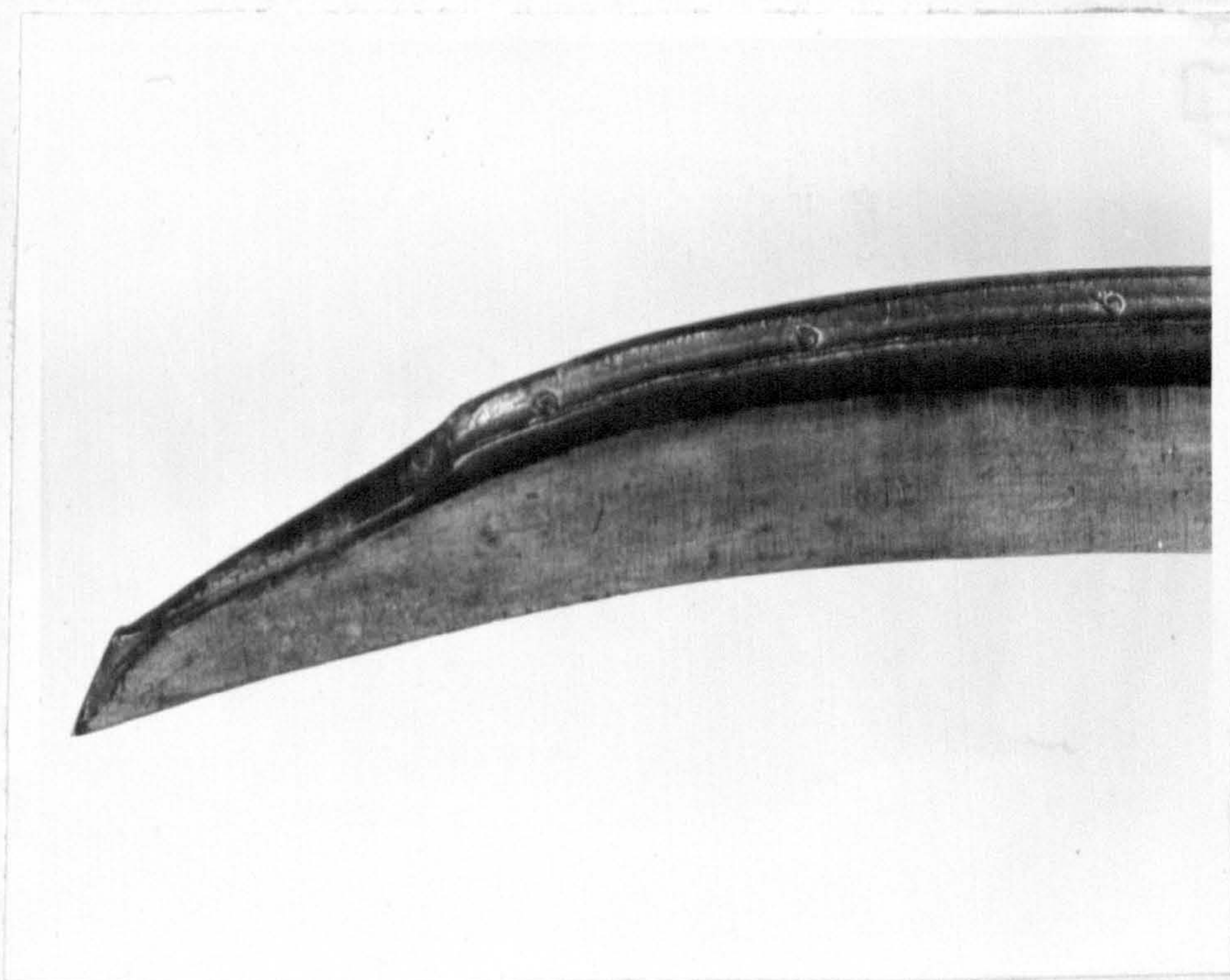
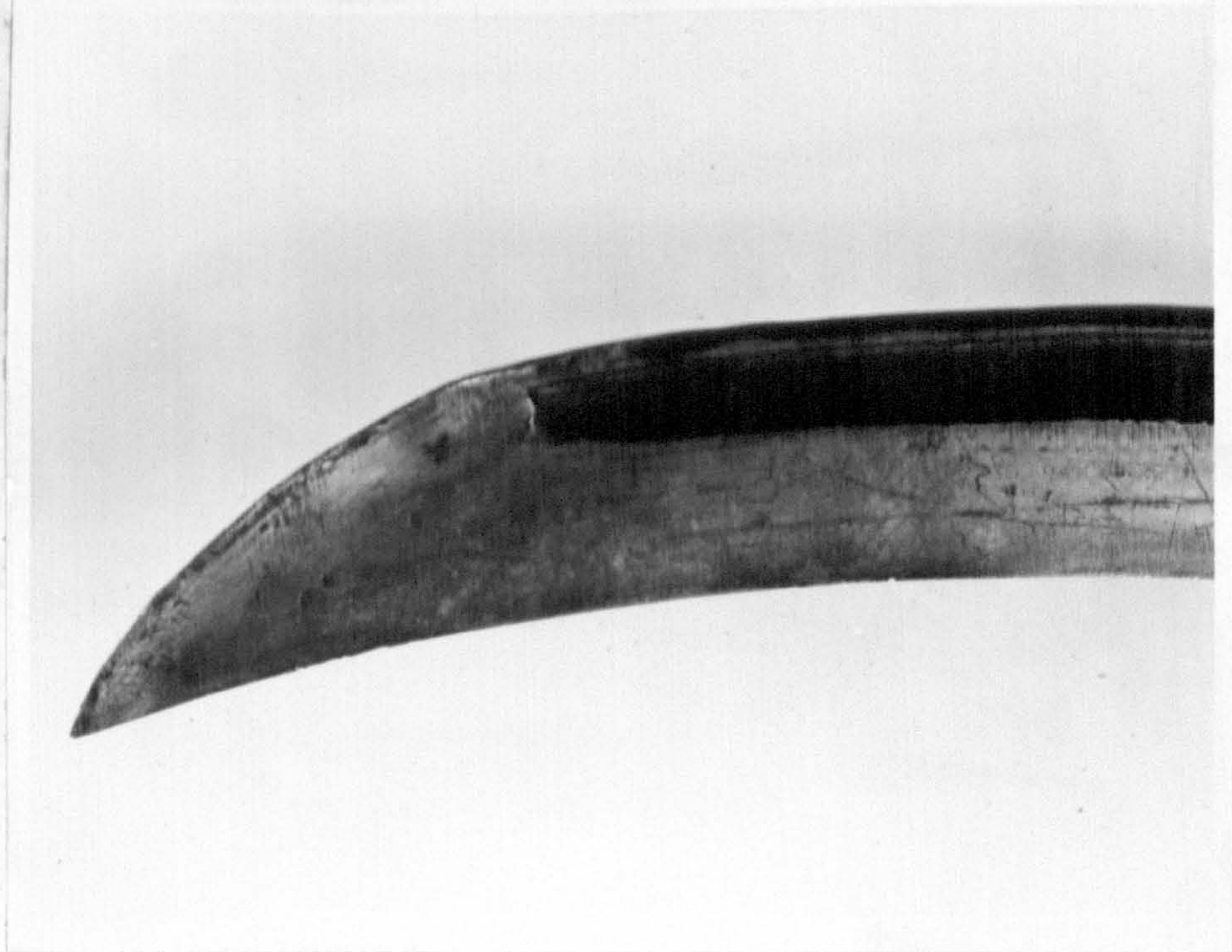
MOWING WITH THE BRITISH-TYPE SCYTHER (see Illustrations 11-16)

There was considerable variation in scythe form, in the design of blade, sned (handle), and 'accessories'. In contrast to its European counterpart, the British scythe blade was manufactured from cast-steel which required only sharpening with a whetstone and occasional grinding to maintain the edge. European scythes on the other hand were made from soft mild-steel which required not only sharpening and grinding but also frequent hammering.⁽¹⁵⁾ There were two main types of British scythe blade; the welded-back (the traditional design) and the riveted-back (which came in about 1840). The same scythe blade could be used for both grass and corn, but it was generally agreed that because straw was more fibrous and therefore more difficult to cut than grass, corn blades should be stiffer, more robust and rather shorter than grass blades.⁽¹⁶⁾

The blade was affixed to the sned by means of a ring secured by wooden wedges and a light metal stay or chain. Around 1850 new mountings, some with hinges, others with revolving sockets, were developed, but they did not, however, ever seriously threaten the traditional ring and wedge.

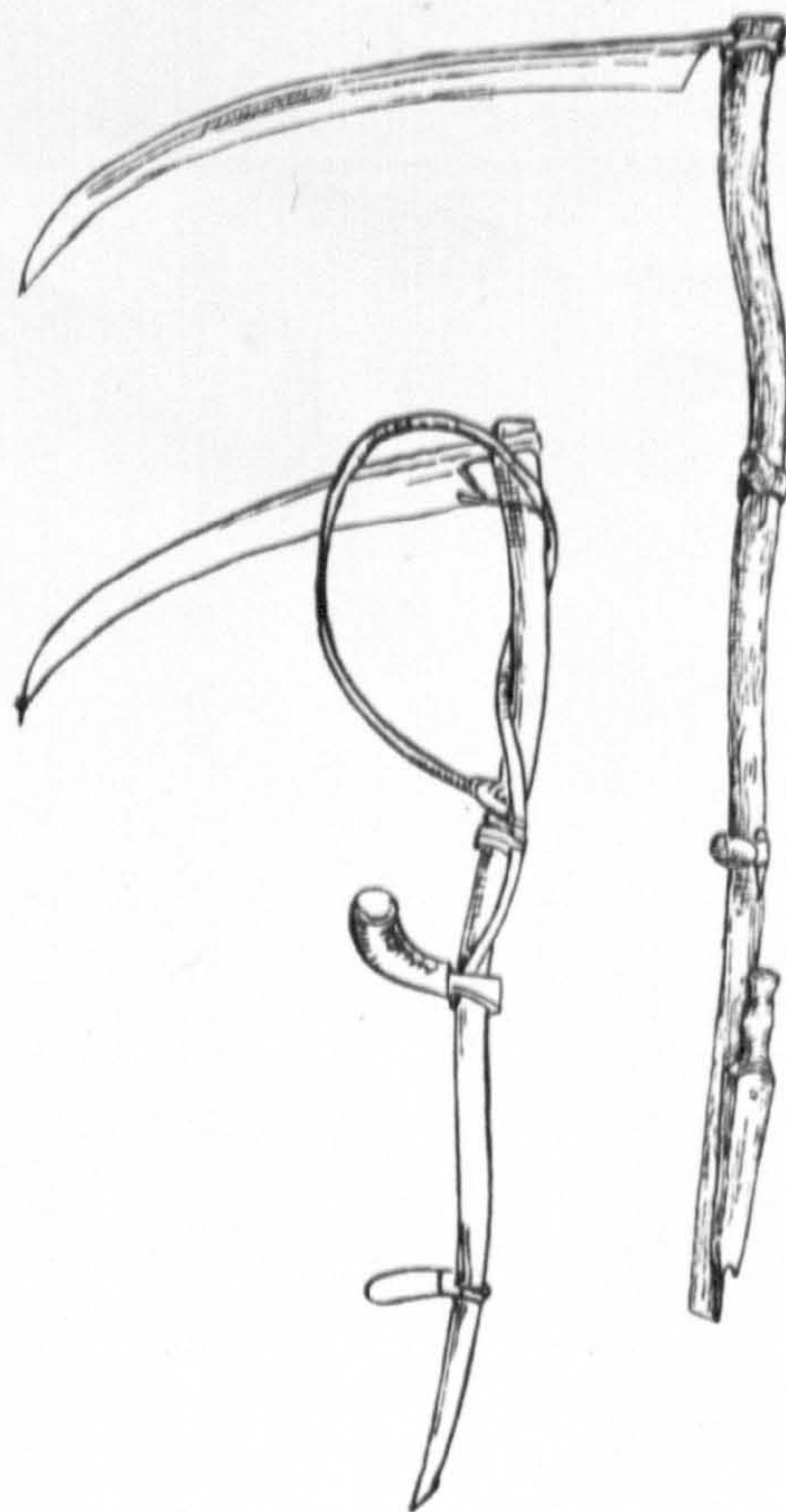
There were four different shapes of sned: the shallow-S, the deep-S, the straight (poled) and the Y-shaped.

The shallow-S sned was introduced into Britain probably in the seventeenth century and by 1800 had entirely ousted the traditional poled sned over most of England south of the Humber.⁽¹⁷⁾ The deep-S sned appears to have come in only at the very end of the nineteenth century, probably from the United States of America.



Illustrations 11 & 12

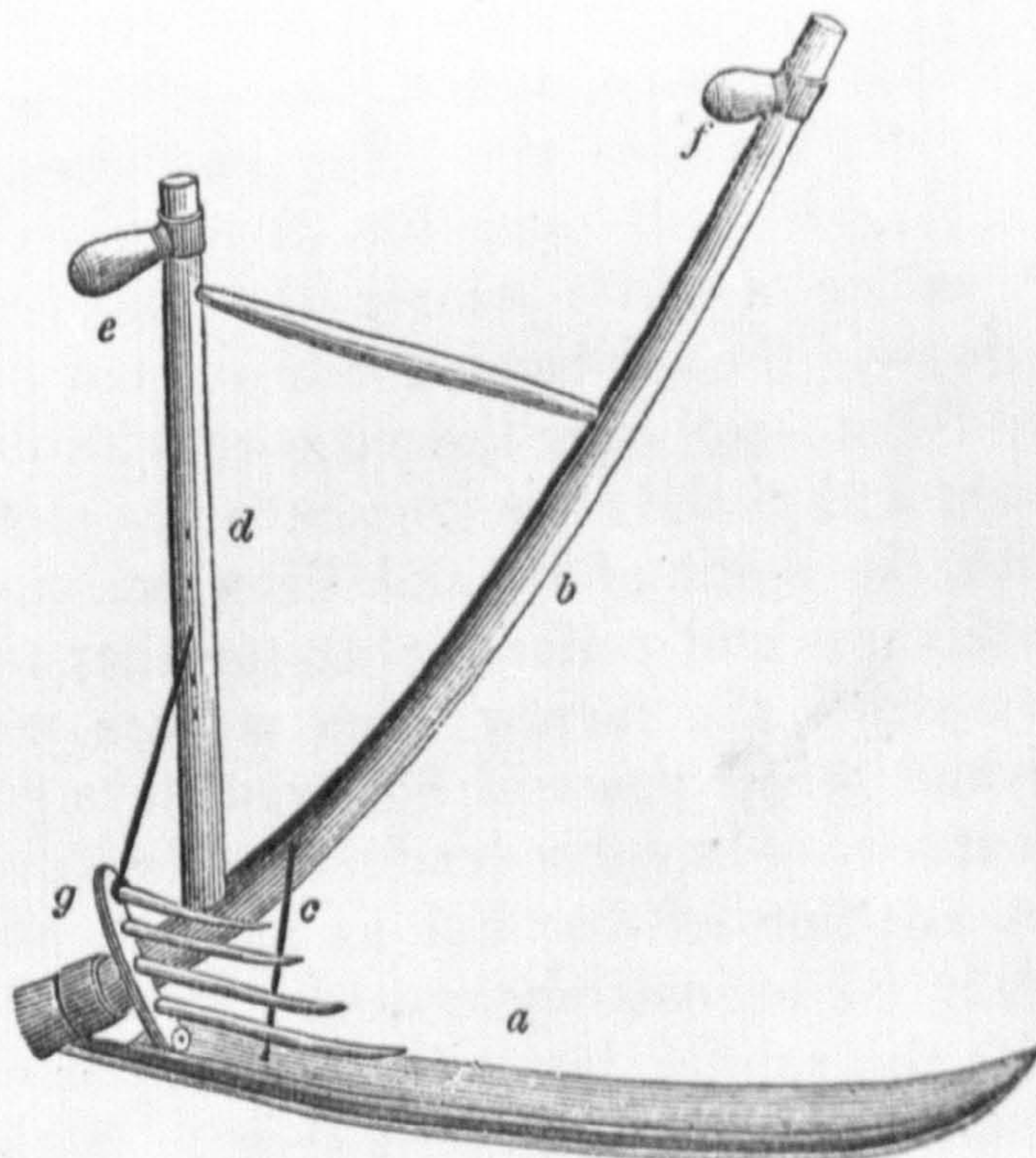
Top: Welded-back scythe blade (Museum of English Rural Life photograph 60/9547)
Bottom: Riveted-back scythe blade (Museum of English Rural Life photograph 60/9548)



Scythe with "bow"

Scythe with ripe-stick
(Elan Valley, Wales)

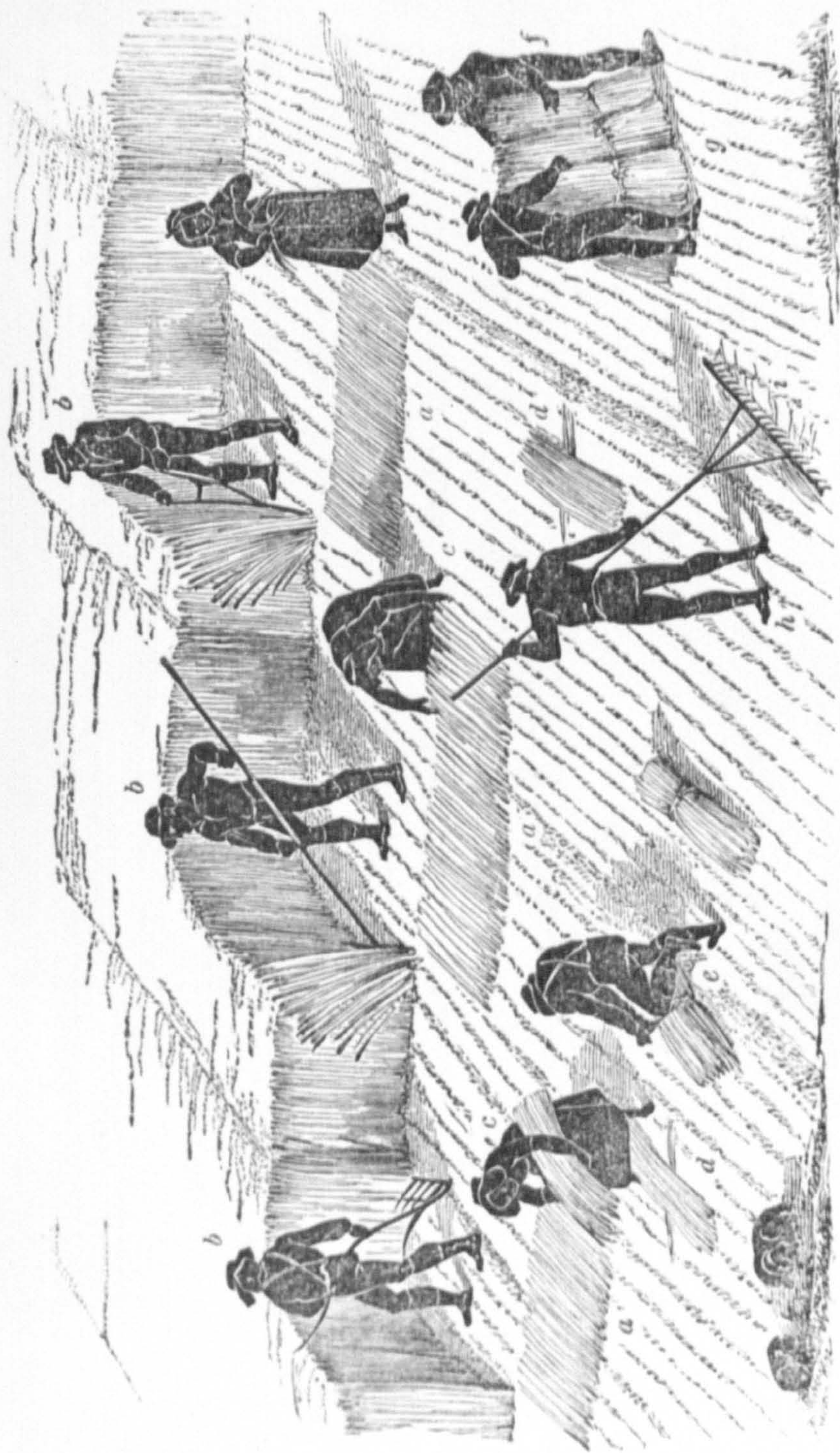
Fig. 399.



THE CRADLE-SCYTHER FOR REAPING.

Illustrations 13 & 14

- 13: 'Naked' scythe and 'bow' scythe. T. Hennell,
Change in the Farm (1934), p. 103.
14: Scottish Y-shaped scythe with 'cradle'.
H. Stephens, Book of the Farm (1951 edn), II, 338.



THE MOWING OF CORN WITH THE SCYTHE.

Illustration 15

Organization of a head of mowers. Note the three types of sned, 3-shaped, poled and Y-shaped. Note also the large number of linkage workers: (c) gatherers and bandmakers (e) binder (f) stockers (h) raker. H. Stephens, Book of the Farm (1851 edn), II, 341.



Illustration 16 & 17

- 16: Mowing with the cradle scythe c. 1890 (location unknown). (Museum of English Rural Life photograph 5/311).
- 17: Husband and wife team mowing with cradle scythe, probably Kent, c. 1900. W.C. Finch, Life in Rural England (n.d.) opp.p.112.

It seems to have been most popular in Ireland, presumably because of the country's close links with North America, whence large numbers of ash and hickory sneds were imported. The poled-sned on the other hand was the traditional design and dated from at least the thirteenth century. It was to remain the standard sned-form on the continent of Europe, but in Britain it was chiefly confined to Scotland and Ireland, although in the early nineteenth century it was still common as far south as Yorkshire. Opinions as to its efficiency relative to the S-types were conflicting. It was, however, reckoned easier to operate than the S-type and more appropriate for corn than grass. On the rare occasions when it was employed in south Britain it appears to have been used only for corn (probably wheat).⁽¹⁸⁾ The Y-shaped sned was a wholly nineteenth century innovation. It was developed in north-east Scotland around 1830 as a specialised corn-scythe mounting. It consisted of two short wooden arm ('helves') one branching from the base of the other, and was specially adapted to carry a 'cradle' attachment.⁽¹⁹⁾ It spread subsequently to many other areas of Scotland and the English Border Counties and was used for a time in Northern Ireland until superseded there by the deep-S sned.⁽²⁰⁾ Iron sneds, manufactured by Drummonds of Stirling, appeared in the late 1830's.⁽²¹⁾ Unfortunately too little is known about the spatial distribution of sned-types. In some areas, notably in north Britain and Ireland, all types, including the iron, may simultaneously have competed with each other.

The 'bow-loop' and 'cradle' were important scythe accessories affixed between the heel of the blade and the base of the sned. Their main function was to assist the mower lay down an even swathe of cut corn. The 'naked' scythe was efficient only

when the crop did not require binding, or sometimes when the crop was so badly lodged and twisted that an attachment served only to restrict the mower's movements. Thus, in south Britain, where barley and oats were often left unbound, the 'bow' and 'cradle' were regarded as obligatory only for wheat, but in north and west Britain where all three crops were bound, some form of attachment, preferably the 'cradle', was deemed essential for all corn. It was claimed in north Britain that the introduction of the 'cradle' was a key factor in the adaptation of the grass scythe into an efficient corn harvesting tool. The best mowers, however, were said to require neither 'bow' nor 'cradle', but the less adept, particularly if they were learners, found them indispensable. (22)

The 'bow' was a very old and very simple device, consisting of little more than a looped piece of wire or hazel-twigg tensioned between the blade and the base of the sned. The 'cradle' was much more elaborate and took on a variety of forms. The best known was that consisting of from four to seven wooden or metal 'fingers' raised on a standard. On the Scottish Y-scythe its outer edge was further secured to the sned by means of a light metal stay. An alternative construction was a wooden framework across which was stretched a piece of sacking or string of rope mesh. The 'cradle' might weigh up to 5-6lbs, compared with the few ounces of the 'bow'. (23)

An important difference between the 'bow' and the 'cradle' was that with the former the corn was generally mown 'inwards', to lean against the standing crop, and with the latter, outwards, to lie away from it. Standard objections to the 'bow' were first, that it left a less tidy stubble than the 'cradle', and second, that it made excessive demands on the gatherers, who had to work

hurriedly in order to avoid being overtaken by the next scythe. Preference for one or another method often varied with crop condition. The 'bow' was more popular in eastern England, and was thought superior to the 'cradle' on badly-laid but still mowable crops.⁽²⁴⁾ Initially, the 'cradle' was thought appropriate only for thin crops, but during the course of the nineteenth century it became the favoured attachment for all conditions of crop, in many cases displacing the 'bow'.

Mowers were usually organised into 'companies', each company working in echelon right to left across a ridge. Normally, each mower had two followers, responsible between them for the gathering, binding, raking and stooking. In parts of East Anglia, however, all these tasks, except sometimes the raking, were performed by the mowers themselves. When the corn was left loose in the swathe the linkage tasks were few and confined to raking (one raker to two or three scythes) and swathe 'turning' (to ensure even drying out).

Corn mowing demanded strong and highly skilled workmen, the task being reckoned one of the most difficult in agriculture. Skill and dexterity were required to lay down an even swathe, to negotiate laid patches of corn, to avoid snagging and blunting the blade, and, to maintain an even rate of cutting. As Wilson warned, 'a man required some practice to enable him to mow grain properly; and if this part of the work be awkwardly performed it will mar all subsequent operations of harvesting'.⁽²⁵⁾ The most skilled scythesmen could sweep seven to eight feet with a forward cut of 12 to 15 inches. Some boasted of being able to cut a square perch at one stroke, or even a circular swather pivoting on one foot.⁽²⁶⁾

MOWING WITH THE HAINAULT SCYTHER

(see Illustration 17)

The Hainault or Flemish Scythe never became established in Britain despite several attempts to popularise the tool, first in the 1760's, and later in 1813-15 and 1825-6.⁽²⁷⁾ It is included here because it must be regarded as theoretically within the available technological spectrum even if the number of successful innovations was, in practice, very few. In the Low Countries, north-west France and north Rhineland Germany it had been the standard corn harvesting tool since the sixteenth century.⁽²⁸⁾ In design and modus operandi it lay midway between the scythe and bagging hook.⁽²⁹⁾ Its blade was very broad, round-pointed and about 20 inches long. The shaft was of approximately the same length, curving sharply outwards at the head to form an 'arm rest' inclined at an angle of about 120° to the main shaft, and with a looped leather strap affixed at the elbow of the shaft. The scythe was used in conjunction with a light stick ('pik') some 3-4 feet long.

The mode of operation was as follows. The scythe was grasped in the right hand with the hand and lower arm resting along the curve of the handle and the forefinger taking the weight by the leather strap. Swinging the scythe backwards and forwards from the wrist and using the 'pik' to tension the straw, the operator advanced into the standing corn cutting left and right. The cut corn was collected by 'pik' and foot and rolled into a neat bundle to await binding.



Illustration 18

Mowing with the Hainault scytha and 'pik', H. Stephens,
Book of the Farm (1851 edn), II, 396.

1. J. Foley, The Agriculture of Derbyshire (1817), II, p. 122; Martin Doyle, Practical Husbandry (1839), p. 402; Catalogue of the Great Exhibition (1851), II, p. 619.
2. For descriptions of hand reaping, see, H. Stephens, Book of the Farm (1844), III, pp. 1048-83; J. Wilson, Rural Cyclopaedia (1851), IV, pp. 25-8; Sketches of Rural Affairs, III (1845), The Sickle; D. Low, Elements of Practical Agriculture (1837), pp. 212-4.
3. The Penny Encyclopedia, XI (1838), p. 58; J. Monk, General View Buckinghamshire (1810), p. 138; T. Hennell, Change in the Farm (1934), p. 116; W. Pitt, General View Leicestershire (1809), p. 102; J. Donaldson, General View Northamptonshire (1794), p. 20; T. Batchelor, General View Bedfordshire (1808), p. 391; A Murray, General View Warwickshire (1815), p. 93; T. Rudge, General View Gloucestershire (1813), pp. 117-9; Messrs. Rennie, Brown & Shirreff, General View West Riding (1794), p. 135; M. M. Milburn, 'On the Farming of the North Riding of Yorkshire', J R A S E IX (1845), p. 501.
4. W. Davies, General View South Wales (1815), I, p. 425.
5. ibid, I, p. 425.
6. Female reapers were chiefly employed in the area from Lancashire and the West Riding in the south to the Forth-Clyde valley in the north. Many of the females were, of course, part-time industrial workers. In south Britain women sometimes reaped in south-central England, and continued to do so until late on in the nineteenth century. On Portsea Island, Dorset, women often did all the reaping. W. Stevenson, General View Dorset (1812), pp. 235-6. They reaped occasionally in Wiltshire, Gloucestershire, Hampshire (north) and Sussex (east).
7. For a detailed description of 'bandwin' reaping, see, H. Stephens, Book of the Farm (1844), III, pp. 1057-60.
8. By the 1840's the supply of Highland female reapers to the Scottish Lowlands had virtually dried up, though they were still to be found in the northern and eastern areas of Scotland.
9. Doyle, op.cit, p. 404. In Ireland sometimes as many as four or five reapers and their helpers occupied a ridge, op.cit, p. 404.
10. J. Wilson, Rural Cyclopaedia (1851), IV, p. 25.

11. Hennell, op.cit, pp. 114-6; W. Marshall, Rural Economy of Norfolk (2nd edn, 1795), I, p. 228; Wilson, op.cit, IV, pp. 25-6.

12. W. Marshall, Rural Economy of the West of England (1797), pp. 121-2; Stevenson, op.cit, p. 218; J. Duncumb, General View Hereford (1805), p. 64; Daview, op.cit, pp. 424-8; Stephens, op.cit, III, p. 1080; Doyle, op.cit, p. 403; G. E. Evans, Ask the Fellows who cut the Hay (1956), p. 117; Agricultural Gazette, 24 Aug 1867, p. 891; Farmers Magazine, Sept 1845, p. 101.

13. This was especially so in Scotland, but 'slashing' was also complained of in several areas of southern England. The difference between bagging and smooth hook reaping may sometimes have been a very fine one. Some farmers clearly reckoned any action other than a drawing one as a break of good practice. It was, of course, very difficult to slash with the serrated sickle and it was for this reason that this tool was the most preferred. See, for example, Marshall (West of England), op.cit, p. 122; P. Foot, General View Middlesex (1794), pp. 28-9; Farmers Magazine, Sept 1845, p. 101.

14. For descriptions of bagging, see, J. C. Morton, Cyclopedia of Agriculture (1856), II, pp. 10; Wilson (Cyclopedia), op.cit, I, pp. 311-2; Stephens, op.cit, III, pp. 1073-4.

15. H. J. Hopfen, Farm Implements for Arid & Tropical Regions (FAO, Rome, 1960), pp. 101-2.

16. Country Life, 5 Dec 1952; J. M. Wilson, The Farmers Dictionary (n.d), III, p. 230; Stephens, op.cit, III, p. 849.

17. E.g. R. W. Dickson, General View Lancashire (1815), p

18. O. Beaumont & J. G. Jenkins, 'Farm Tools, Vehicles & Harness, 1500-1900', in C. Singer, E. J. Holmyard, A. R. Hall & T. I. Williams, eds, Cambridge History of Technology (Oxford, 1957), III, p. 137. For information on the use of the poled and S-sned in Ireland I am indebted to Dr. A. Gailey of the Ulster Folk Museum. The poled-sned appears to have been used in Suffolk in the 19th c. and in Pembrokeshire in the early 20th c. (Museum of English Rural Life, Accession 54/640). Stephens, op.cit, III, p. 1080, implies that in the mid-1840's the 'common reaping scythe' in Scotland was poled.

19. ibid, III, pp. 1080-1; A. Fenton, 'Hand tools in Agriculture', Trans. Museums Assistants Group, V (1965); Farmers Magazine, Sept 1841, p. 102.

20. Private Communications: A. Gailley, Ulster Folk Museum; A. Fenton, National Museum of Antiquities of Scotland. The Museum of English Rural Life has a Y-scythe apparently used in Hampshire, perhaps by Scots immigrant farmers.
21. Dob, op.cit, p. 266.
22. See, for example, Stephens, op.cit, III, pp. 1081-2; G. H. Andrews, Modern Husbandry (1853), p. 173; Farmers Magazine, Sept. 1841, p. 102; Hennell, op.cit, p. 106.
23. Stephens, op.cit, III, p. 1081. It is clear, however, that the cradle could take a variety of shapes and be made from many different materials. Labourers often made their own cradles, although the appearance of some of the cradles in the Museum of English Rural Life collections suggests that by the late 19th c. many were made up professionally.
24. Stephens, op.cit, (1851 edn), I, p. 342; W. Marshall, Rural Economy of the Midland Counties (1790), I, pp. 218-9, 247; T. Hale, A Complete Body of Husbandry (1759), IV, p. 361; H. E. Strickland, General View East Riding of Yorkshire (1812), pp. 125-6.
25. Wilson (Dictionary), op.cit, p. ; 'The scythe is a dangerous implement in unaccustomed hands', Sketches of Rural Affairs (SPCK), The Sickle (1845), pp. 13-14.
26. Davies, op.cit, I, p. 563.
27. Museum Rusticum, I (3rd edn, 1766), pp. 158-60, 235-7, 437-41; Minute Books of the Christchurch Agric Society 1794 f. (now with Avon & Stour Society); Irish Farmers Journal, 11 Sept 1813; Farmers Magazine, Aug 1825, pp. 339-49; 'On the Flemish Scythe', Prize Essays & Transactions of the Highland Society, new ser, I (1829), pp. 244-5.
28. See, E. J. T. Collins, 'Labour Supply & Demand in European Agriculture, 1800-1880', in E. L. Jones & S. J. Woolf, eds, Agriculture & Economic Development: The Historical Problems (1969), pp. 55-6.
29. For descriptions of method, see, Stephens, op.cit, III, p. 1074; Wilson (Cyclopedia), op.cit, II, pp. 376-7; Andrews, op.cit, pp. 373-4.

CHAPTER XIV

HAND TOOL INNOVATION: THE INCENTIVES AND CONSTRAINTS.

THE INCENTIVES TO HAND-TOOL INNOVATION.

A prime incentive for the adoption of the slashing and stroking tools was that they saved labour. That they cut faster than the hand-reaping tools is well known. In cutting wheat, for example, the scythe and bagging hook were approximately four times faster than the sickle and three times faster than the reap hook. Work rates were higher for spring grains than for wheat on account of their lower straw resistance, which made for easier cutting and less frequent blade-sharpening. Precise work rates varied according to crop yield and condition. A heavy badly-tangled crop absorbed considerably more labour than a light fair-standing crop. An Aberdeen farmer reckoned to be able to mow three acres of thin oats in a day, but only two acres of an average oat crop.⁽¹⁾ Wilson estimated that barley undersown with clover was 25-30 per cent more consuming of labour than a clean crop.⁽²⁾ Similarly with the sickle, 0.2 acres a day was reckoned a fair rate on a heavy crop of oats compared with 0.4 acres on a medium crop. With the bagging hook a good worker could manage an acre of upright wheat in a day, but only 0.75 acres of laid wheat.⁽³⁾

Because of higher yields and greater tendency for crop lodging, per acre work rates in 1850 were substantially lower than in previous centuries. In late eighteenth century Norfolk,

for example, the toothed sickle was said to cut 0.5 - 0.75 acres per day. In the 1760's it was claimed that in the East Riding 2 acres of wheat could comfortably be mown in a day. A century earlier Markham put the mowing rate for spring corns as high as three to four acres. (4)

Average Per Diem Cutting Rates for Competing Tools, c. 1850. (in acres) (5)

	<u>Wheat</u>	<u>Barley & Oats</u>
Sickle (high reaping)	.35	-
Sickle (low reaping)	.25	.33
Smooth Reap Hook	.33	.40
Bagging Hook	1.0	1.3
Scythe	1.1	2.0

In practice, however, the labour savings of the scythe and bagging hook were less spectacular than the cutting rates suggest. For whereas the hand-reaping tools required very few ancilliary workers, the slashing and stroking tools required large numbers for the connected operations of gathering, binding, sheaving and raking.

However, labour deployment varied considerably between areas, and within different parishes, sometimes between farms. Thus in hand reaping, and particularly in south Britain, field organization was often very indiscriminate, most of all when the harvest was performed by the piece and unpaid family labour was extensively employed. Sometimes reapers worked alone; sometimes two persons shared a ridge, dividing the linkage tasks between them;

and sometimes (as in Scotland) women did the reaping and the men the binding and stooking, by contrast to Ireland and most of southern Britain, where the rôles were normally reversed. As a norm, therefore, we will use the ratio of one linkage worker to six reapers as obtained in the Scottish 'bandwin' system.⁽⁶⁾ High-reaping needed fewer linkage workers than low-reaping, on account of its lower sheaving requirements. Scythe ratios are more readily fixed. Normally a mower was accompanied by two followers, although in some areas a third helper, a specialist raker, was attached to each 'head' of three mowers.⁽⁷⁾ An important exception to this rule was in East Anglia, where the mowing 'company' did its own binding and stooking, but only at the expense of a reduced rate of cutting; in east Essex, for example, a scythesman aided by a strong boy were reckoned to cut and stook between half and three quarters of an acre of wheat a day compared with the usual average of 1 acre when two specialist linkage workers were employed.⁽⁸⁾ On barley and oats scythe ratios tended to be the same as for wheat, although when left loose in the field, the linkage requirements were very much lower. The bagging hook raises certain problems for strictly contemporary literary evidence on field organisation is scarce. However, extensive enquiries among older farm workers in the counties of Berkshire, Kent and Monmouthshire, suggest that to cut an acre of wheat a day a 'fagger' required two strong helpers, and that when reduced to one the cutting rate fell to 0.75 acres.⁽⁹⁾

We arrive then, at the following notional average labour requirements per acre for the six competing methods. (For sources see infra, App. II)

Work Rates and Labour Requirements for Competing Harvest Methods in Britain

A = Cutting rate per worker-day (in acres)

B = Ratio linkage workers to cutters

C = Worker-days per acre

	<u>Wheat</u>			<u>Barley & Oats</u>		
	A	B	C	A	B	C
High Reaping (sickle)	0.35	1:7	3.60	-	-	-
Low Reaping (sickle)	0.25	1:5	4.80	0.33	1:5	4.00
Low Reaping (reap Hook)	0.35	1:5	3.9	0.40	1:5	3.30
Bagging	1.00	2:1	3.00	1.30	2:1	2.20
Mowing (binding & sheaving)	1.10	2:1	2.70	2.00	2:1	1.50
Mowing (leaving loose in swathe)	-	-	-	2.00	5:1	0.75

For Sources, see Appendix II

Thus in the cutting, binding and stooking of wheat the labour-saving potential of the reap hook, bagging hook and scythe relative to the sickle was of the respective order 19 per cent, 37 per cent, and 44 per cent, and in the harvesting of spring grains, 17 per cent, 45 per cent and 62 per cent. Over the longer run, high-reaping proved more consuming of labour than low-reaping, but in the primary operations, with which we are here chiefly concerned, it enjoyed approximate parity with the reap hook. The labour-saving advantages of the scythe were substantially enhanced when spring corns were left unbound in the swathe.

Some of the labour-savings secured in the primary operations were lost in the secondary operations of carting, stacking and threshing. This was primarily because sheaves of mown and bagged corn were bulkier and less tidy than those of reaped corn. The greater unevenness of the sheaves, and the higher proportion of up-ended straws, meant more work for both the flail (because the ears of corn were unevenly exposed), and for the threshing machine (because the sheaves were more difficult to part and inverted straws had to be fed through twice).⁽¹⁰⁾ Assuming a linear relationship between labour costs and labour inputs, Love's 1861 data⁽¹¹⁾ suggest that in the carting and stacking operations, mown corn consumed 35 per cent more labour than reaped corn and 15 per cent more than bagged corn. However, it is difficult to sustain the argument that the higher costs incurred in the barn operations were a major disincentive to innovation in the field operations. In practice, farmers tended to view the two tasks as completely separate, in terms of both innovation and labour management.

However, mowing and bagging offered other compensations. They permitted a more flexible deployment of the harvest workforce,

in that female and child labour could often be utilised in the linkage operations, thus allowing male labour to be concentrated on the cutting, in which their productivity was much higher with the new tools. Indirect savings stemmed from the fact that sheaves of mown and bagged corn dried out faster than those of reaped corn, which made for earlier carting and, with the field cleared, enabled an earlier start on autumn cultivations. Sullivan estimated the time-savings as two or three days on wheat and up to six days on spring corns; Stephens put the barley savings as high as eleven days.⁽¹²⁾

The cost-savings of the scythe and bagging hook are much less easily established. Per-acre costs varied from farm to farm according to wage rates, the value of perquisites, the age and sex composition of the workforce, task allotment and the relative price elasticities of reapers, baggers and mowers and grades of ancilliary worker. Also, because the elements entering total costs were so complex and the contemporary costings so variously compiled it is difficult to compare method costings. For example, some costings appear to include only the cutting, while others include not only binding and stooking but also carting and stacking. The assumptions underlying the calculations are also doubtful because where some of the corn area had been cut by one method and some by another, it would clearly be wrong to assume that the price elasticities of the different categories of worker would remain the same if one or another method was extended to the whole crop. It was hardly surprising therefore, that Stephens was able to state only that costs of mowing in England varied between 8s. and 24s. per acre.⁽¹³⁾

However from the costings available (detailed below), it would appear that in the harvesting of wheat, mowing was a little cheaper than bagging, and 20-25 per cent cheaper than low-reaping.

COMPARATIVE PER ACRE COSTS OF COMPETING METHODS

(in shillings)

	<u>Mowing</u>	<u>Bagging</u>	<u>Reaping High</u>	<u>Reaping Low</u>
(a) 1793	4.5			6.75
(b) 1817	13.0			15.0
1817 (Barley)	11.0			13.0
(c) 1841	3.5			8.75
(d) 1841	10.0			12.0
(e) 1845	8.0			12.0
(f) 1845	8.8			15.3
(g) 1845	9.0			12.0
(h) 1845	7.8		7.0 *	10.4
(j) 1846			10.0 **	7.0
(k) 1850 (Barley)	7.5			10.0
(l) 1851	5.4			8.75
(m) 1860	8.0			11.0
(n) 1861	8.5	10.0	13.7 **	12.6
			9.9 *	
(o) 1867	9.2			8.3
(p) 1878	8.5	8.5		9.0

* = excludes stubble mowing.

** = includes stubble mowing.

The cost-savings of the faster tools were less impressive therefore than their labour-savings, which is to say that the relationship between work output and unit costs was not linear, that farmers had to pay for higher productivity. A key factor was that the supply of mowers was less elastic than that of reapers, for while all categories of harvest worker - male, female, child and part-time industrial - could operate the light hand-reaping tools, the heavier stroking and slashing tools required strong and experienced adult male workers. In southern Scotland, in the 1840's, mowers could command 3s. a day compared with the reapers' 2s.⁽¹⁵⁾ Similarly in Co.Kerry, in the 1860's, mowers received twice as much as reapers.⁽¹⁶⁾ Thus it was that on one Roxburgh farm the substitution of high-priced male scythesmen for relatively low-priced female 'shearers' actually made mowing the more expensive mode.⁽¹⁷⁾

Some of the cost savings secured in the field operations were subsequently lost in carting, stacking and threshing. The detailed costings prepared by Peter Love of Northampton in 1861 (tabulated below) suggest that over the whole process, cutting to threshing, reaping was actually cheaper than either bagging or mowing, the critical factor being threshing costs, which were 70 per cent (4.9s per acre) higher in mowing than in reaping.⁽¹⁸⁾ Such a conclusion, or rather its general validity, is open to serious doubt, chiefly because most contemporary estimates put the threshing cost differentials much lower, at between 20 and 30 per cent (1.8s. per acre on Love's costings). Morton, for example, gave 2s. per quarter as the average cost of threshing wheat by machine, compared with Love's 3s 5d (assuming his wheat yield 28 bushels per acre). A differential of 20 per cent is suggested

by detailed steam threshing costings made by an Essex farmer in 1860. (19)

LOVE'S HARVEST COSTINGS, 1861

(cost in shillings per acre.)

<u>Operations</u>	<u>Low Reaping</u>	<u>High Reaping</u>	<u>Bagging</u>	<u>Mowing</u>
Cutting & shocking	12.6	9.9	10.0	8.5
Carting & stacking	2.4	1.8	2.8	3.2
Thatching	.8	.5	1.1	1.4
Threshing	7.2	4.5	9.9	12.1
Cutting & carting stubble	-	3.8	-	-
<u>TOTAL COSTS PER ACRE</u>	23.0	20.5	23.8	25.2

COSTS PER ACRE OF HIGH REAPING, BAGGING & MOWING as percentage of
LOW REAPING COSTS

	<u>High Reaping</u>	<u>Bagging</u>	<u>Mowing</u>
Cutting & shocking	78	79	67
Carting & stacking	78	117	133
Thatching	77	137	175
Threshing	73	137	170
Cutting & carting stubble	-	-	-
<u>TOTAL COSTS</u>	89	105	110

Yet again there were other advantages which tipped the scales more decisively in favour of the heavier tools. One was that they allowed a more intensive use of women in the linkage operations, a facility which according to C.S. Read resulted in a cost saving of 20 per cent⁽²⁰⁾ Another, and in many cases perhaps the key cash incentive to adopt bagging or mowing was the increased volume of their straw-cut, which at off-farm prices represented a substantial gain on this one item alone. The scythe was reckoned to cut two inches lower and the bagging hook four inches lower than the sickle or reap hook, which, at 56 lbs per one inch of stubble, could mean an increased straw yield of up to 6cwt per acre.⁽²¹⁾ In the 1840's, Kent farmers reckoned that the bagging hook boosted their straw receipts by 16s. per acre. It was also argued that straw deteriorated badly when left in high stubbles, to the extent that it had lost most of its value by the time it reached the yards.⁽²²⁾

We may conclude therefore that the prime economic incentive to adopt the scythe and bagging hook was their labour and labour-cost savings in the cutting operation. Clearly, in view of the number and complexity of the variables involved it is unwise to place too much faith on the contemporary costings. We have suggested, however, that farmers tended to regard field work and barn work as discrete areas of decision-making. Even so, the costings suggest that over the longer run the opportunity costs of method switching were not of a sufficiently high order to rank as serious disincentives to method change.

THE CONSTRAINTS ON HAND-TOOL INNOVATION.

Proponents of change argued that the new tools permitted valuable savings in labour and time, and therefore labour cost, while adherents to the small reaping tools justified their retention on the grounds that the savings were often more apparent than real, that the technical and social costs of change were too high.

Until relatively late on in the nineteenth century it was still conceded that hand-reaping was the most perfect and tradesmanlike mode of cutting corn. In 1853, the Royal Agricultural College taught the sickle as the 'cleanest and most expert' and the scythe as the 'most slovenly' tool.⁽²³⁾ The spirit of hand-reaping was symbolised by 'perfect sheaves well-placed stooks shaven ricks and ornamental thatching'.⁽²⁴⁾ Those who worshipped at such shrines, vituperated against the shapeless stacks and 'higgledy-piggledy' work which, they alleged, followed in the wake of the scythe. As late as 1891, after almost a century of hand-tool change, the foremost Scottish agricultural encyclopedia was still of the opinion that mowing was an unsatisfactory treatment for wheat.⁽²⁵⁾ Bagging was for a long time regarded as 'slovenly' and 'irresponsible', permissible only when labour was scarce, and significantly, its synonyms, 'cuffing', 'hacking', 'hamming', 'slashing' and 'clouting', all connote violence of treatment as against the gentle meticulousness of hand-reaping.

It is by no means easy to assess the validity of the many objections raised against the faster tools. One criticism, that

of higher grain loss, was undoubtedly true so long as farmers persisted in cutting their corn at the dead-ripe stage. Oats, and then wheat, were the grains most vulnerable to shedding and shattering, and the risk of loss was enhanced when the crop was laid and badly twisted. Early ripening varieties of oats, such as Poland and Potato, shed more easily than the lower-yielding, later-ripening varieties, and the tight-eared, strong-strawed Red Wheats, the Colns and Rivets, were less susceptible than the fragile White Wheats.⁽²⁶⁾ Thus it was likely that wastage was greater on the White Wheat lightlands than on the Red Wheat clays, a suggestion partly borne out by the geographical spread of evidence for the practice of cutting before dead ripe. Compared with the scythe and bagging hook the sickle was a very conservative tool. 'It was painful', lamented one Scottish farmer, 'to see the destruction of grain caused by many stalks falling back after being [mown], mixing the swathe and shedding their grains, a disadvantage detracting very much from the profit arising from the additional length of straw obtained'.⁽²⁷⁾ McConnell remembered the amount of corn and straw left behind after the scythe as 'something terrible', for in order to keep a clean sward, everyone in the gang 'had to be perpetually gathering heads and straws'.⁽²⁸⁾ The bagging hook was similarly criticised. 'It isn't picked up so close', said the Surrey workmen, 'a man leaves his wages on the ground'.⁽²⁹⁾ Nor did the reap hook entirely escape censure. Critics argued that it was wasteful of grain in that many straws were accidentally severed and because it tempted workers to slash down the corn rather than cut it by the handful. According to a report of a speed trial between the sickle and the reap hook, the victory of the latter was secured at the cost of an 80 per cent loss in shed

grain.⁽³⁰⁾

On balance, contemporary opinion was more hostile to the scythe than to the bagging hook. The practice of bagging was criticised chiefly on the grounds of neatness but otherwise was reckoned efficient, whereas mowing was condemned as not only slovenly, but also as inappropriate for heavy and badly-lodged crops.

Mowing was slow to take hold on heavy nitrogenous soils, whose high yields and prolific straw growth greatly exacerbated the risks of lodging and tangling. Such were the physical constraints on the use of the scythe that in some areas, notably the Fens and Lothians, hand-reaping persisted into the twentieth century.⁽³¹⁾ It was observed, correctly enough, that on laid crops, 'the powerful leverage of the scythe is lessened, the mower must constantly be making fresh openings and seldom has a clean unhampered sweep, [while] the shearer, with his scythe hook [reap hook], shifts his position easily'.⁽³²⁾ It was further complained that mowing made for loose untidy sheaves which let in the weather, made hard work for the gatherers and binders, and raised the costs of carting, stacking and threshing.

These purely physical factors were an important influence on choice of tool and method mix. Many farmers regarded the several methods as inter-changeable, as equal elements within the method spectrum. Thus, on Romney Marsh and in Thames Valley Berkshire, the cradle scythe was used if the corn was laid all one way and the bagging hook if it was twisted in all directions. On the Fens, sickle/scythe proportions varied from year to year according to crop condition.⁽³³⁾ In 1863, a north Oxfordshire farm, part of the wheat was reaped at 9s. and 13s. an acre and the

rest bagged at 8s. and 11s. ⁽³⁴⁾ In 1850, in north Nottinghamshire, the majority of the corn was mown but the heaviest stands were reaped by 'strangers' (probably Irish). ⁽³⁵⁾ In some districts of southern and south midland England it was usual practice to reserve the heaviest crops of oats and even barley for the sickle.

Other real or alleged constraints on the use of the scythe were as follows:-

- (a) uneven or rock-strewn terrains which restricted the swing of the scythe and caused frequent 'snagging' and blunting of the blade. Prior to the adoption of mowing it was often necessary to roll the field, level-off high backed ridges and remove large stones and exposed tree stumps. ⁽³⁶⁾
- (b) small fields were similarly restricting of swing. This was a standard objection to mowing on small holdings in western Ireland
- (c) the belief that mown sheaves harboured more roots, weeds and dirt than reaped sheaves, thus raising threshing costs and lowering the quality of the sample. The sickle was claimed to cut much more selectively. ⁽³⁷⁾
- (d) that mown straw was more broken than reaped straw and therefore less suitable for thatching. Condition of stem was more important in straw intended for plaiting. In the straw-plait districts corn was usually cut high, 8-12 inches from the ground, the ears removed, and the straw drawn off by hand. In Hertfordshire an acre of good plaiting straw might fetch as much as the corn itself. ⁽³⁸⁾

(e) the insistence of certain 'sporting landlords' that tenants reaped their wheat high so as to leave adequate cover for partridges. On some estates tenants were allegedly covenanted not to use the scythe. (39)

I

As a constraint on the adoption of the faster tools, the skill factor would appear to have been at least as important as the environmental. Resistance to change was especially apparent if innovation involved the retraining of the local workforce in a range of new and unfamiliar techniques. Farm Workers' antipathy towards new methods is, of course, axiomatic, but where, as in harvesting, they provided their own tools, they were especially well placed to frustrate innovation. Having acquired through long practice considerable skill and high earning capacity in one method, they were naturally unprepared to learn another unless the cash incentives to do so were sufficiently large. Young farm workers were more receptive to new ideas than the old, and usually where obsolescent practices hung on, they did so in the hands of the older workmen.

The failure of the Hainault Scythe to establish itself in Britain owed much to the disinclination of local workmen to learn what seemed to^{be} required of them, 'some peculiar and indescribable dexterity'. (40) Would-be adopters of the scythe were warned that 'practice makes great proficiency in this matter', that mowers should, 'not only be strong men, capable of undergoing

great fatigue, but they must use the instrument dexterously, otherwise, they will make only rough work and create only confusion in the harvest field where every operation ought to be carried out with precision and least loss of time!.⁽⁴¹⁾ Scythesmen, it was said, were best made young, 'when the body was flexible and responsive'.⁽⁴²⁾ An Aberdeenshire farmer saw the problem thus: 'Beginners with the sickle very soon learn to reap neat enough but are defective in point of speed, beginners with the scythe very soon learn to reap fast enough but are defective in point of neatness'.⁽⁴³⁾ The chief attraction of the Scottish Y-scythe was that it was worked chiefly by the arms, and did not therefore 'twist the lumbar regions of the body' as much as did the common scythe.⁽⁴⁴⁾

The skill constraint was most operative in north Britain where prior to 1790 the scythe had been employed only for cutting grass. As late as the 1840's local skills were still so scarce that in some parts of southern Scotland corn mowers and even gatherers had to be specially imported from Aberdeen.⁽⁴⁵⁾ In southern Britain the extension of the scythe from spring grains to wheat, or the heavy hook from pulses to corn, were by comparison far less radical shifts. But even here great perseverance was often necessary. A Leicestershire farmer reported how he had 'a dozen times commenced having his wheat mown, and had taken the men out of the field thinking it could not be done'.⁽⁴⁶⁾

Innovation was especially difficult when farmers had little discretion as to the quality of worker they employed. Female harvesters lacked the strength, and part-time industrial harvesters the facility, to become proficient in the use of the slashing and stroking tools. Migrant workers were much more resistant to farmers' demands for hand tool change than resident

workers. The Irish preference for the sickle and disdain for the scythe were for a long time regarded as immutable. Cobbett noted how even in the hay harvest it was unusual for the Irish to mow, that the English did most of the cutting and the Irish the hay-making.⁽⁴⁷⁾ In 1856 Evershed claimed that the reason why reaping was more common than bagging in Warwickshire was that most of the harvesting was done by the Irish, and 'it was difficult to alter their practice'.⁽⁴⁸⁾ Conversely, few Irish went onto the Yorkshire Wolds because farmers wanted their corn mown, and for this purpose were able to hire Dalesmen, 'experts with scythes'.⁽⁴⁹⁾ The standard formula was for the Irish to reap wheat and for native labourers to mow spring corns. Significantly, it was in northern England and south Scotland, the regions in which female, part-time industrial and Irish harvest workers were most abundant, that the reaping machine was most often able to take over directly from hand reaping without the prior intervention of the scythe. On the other hand, migrant harvesters were sometimes important diffusion agents of new techniques. Aberdeen migrants brought their scythes into southern Scotland, Cardigan migrants their 'swiving' hooks into other areas of south Wales, and west Surrey migrants their bagging hooks onto the South Downs.⁽⁵⁰⁾

That in the longer run bagging and mowing did replace hand reaping can suggest only that farmers came to rate labour-saving more highly than either grain-saving or technical performance. The technical difficulties tended, therefore, to evaporate

in the face of mounting labour scarcity. There was, therefore, no invariable correlation between physical environment and the timing of innovation. Among the first areas to adopt faster tools were Nairn, Cardiganshire, Moray and the Yorkshire Dales (rocky and mountainous areas), Aberdeenshire (clays), Romney Marsh and the Essex Hundreds (rich highly nitrogenous soils), and among the latest, the Cotswolds, Chilterns and Berkshire and Wiltshire Downs (light soils, large fields and smooth terrain).⁽⁵¹⁾

The root analysis is that between the 1830's and 1860's, harvest wages increased faster than corn prices, thus raising the marginal cost of saving ears to the point at which labour-intensive, low-loss methods ceased to be profitable.⁽⁵²⁾ Moreover, as the economic importance of corn in the national economy diminished and livestock farming became more important, so some of the non-economic constraints on innovation became less operative, in particular the folk attitudes towards the harvest, of which the sickle was the time-honoured symbol.⁽⁵³⁾ We may conclude that the primary incentive to change was provided by a deterioration in the supply of harvest labour relative to demand.

We would expect, therefore, a close if somewhat laggard correlation between type of technology and labour supply. Indeed, most evidence suggests that farmers delayed the adoption of faster tools until hard experience, coupled with the failure of alternative shifts, had convinced them that only technological change could obviate the risk of serious crop loss and insure against exorbitant wage demands at times of labour shortage. Increasingly, proponents of the sickle tempered their enthusiasm with the qualification that it was profitable only where labour was cheap and plentiful. In South Wales in was 'much corn and too few hands'

which first suggested bagging, ⁽⁵⁴⁾ just as in Inverness, farmers took to mowing, that 'rough and ready was of getting through the work [which] involved a considerable sacrifice of grain', when the supply of labour became insufficient for hand-reaping. ⁽⁵⁵⁾

Conversely, the sickle was still extensively used in Joseph Ashby's Tysoe in the 1870's because labour was still relatively abundant. ⁽⁵⁶⁾

A most important point to establish, however, is that farmers were loathe to innovate if, by doing so, they displaced resident workmen and their families or reduced substantially their harvest earnings. We return, in fact, to the residual employment theme. The case was put most cogently in 1814 by the Irish Farmers Magazine which, arguing against the introduction of the Hainault Scythe, concluded that 'we could not, in this country, where the population is great and without resource, except in agriculture, for employment, recommend the too great abridgement of manual labour. What is gained in money is often lost in sustaining those who are thrown into distress from poverty, the result of inoccupation'. ⁽⁵⁷⁾ The belief, expressed by Marshall in 1790, that 'the poor's rates of a country village falls principally on the farmer; and if he does not employ the poor, he must support them in idleness', summed up nineteenth century attitudes towards agricultural employment. ⁽⁵⁸⁾ As late as 1868 Morton was still proclaiming that, 'farmers cannot employ a few and feed them well, [they] have to maintain all in that parish in the field or in the workhouse'. ⁽⁵⁹⁾ Thus the presence of an abundant supply of resident workmen carried with it a social obligation to provide employment, even at the cost of deliberately passing over opportunities to save labour. In 1825, for example, the Eastern Agricultural Association rejected the Hainault Scythe on the grounds that it threatened to take away

the sickle from 'poor widows etc.'⁽⁶⁰⁾ Stephens himself admitted to reaping one third of a field on oats, so as to give 'a little harvest work to a few elderly men and women, cottars' and hinds' wives, who, having to attend to young children, could not undertake the regular work of the harvest'. Similar considerations tempered his enthusiasm for the scythe. 'Any plan' he said, 'that would deprive the inhabitants of a farm of work I would hesitate to recommend; but when the farmer as at present situated, is very dependent on the public (i.e. non-resident) market of labour to secure his whole year's produce, he is justified in the endeavour to make himself independent in this respect'.⁽⁶¹⁾ In the 1880's, in Flora Thompson's Candleford, farmers still reserved a small field for the few women of the parish who cared to go reaping, even though it was often necessary to call in the Irish to complete the work,⁽⁶²⁾ The Irish practice of providing each male reaper with two female helpers was income-spreading plain and simple, for it was said, 'by giving them [the women] such employment the means of supporting their families are enlarged'.⁽⁶³⁾

Contemporary attitudes towards the introduction of labour-saving machinery are similarly instructive. Social considerations alone dictated that the farmer should 'pause before substituting machines when men are available and wages not too high for men who work at comparatively low wages from October to April should not be grudged higher earnings from May to September'.⁽⁶⁴⁾ As Wren Hoskyns explained, 'the machine doctrine of most produced by least labour, [is] the doctrine of starvation to the labourer and dispossession of the small proprietor'.⁽⁶⁵⁾ In the 1840's, Harleston Farmers' Club resolved that if the threshing machine

was introduced only to save labour, then it was 'most baneful from every point of view it is an evil and a very serious one'. When in 1843, the first threshing machine was introduced into the parish of Ealing, Middlesex, its owner was blamed for injuring the labourers, and that 'at a farmers' ordinary'. The Political Economists would presumeably have supported this censure. 'A threshing-machine', explained Nassau Senior, 'would not cost the wages of one man for a year and would save the wages of two. But the two men are there and must be employed or relieved, so they are set to work with flails'. (66)

Accordingly, the reaping machine appears to have displaced not resident workers but chiefly migrant and part-time industrial workers. C.S. Read reckoned its greatest advantage was that it allowed farmers to dispense with the services of 'strangers' and to secure the harvest using just their resident labour force. (67) Indicatively, local labourers in one area of northern England, having witnessed trials of the reaping machine, were unperturbed at the prospect of its introduction because, 'it would only do the work which is at present done by the Irish'. (68) Nor did mechanization appear to have seriously reduced harvest earnings, although undoubtedly, there were cases in which innovation may have had this effect. In 1869 Clutterbuck noted that in Middlesex, some farmers refused to mechanise the hay harvest lest they 'risk a collision with their regular staff of labourers, who look with an evil eye on that which they considered an interference with the rights of labour'. But when their incomes were guaranteed, farm workers appear to have welcomed the reaping machine, as they had the threshing machine, as a means to easier work. (69) Nor did

every farmer who purchased a machine immediately use it. There is evidence that some at least held it only in terrorem, 'to secure themselves against the difficulty of unreasonable demands, as to price and wages in times of pressure'.⁽⁷⁰⁾ At Candleford it was for a long time regarded as something of a 'farmer's toy', as simply an auxilliary to the scythe.⁽⁷¹⁾

More to the point, mechanization was often only partial. In East Anglia, for example, the reaping machine was for a long time used only for wheat, while barley and oats continued to be mown with the scythe. Where hand tools methods were kept up it may often have been with a view to providing employment. As late as 1914 there were still 'countless cases in which large farmers find it best to keep their men in good employment in summer, even if actual cost might be reduced by machine'.⁽⁷²⁾ An additional constraining factor on harvest mechanization was that farmers were unwilling to displace labour which would then not be available for other operations such as turnip hoeing, hay harvest or hop and fruit picking. Some at least, were prepared to forego mechanization in order to keep men on the farm.⁽⁷³⁾ At New Romney, Kent, the scythe and bagging hook were still in use in the mid-1930's, primarily so it was said, 'to put a little money into the pocket of the worker'.⁽⁷⁴⁾

Likewise, farmers were always very cautious about adopting methods which were likely to unsettle their resident workmen. As Thäer warned, '[Innovations] often damp if not destroy, that alacrity and cheerfulness on the part of the men which cannot be too diligently fostered at harvest time'.⁽⁷⁵⁾ The village community, rightly enough, regarded the harvest as the 'day of prosperity

of continuous work for all, of high wages', the one chance in the year to set aside a small nest-egg of money. Walter Rose said of the harvest in his Buckinghamshire village:-

'the Cottagers regarded the work as their right, cutting the corn was the big event of the year, a task anticipated and arranged for. It was their opportunity of earning a few extra pounds; and not to have this extra money would have meant something like chaos to their carefully planned lives'. (76)

Opposition to the scythe was apparent from the outset. The failure of an early attempt to introduce it, in the 1760's, was attributed to the 'obstinacy and wickedness of the workmen, who wilfully spoiled a considerable quantity of corn that they might cure [the farmer] of enterprising to the prejudice of the poor'. (77) In the same way, attempts during the Napoleonic Wars to promote wheat mowing in Middlesex miscarried because labourers believed it would reduce employment. (78) Similarly in Kent, in the 1830's, the bringing out of the scythe 'on all occasions excited the ill-will of the labourers to a very dangerous extent, for [it] is a most powerful and efficient implement and it is thought that if brought into use it would extinguish harvest earnings'. (79) This fear of work-deprivation, greatest in the low-wage areas, applied also to machinery. It is indicative that farm workers in the Hungerford district of Berkshire remembered Jethro Tull not as the inventor of the seed-drill, but rather, as the man, 'wicket enough to construct a machine which beat out corn without manual labour'. (80) Nor did machine-wrecking cease with the Swing Riots. All manner of devices, files, iron bars and wooden spikes in the field, and sand and grit in the bearings, hindered the progress of the reaping machine. (81) Where sabotage was not direct, it was often indirect, in that labourers

pretended not to understand mechanical things, and showed 'little willingness to overcome difficulties'.⁽⁸²⁾ They objected as well to being asked to cut the laid crops by hand when the fair-standing were cut by machine. 'Them as cut the one ought to cut t'other', grumbled the labourers on Tom Strong's Stubble Farm, and subsequently they broke up the machine in the field.⁽⁸³⁾

It can only be concluded that the introduction of labour-saving factors into the harvest field was a carefully regulated process, constrained by the farmers' sense of social responsibility on the one side, and by the labourers' fear of unemployment on the other. By 1870 much of the clamour against the use of faster harvesting methods had subsided. Or at least, it was much less evident than in 1811-12, when for fear of public reprisals, the Duke of Northumberland and his protégée, the inventor John Common, were obliged to conduct reaping machine trials by moonlight.⁽⁸⁴⁾

1. J. C. Morton, Hand Book of Farm Labour (1868 edn), p. 104;
J. Wilson, Rural Cyclopedia (1851), IV, p. 27.
2. J. Wilson, Our Farm Crops (n.d. Edinburgh), I, p. 126.
3. Private Communications: F. Wyerth, Swallowfield, Berkshire;
R. H. Wilson, Bishopstone, Wiltshire.
4. D. Henry, The Complete English Farmer (1771), pp. 216-7; N. Riches,
Agricultural Revolution in Norfolk (2nd edn, 1967), pp. 132-3;
G. Markham, Inrichment of the Weald of Kent (10th edn), pp. 112-18.
5. For data sources, see, App. II.
6. H. Stephens, Book of the Farm (1844), III, pp. 1057-8.
7. ibid, p. 1050; Agricultural Gazette, 26 July 1845; Farmers Magazine, Nov 1838, p. 335.
8. G. E. Evans, Ask the Fellows who cut the Hay (1956), pp. 85-97;
Private Communications: J. Stuck, Althamstone, Essex;
J. Tuddenham, Aylsham, Norfolk; R. Hendry, Munden, Essex.
9. Private Communications: H. Bew, Padworth, Berks; W. C. Coultrip,
Kingsdown, Kent; F. Wyerth, Swallowfield, Berkshire; A. Gladwin,
Bridport, Dorset; R. H. Wilson, Bishopstone, Wiltshire;
J. O'Rourke, Earley, Berkshire; P. E. Ryder, St. Mary St.
Monmouthshire; Fred Archer, The Distant Scene (1967), p. 173.
10. Wilson (Cyclopedia), op.cit, IV, p. 27.
11. Peter Love, 'On harvesting corn', J R A S E, XXIII (1862), p. 223.
12. Farmers Magazine, Oct 1845, p. 345; Stephens, op.cit, III, p. 1068;
Love, loc.cit, p. 225; S. Jonas, 'On the farming of Cambridgeshire',
J R A S E, VIII (1846), p. 49; Communications to the Board of Agriculture, V (1806), pt I, p. 49.
13. Stephens, op.cit, III, p. 1067;

14. Sources are as follows; i-xv:- J. Tuke, General View North Riding (1800), p. 114 f.; J. Sinclair, Code of Agriculture (1817), pp. 323-7; Farmers Magazine, Oct 1841, p. 280; Nov 1841, p. 367; Agricultural Gazette, 26 July 1845, p. 521; Farmers Magazine, July 1845, pp. 64-5; British Husbandry (SPCK), III (1840), p. 139; Farmers Magazine, July 1845, pp. 64-5; Jonas, loc.cit, p. 49; J. C. Morton, Cyclopedia of Agriculture (n.d.), I, p. 190; W. Dickinson, 'Farming of Cumberland', J R A S E, XIII (1852), p. 233; Morton (Handbook), op.cit, p. 106; Love, loc.cit, p. 223; Agricultural Gazette, 28 Sept 1867, p. 1011; Ward & Lock's Book of Farm Management (n.d.), p. 106.
15. Stephens, op.cit, III, p. 1067.
16. Agricultural Gazette, 24 Aug 1867, p. 891.
17. Agricultural Gazette, 28 Sept 1867, p. 1011. See also, G. Robertson, Rural Recollections (Edinburgh, 1829), pp. 247-8, which complains that while mowing saved much time, three men now had to be hired in place of women, two of whom drew double wages.
18. Love, loc.cit, p. 223.
19. Morton (Handbook), op.cit, p. 105; Farmers Magazine, Nov 1841, p. 367; H. Evershed, 'Wear and tear of agricultural steam-engines and threshing machines', J R A S E, XXIII (1862). See also, costings detailed in Farmers Magazine, Nov 1840 and Aug 1841.
20. Morton (Handbook), op.cit, p. 105.
21. Stephens, op.cit, III, p. 1069.
22. Farmers Magazine, Nov 1841, pp. 367-8; and on the same theme; Sinclair, op.cit, pp. 323-7; A. Young, General View Hertfordshire (1804), pp. 86-7; Wilson (Cyclopedia), op.cit, IV, p. 26; Messrs. Rennie, Brown & Shireff, General View West Riding (1794), p. 135. Long stubbles used for sheep grazing were described as 'poor but dear keep', P. Pusey, 'Autumn Clearance of wheat stubble upon higher land', J R A S E, VIII (1847), p. 572. The displacement of oxen by horses in ploughing may have increased the demand for bedding straw.

In addition to cost savings in the cutting operation itself, complementary savings could be made in the secondary field operations by other labour saving innovations; in particular, the horse-rake. There may also have been an 'intermediate technology' here in the form of larger and better constructed hand-rakes - this is suggested from the Museum of English Rural Life's collection, which contains a large variety of shapes and sizes of rake, and by John Boys' attempt in 1840 to popularize the Kent binding rake, which he claimed was able to sweep the field faster than most conventional designs. Farmers Magazine, Sept 1840, pp. 163-4.

23. Agricultural Gazette, 22 Jan 1853, pp. 58-9, and also, Farmers Magazine, Aug 1845, p. 101; Oct 1841, pp. 280-1.
24. J. Wrightson, 'Comparative economy of different methods of harvesting corn crops', JRASE, 67 (1906), pp. 980106.
25. British Farmers Magazine, Oct 1843, pp. 430-5; Stephens, (1891 edn), op.cit, III, p. 77.
26. ibid, (1891 edn), III, p. 55; Wilson (Cyclopedia), op.cit, pp. 583-9, 593; J. Percival, Wheat in Great Britain (2nd edn, 1948), Chapter VIII, passim. Taylor claimed, though, that by careful management and early cutting, grain losses by mowing need be no higher than in hand reaping, Wilson (Cyclopedia), op.cit, IV, p. 27. However, grain loss would have been highest in the labour-scarce years, either directly, through hurried harvesting of over-ripe corn, or indirectly through the 'blowing out' of yet uncut corn by high winds.
27. Farmers Magazine, July 1845, p. 64.
28. P. McConnell, Diary of a Working Farmer (1906), p. 253.
29. G. Jekyll, Old West Surrey (1904), p. 184.
30. M. Doyle, Practical Husbandry (1839), p. 402.
31. M. J. Malden, Actual Farming (1906), p. 239; Stephens (1891 edn), op.cit, III, p. 57.
32. Farmers Magazine, July 1845, pp. 63-5. It was largely this inability to manage laid and twisted crops which brought the scythe into disrepute. See also, F. Miller, The Husbandman's Directory (1770); Sinclair, op.cit, p. 326; British Husbandry, op.cit, II, p. 190; Agricultural Gazette, 4 May 1850, p. 284; Farmers Magazine, Oct 1841, pp. 280-1; Sept 1845, p. 212; Hale, op.cit, IV, p. 359, recommended the scythe only for thin crops.
33. Private Communications: F. Wyerth, Swallowfield, Berkshire; R. G. Wood, New Romney, Kent. (Fens): Farmers Magazine, Aug 1865, p. 156 cf.; A. D. Hall, Pilgrimage of British Farming (1913), p. 75; McConnell, op.cit, pp. 239, 253, and P. McConnell, The Complete Farmer (1911), pp. 391-2.

34. Reading University Library, Farm Records Collection, Radford Farm P275-7.
35. Agricultural Gazette, 4 May 1850, p. 284.
36. W. Davies, General View North Wales (1810), p. 167; J. Headrick, General View Angus & Forfarshire (1813), p. 315; Robertson, op.cit, pp. 247-8; R. Kerr, General View Berwick (1809), p. 244; Farmers Magazine, Aug 1845, p. 101; Oct 1853, p. 330. In Scandinavia (as in Scotland) the coming in of the scythe was associated with the use of the heavy roller. A Steensberg, Ancient Harvesting Implements (Copenhagen, 1943), pp. 232-5.
37. A. Clergyman, Useful and Practical Observations on Agriculture (1783), pp. 119-20; The Penny Encyclopedia, XI (1838), p. 58. A Kent farmer reckoned a sample of reaped corn was worth 2s per quarter (c. 7s an acre) more than that of mown corn. Farmers Magazine, Nov 1841, p. 368.
38. H. Evershed, 'Agriculture of Hertfordshire', J R A S E, XXV (1864), p. 275; T. Hennell, Change in the Farm (Cambridge, 1934), pp. 145-9; J. Dony, A History of the Straw Plait Industry (Luton, 1962), pp. 61-2; The thatching constraint appears particularly evident in south-west England, where not only was the scythe not used on that straw, but also the corn was threshed by 'knocking' out over a trestle rather than by the flail or machine. Private Communications: C. A. Jewell, Museum of English Rural Life; H. Gladwin, Bridport, Devon.
39. S. Copland, Agriculture Ancient and Modern (1866 edn), II, p. 194; Farmers Magazine, Nov 1841, p. 367; Aug 1845, p. 141; Aug 1866, p. 89.
40. Wilson (Cyclopedia), op.cit, II, p. 377.
41. Stephens, op.cit, III, p. 1050, and also, Farmers Magazine, Sept 1845, pp. 216-7.
42. Rose, op.cit, p. 103.
43. Wilson (Cyclopedia), op.cit, III, p. 27. Stephens, too, was convinced that 'practice makes great proficiency in this matter', op.cit, III, p. 1068.
44. ibid, III, pp. 1062-3.

45. Farmers Magazine, July 1845, pp. 64-5; Sept 1845, p. 211. A prime reason for the failure of the scythe to spread more quickly in Scotland after 1850 was stated by J. Wilson as 'the greater difficulty of finding good mowers than good reapers', British Farming (Edinburgh, 1862), p. 309.
46. Agricultural Gazette, 26 July 1845, p. 521. Around Loughborough in 1845 the scythe was advancing only slowly largely because it was difficult to get workmen 'to act in improved ways because they are not used to them'. Farmers Magazine, Aug 1845, p. 140. In mid-Kent most labourers could mow but few were expert in bagging, and as farmers used few migrant workers 'it was difficult to get bagging done'. Farmers Magazine, Nov 1841, p. 367.
47. 'It is curious' remarked Cobbett in 1822, 'how the different labourers are divided as to nations. The mowers are all English; the haymakers all Irish'. Rural Rides, 19th June 1822.
48. H. Evershed, 'Farming of Warwickshire', J R A S E, XVI (1856), p.480.
49. G. Legard, 'Report on the Farming of the East Riding of Yorkshire', J R A S E, IX (1848), pp. 117-8. The Irish preference for the sickle was matched by the Welsh migrants' preference for the bagging-hook. In Shropshire, on the Barleylands, they worked side by side in the field. H. Tanner, 'Agriculture of Shropshire', J R A S E, XIX (1858), p. 17. Following the increase in the supply of Irish migrant harvesters in 1867, farmers in the Vale of York again took up the sickle; 'formerly the scythe was most used'. Agricultural Gazette, 24 Aug 1867, p. 888.
50. Farmers Magazine, July 1845, pp. 64-5; Davies, op.cit, I, pp. 424-8; G. Bourne, Lucy Bettesworth (1913 edn), p. 141.
51. The regional chronology of innovation is detailed infra, pp. 306 ff. The fact that hand reaping often stayed longest on smallholdings is better explained by economics than topography. On small subsistence farms with small grain areas the incentives to labour-saving with family labour well supplied would have been very low and those for grain-saving very high.
52. Between 1830-39 and 1860-69 wheat prices fell 8 per cent while barley and oats prices increased by only 11 per cent and 6 per cent. B. R. Mitchell & P. A. Deane, British Historical Statistics (Cambridge, 1962), pp. 448-9. Over the same period average weekly earnings rose 17 per cent in England and 57 per cent in Scotland. ibid, pp. 349-50. Harvest wage data are notoriously scarce but between the late 1840's and the late 1850's hiring rates increased by c 30 per cent. Agricultural Gazette; 27 April 1850, pp. 366-7; 30 April 1860, pp. 392-3.

53. This is, of course, a very secondary consideration but it is well not to underrate the influence of folk attitudes particularly in a society many of whose values were still recognisably pre-industrial, and which was only a century or so removed from the threat of famine. Folk attitudes, particularly among the older villagers, died hard and probably helped retard the process of change.
54. Davies, op.cit, I, pp. 424-8.
55. Agricultural Gazette, 1 April 1861, p. 296.
56. M. K. Ashby, Joseph Ashby of Tysoe (Cambridge, 1961), p. 25. In the 1760's, the Museum Rusticum, comparing the scythe and sickle, recommended the former tool when speed was necessary, but, it went on, 'when hands can be procured, and the wheat fully ripe, there is no method will ever exceed that of hand reaping, if decency, saving and dispatch be considered going hand in hand'. ibid, II (revised edn, 1764), pp. 360-2. A century later, Wilson advised reaping only when 'a sufficient number of labourers at reasonable cost can be obtained'. Cyclopedia, op.cit, I, p. 347.
57. Irish Farmers Journal, 6 Aug 1814.
58. W. Marshall, Rural Economy of Norfolk (2nd edn, 1795), II, p. 44.
59. Morton (Handbook), op.cit, p. 76.
60. Farmers Magazine, Nov 1825, p. 490.
61. Stephens, op.cit, III, pp. 1068-9.
62. Flora Thompson, Lark Rise to Candleford (Oxford, edn, 1954), pp. 256-7.
63. Morton (Cyclopedia), op.cit, IV, p. 26.
64. R. P. White, ed, The Standard Cyclopedia of Modern Agriculture (n.d.), VII, pp. 226-7.
65. Cited in T. E. Cliffe Leslie, 'The Land System of France', in J. W. Probyn, ed, Systems of Land Tenure (2nd edn, 1881), p. 307.

66. Reports of the Harleston Farmers' Club, 1838-1849 (1850), pp. 112-3; Nassau Senior, Industrial Efficiency and Social Economy, ed, S. Levy (1928), II, p. 242; J. H. Clapham, An Economic History of Modern Britain (Cambridge, 1964 edn), I, pp. 461-2; Report and Minutes of Evidence of the Select Committee of the House of Lords on the Poor Laws, 1830-31 (1831), pp. 254-5.
67. Morton (Handbook), op.cit, p. 105. Elsewhere Read observed that 'farmers are kind enough to their own folk, yet naturally care but little for the riffraff of other parishes'. 'Improvements in Norfolk Farming', J R A S E, XIX (1858), p. 293. And also, Jacob Wilson, 'Reaping Machines', Trans. Highland Agricultural Society (1864), p. 149.
68. Farmers Magazine, Sept 1853, p. 199.
69. In 1880 it was claimed that only in very few cases had the reaping machine actively reduced earnings. R.C. on the Distressed Condition of the Agricultural Interests (1881), Reports of the Assistant Commissioners, pp. 337-42.
70. J. C. Clutterbuck, 'On the farming of Middlesex', J R A S E, 2nd ser, V (1869), p. 10 (this reference relates to grass-mowing machines); R.C. on Agricultural Distress, op.cit, Minutes of Evidence, III, Q. 60520.
71. F. Thompson, op.cit, pp. 256-7.
72. White (ed), op.cit, VII, pp. 226-7.
73. A Worcestershire hop-farmer, for example, A. H. Savory, Grain & Chaff from an English Manor (1920), p. 82.
74. Private Communication: R. G. Wood, New Romney, Kent.
75. A. Thaër, The Principles of Agriculture (English edn, 1844), II, pp. 380-1.
76. Rose, op.cit, p. 27. Richard Jefferies described the harvest as 'the labourer's gold mine'. Toilers of the Field (1894 edn), p. 122.
77. Museum Rusticum, III (1764), p. 365.
78. J. Middleton, General View Middlesex (1807), p. 216.

79. Report on the State of the Irish Poor in Britain (1835), App. G. p. 165.
80. J. A. Ransome, The Implements of Agriculture (1843), p. 5.
81. In most areas of rural England there still survive in the folk memory tales about the wrecking of harvesting machines, certainly in south and east England, but surprisingly too, in Yorkshire. Private Communication: T. Marshall, Tonbridge Wells. Harvesters in Edinburgh and Linlithgow 'bewailed' them. T. Farrall, 'On the Farming of the Counties of Edinburgh & Linlithgow', Trans. Highland Agricultural Society, 4th ser, IX (1871), p. 17. Farmers Magazine, Aug 1860, p. 176 condemned 'the worthless miscreant' who had driven a bar in the ground to catch the reaper. For the wrecking of threshing machines in 1830, see, E. Hobsbawm & G. Rudé, Captain Swing (1969), passim.
82. Davies, op.cit, I, pp. 444-5; Agricultural Gazette, 4 Sept 1854, p. 571.
83. Anon, Stubble Farm (n.d.), II, pp. 209-11. See also, Farmers Magazine, Aug 1867, p. 174. Examples of machine-wrecking in the period after 1870, are numerous, and in many rural areas these have survived in the folk-memory to the present day. At Beenham, Berkshire, for example, in the late 1880's, one farmer had to have his reaping machines guarded from gangs of about 20 men who had formerly taken the harvest by hand, and who feared unemployment. The local policeman had to patrol the area at night. Private Communication: Dr. E. L. Jones, University of Reading, ex inform, Mrs. Froom, Orchard Road, Mortimer, Berks, March 1970.
84. D. Pidgeon, 'The Evolution of Agricultural Implements - I', J R A S E, 3rd ser, III (1892), p. 63.

CHAPTER XV

THE CHRONOLOGY OF CHANGE IN HAND HARVESTING TECHNOLOGY, 1790-1870.

The State of the Art in 1790.

The later eighteenth century marked an important watershed in the history of British harvesting technology. It would be approximately true to say that in 1750 the range and geographical distribution of harvesting techniques was little different than in the early sixteenth century when Fitzherbert noted the sickle, reap hook, bow and cradle scythes all in use in south Britain.⁽¹⁾ The practice of mowing spring corns had been introduced into southern England before 1350 and by 1550 had become standard procedure over most of Britain south of the line Humber to Mersey. But significantly, in 1790, it was still virtually unknown in northern England, Scotland and Ireland, where all grains were cut with the sickle.

The eighteenth century witnessed certain important qualitative changes in the method mix. The East Riding of Yorkshire was the first area to extend the scythe from spring corns to wheat. The practice came in sometime between 1641 when Henry Best at Elswell was hiring mowers from 'the Moors' to cut his 'haver' (spring) corn and issuing 'harvest gloves' to his wheat reapers,⁽²⁾ and the 1760's, when according to Comber all corns on the Wolds were mown, 'the quantity there being so great, that it would be impossible to find hands sufficient to shear [reap] it'.⁽³⁾ In the

early 1760's considerable interest was aroused by some experiments with the Hainault and Brabant Scythes carried out on a farm in Northamptonshire and reported in the Museum Rusticum.⁽⁴⁾ In 1771 Stillingfleet referred to the mowing of wheat as 'a subject much sidcussed within a few years and with great warmth'.⁽⁵⁾ In the 1740's, William Ellis, of Little Gaddesdon, Hertfordshire, was recommending the Kent cradle scythe in place of what he described as, the 'old erroneous custom of mowing corn with the bare scythe'. As early as 1759, another agricultural writer, Thomas Hale, was advising farmers to vary their method-mix according to the condition of the crop: i.e. to cut their heaviest crops of wheat with a sickle, their poorer with a reap hook, and their thinnest and shortest with a scythe; to mow upright crops of barley and oats with a cradle scythe, partially laid with a bow scythe and most badly laid with a naked scythe.⁽⁶⁾ The origins of bagging are not clear. The practice is not referred to by either Tusser or Fitzherbert but we can reasonably assume that it too evolved during the first half of the eighteenth century, probably as a variant of smooth hook reaping or as an extension of a practice already used on peas and beans. One of the methods of hand reaping employed in Norfolk in the 1780's is curiously reminiscent of bagging, in so far as the reaper, instead of filling the sheaf as he cut, drove the corn before him with his feet until enough had accumulated to form a sheaf.⁽⁷⁾ There is, however, no evidence that subsequently the practice of bagging proper ever became established in the county. It would appear though, that by this stage bagging was already common in Middlesex and Devon.

The Board of Agriculture Reports (1793-1815) provide a

very comprehensive body of information about the state of the art in the late eighteenth century, sufficient for the construction of method distribution maps. This does not imply that the evidence is always satisfactory. Many reports dismiss the subject briefly, while the state of readiness of the crop, or the construction of stooks and stacks, sometimes monopolised more text than the cutting process itself. However, some reports, such as those for South Wales and Lancashire, treat the subject at great length. Fully detailed descriptions of harvest tools and methods are not available until after 1835, and even then Scottish practices tend to be better documented than the English.⁽⁸⁾ Not infrequently, 'scythe' and 'sickle' interested rural encyclopaedists less than 'acorns' and 'adders'. Nor was their terminology always precise. The terms 'sickle' and 'hook' were sometimes used indiscriminately while 'reaping' was often no more than a conventional synonym for 'harvesting', irrespective of tool and method. However, most inconsistencies can be resolved from their context. Fortunately, we are chiefly concerned with the economic rather than the ethnographic aspects of harvesting change, which means that most minor local and regional variations in tool form and modus operandi can be safely ignored.

In 1790, wheat was almost everywhere cut by sickle or reap hook. The precise regional distributions of the two tool forms is unclear. The sickle appears to have predominated in south-east, east, midland and northern England, over most of Scotland except the extreme south-west, and over most of Ireland except the north-east. The reap hook claimed the greater part of Wales, the English Marcher counties and south-west England. The two tools overlapped in south and west central England. Smith's Key

to the Trades and Manufactures of Sheffield suggests that in 1790 the sickle was by far the most popular tool: out of the 25 tools illustrated all but half a dozen carried a serrated edge. (9)

High reaping was practiced in eastern, midland and south-central England, and also, but probably to a lesser degree, in Cheshire, the Vales of York and Cleveland, north-east England and central Scotland.

Exceptions to this general pattern appear as follows:-

- (a) Mowing Wheat:- regularly in the East Riding, and occasionally, and perhaps still only experimentally, in east Kent, south-west Essex, east Dorset, south Hertfordshire, Norfolk, Shropshire, west Cardiganshire, the Vales of Clwyd and Towy and parts of the Llyn Peninsula. (10)
- (b) Bagging Wheat:- in the inner Home Counties (Hertfordshire, Kent, Middlesex and Surrey), the English Marcher Counties (Herefordshire and south-west Shropshire), and south-west England (south Devon and perhaps extreme west Dorset and south-west Somerset). (11)
- (c) Swiving Wheat:- in Cardiganshire. (12)

In the harvesting of the spring corns, barley and oats, there were fundamental differences between the practices of south and north and west Britain. In the former area, barley and the majority of oats were mown, and in the drier, warmer, counties of east and south-east England were often carted loose from the swathe. In the latter, all spring corns were hand reaped, and all sheaved and stooked. The Table below attempts to demonstrate that the

approximate northward line of demarcation between the two areas ran between Chester in the west and Whitby Bay in the east. (13)

Methods of Harvesting Barley and Oats in north Midland and northern England.

	<u>Barley</u>	<u>Oats</u>
Cheshire	mown	mown
Derbyshire	mown	reaped
Nottinghamshire	mown	mown
Lincolnshire	mown	mown
East Riding	mown	mown
North Riding (south)	mown	mown
<hr/>		
North Riding (north)	reaped	reaped
Northumberland	reaped	reaped
Cumberland	reaped	reaped
Westmorland	reaped	reaped
Lancashire	reaped	reaped
Isle of Man	reaped	reaped

The exceptional practices appear as follows:-

(1) In England and Wales: all spring corns were reaped in the Channel Islands, Isles of Scilly and mountain districts of North Wales; oats and sometimes barley were reaped in the East Anglian Fens, and occasionally heavy crops of oats and possibly even barley were reaped in a few parts of southern Britain, chiefly in the heavier soil areas. (14)

(2) In north Britain and Ireland: spring corn was mown very occasionally in southern Scotland, the Isle of Man and in a few places in eastern Ireland, such as Queens co. and Kilkenny. (15)

The evidence for the use of 'bow' and 'cradle' attachments is extremely patchy. According to Marshall, naked scythes were the rule throughout the Midlands, while according to Davies, in South Wales the 'cradle' was used only in Carmarthenshire, and in North Wales only in the Vale of Clwyd. (16) As far as can be gathered the 'cradle' was unknown in Scotland and Ireland and its use in England very much confined to the southern counties, Kent and Surrey in particular. The 'bow' was recorded only in the East Riding and East Anglia. This does not preclude their wider usage, but the impression conveyed by the contemporary sources is that in most counties, in Bedfordshire, Berkshire, Dorset, Hertfordshire and Lancashire, for example, the use of any form of attachment was still very much a novelty in 1790. (17)

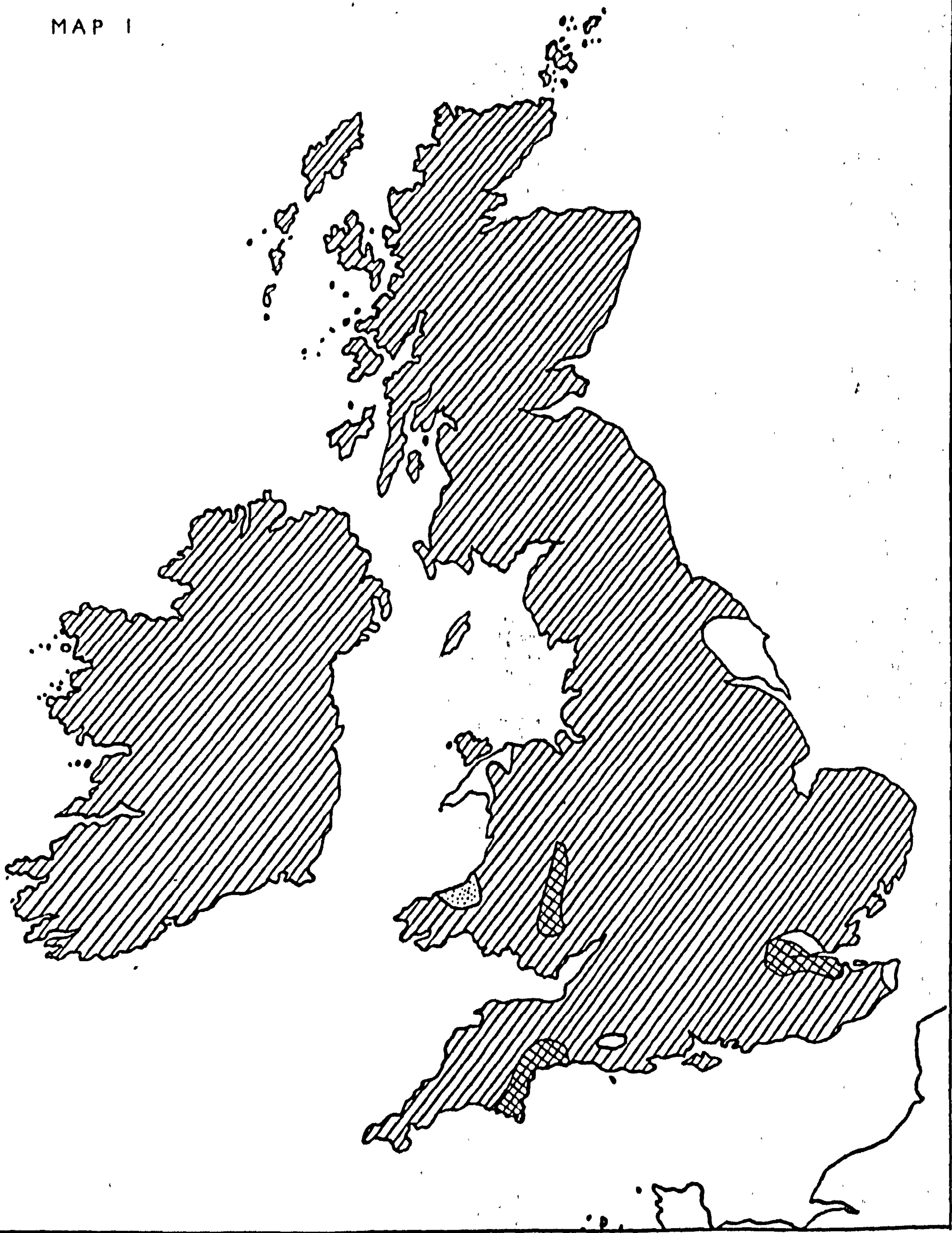
For comparative purposes, some attempt, however crude, must be made to quantify crop/method distributions in the base year 1790. The crop/method mix in northern England, Scotland and Ireland presents few problems, as we can safely assume that at this stage all three cereals were still exclusively hand-reaped. The situation in England and Wales was much more complex, but the degree of error may not, however, be very great, because we know, first, that practically all spring corn was cut by the scythe, and second, that the majority of wheat was cut by the reap hook and sickle, with the deviant areas small and fairly well documented. The major difficulty is that there exist no reliable corn acreage statistics for 1790. Let us assume, though, that the national crop mix and

regional crop distributions in 1790 were of the same relative order as in 1870. On this basis we can calculate crop/method distributions by the crude expedient of applying the 1790 crop/method mix (derived from the contemporary literary evidence), to 1870 crop acreages (derived from the Agricultural Statistics). The results are mapped and tabulated below.

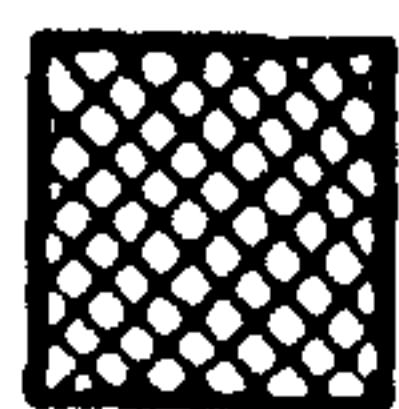
Approximate Proportion of Cereal Area Cut by Different Hand Tool Methods in 1790 (in per cent)

	<u>Wheat</u>	<u>Barley</u>	<u>Oats</u>
<u>Sickle or Reap Hook</u>			
Great Britain	92	30	75
England and Wales	88	25	35
Scotland	100	100	100
Ireland	100	100	100
<u>Scythe</u>			
Great Britain	3	70	25
England and Wales	5	75	65
Scotland	0	0	0
Ireland	0	0	0
<u>Bagging Hook</u>			
Great Britain	5	(1)	(1)
England and Wales	7	(1)	(2)
Scotland	0	0	0
Ireland	0	0	0

MAP 1



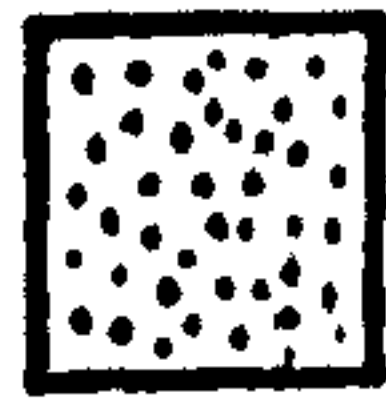
SPATIAL DISTRIBUTION OF HARVEST METHODS
1790 - WHEAT



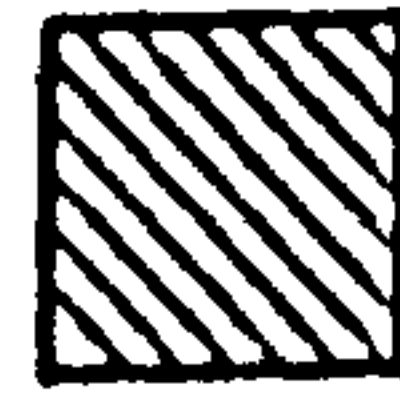
bagging



mowing

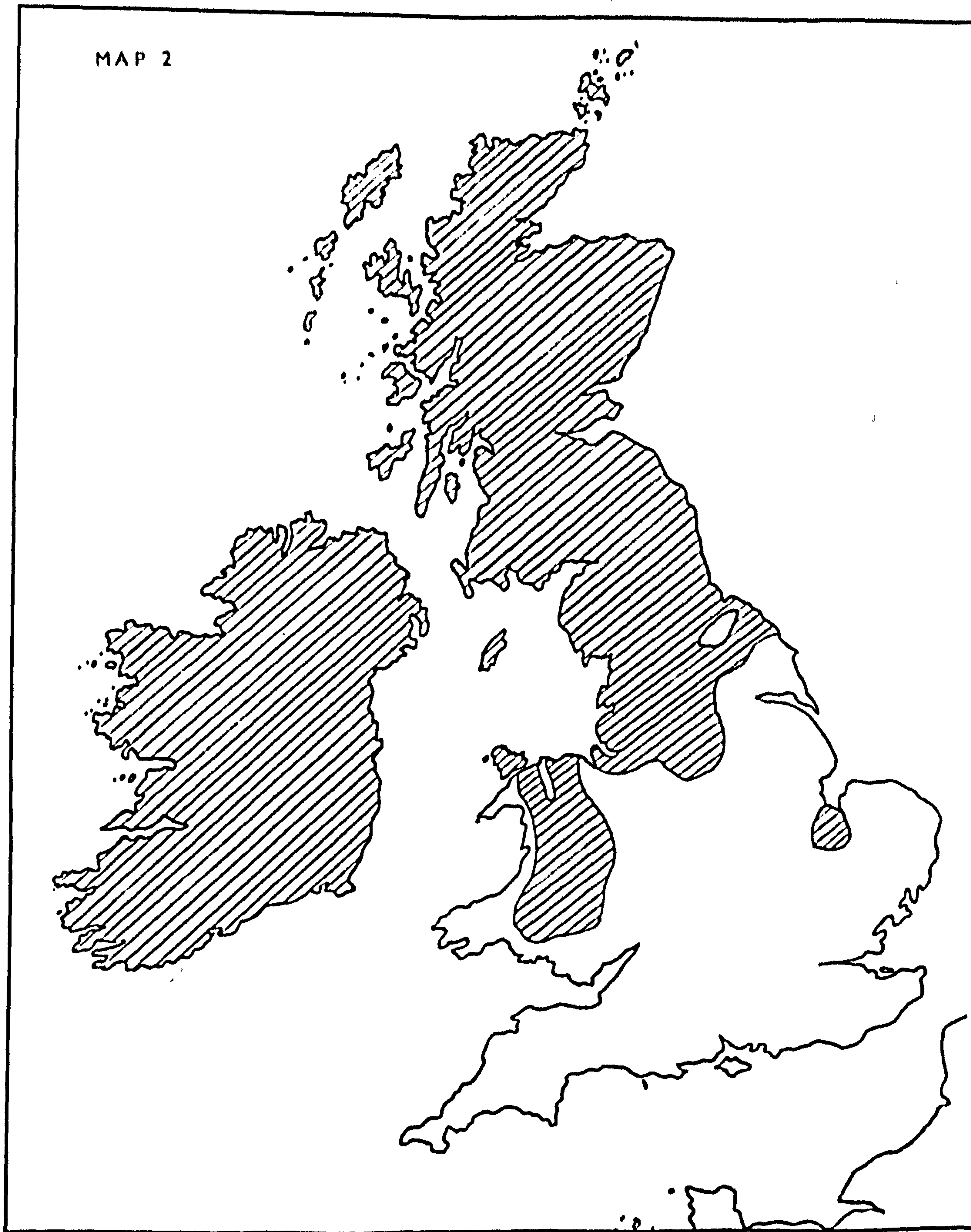


swiving



hand-reaping

MAP 2



SPATIAL DISTRIBUTION OF HARVEST METHODS

1790 - BARLEY & OATS



mowing



hand-reaping

The Chronology of Hand Tool Change, 1790-1870.

The phases of the hand tool 'revolution' coincide approximately with the different stages of the long-run harvest labour demand/supply curve. The period 1790-1814 saw an upsurge of innovating activity; 1815-1833, low levels of innovating activity; 1834-51, a resumption of innovating activity (the 'early majority adoption phase'), and 1851-70, much increased innovating activity (the 'late majority adoption phase').

Each phase of the long-run adoption sequence will be treated successively.

PHASE I, 1790-1814.

The spirit of the age was best summed up by Walter Davies in 1815. 'Formerly', he said, 'provincial customs seemed to be entirely locomotive; they continued unnoticed where they began now a mutual adoption of each others' customs takes place to the greater expedition of harvest labour',⁽¹⁹⁾ Change was not, however, dramatic: it affected probably less than 10 per cent of the national corn area, and was, moreover, regionally selective. Yet although only a small minority of farmers chose to depart from the status quo, a high proportion became more critically aware of the new methods and their labour-saving potential. The scale of innovation was still great enough for the more conservative farmers to feel the old order threatened.⁽²⁰⁾ So alarmed was the Berkshire Agricultural Society at the growing popularity of the reap hook that it organised special classes to promote the

use of the sickle, while in Scotland, farmers were urged to boycott the reap hook, refuse to employ labourers using it, and otherwise to banish 'that unprofitable implement from the field'.

Young was sufficiently convinced of the superiority of the sickle as to try to persuade farmers to reap even their spring corn. (21)

His exhortations were in vain, because despite much opposition, the mowing of corn continued to be 'a question in agriculture', and the scythe continued to gain ground. (22)

In south Britain innovating activity seems to have been most vigorous on the Dorset Downs, it being noted in 1806 and in 1831 that 'a great deal of the wheat is mown, which was formerly reaped: this [being] advantageous to the farmer, for when wheat is got to be put into the bund [band] the women are employed to do it, and a great many acres are secured in a few days'. (23)

Mowing also displaced high-reaping in parts of upland Leicestershire, (24) while it was reported in 1810 that wheat was frequently mown in Cornwall when reapers were in short supply. (25)

In South Wales mowing may have spread rather quickly. It was complained in 1803 that the mode of reaping by the hook had become 'shamefully negligent'. A while later, Davies reported 'cradle scythes' in use in five South Wales counties, where previously they had been confined to the Vale of Towy, and the mowing of wheat in the Vale of Usk. (26)

In at least two areas of north Britain, north-east Scotland and northern England, the corn scythe appears to have gained considerable ground. Writing in 1800, Tuke commented on the fact that a few years previously all spring corn in the northern part of the Vale of York and in the Vale of Cleveland had been reaped with the sickle, but that this practice was now rapidly giving

way to mowing.⁽²⁷⁾ The occasional mowing of barley and oats was also reported from Durham.⁽²⁸⁾ The corn scythe came into Aberdeen around 1800.⁽²⁹⁾ By 1806 it had also penetrated Perthshire (an event which elicited some surprise that a method which required only the fixing of the 'cradle' to the ordinary grass-scythe and which saved much labour and straw, was not more practiced),⁽³⁰⁾ and by 1808 had been tried in Nairn and Moray.⁽³¹⁾ There were similar attempts to introduce the "English method" of mowing corn into Forfar, but it was not until the dry hot summer of 1814 when the corn ripened rapidly and labour became suddenly very scarce, that it was taken up on any scale.⁽³²⁾ How much of this activity was purely experimental is difficult to gauge. It may even have been exceptional, for what is clear is that elsewhere in Scotland and in north-west England progress was by any standards unspectacular.⁽³³⁾ In Cumberland, the advent of the scythe in the Whitehaven area was wholly fortuitous, it having been introduced there by a company of Welsh Militiamen.⁽³⁴⁾ Mowing scarcely challenged hand-reaping in Lancashire despite 'the very extravagant wages demanded for this sort of labour', although this was perhaps due to the county's heavy dependance on female, part-time industrial and Irish migrant labour. In 1794 a few farmers around Liverpool began mowing, but it subsequently failed to spread to other parts.⁽³⁵⁾ Nor did the scythe do any better in Ireland; apart from a limited use in the eastern counties of Queens, Dublin and Kilkenny, the hand-reaping tools held undisputed sway.⁽³⁶⁾

The practice of bagging wheat may have extended more rapidly in southern Britain than the contemporary evidence suggests. It spread from Devon into west Dorset and by 1812 had reached the Dorset Downs.⁽³⁷⁾ It also gained ground in extra-metropolitan

Surrey, while its reported presence in south Oxfordshire in 1809 suggests that it had by then also penetrated east Berkshire and south Buckinghamshire.⁽³⁸⁾ 'Much corn and too few hands' first suggested 'bagging' in South Wales which practice was subsequently imported from the English Marcher counties under the name of the 'Wenlock Stroke'. In 1810 migrant workers from South Wales (probably Cardiganshire), were 'hacking' in Herefordshire.⁽³⁹⁾

In certain areas of Britain the smooth reap hook appears to have gained considerable ground at the expense of the serrated sickle. In England, this transition was most apparent in the south-west, where the reap hook and sickle had shared the field in 1790 but where according to one account, the serrated edge had virtually disappeared by 1815. The adoption of the reap hook may in some cases have signalled a switch from hand reaping into something resembling 'bagging'. There were complaints of 'bagging' in east Dorset,⁽⁴⁰⁾ while it was perhaps fear of bagging which prompted the Berkshire Agricultural Association to organize its sickle-reaping classes.⁽⁴¹⁾

Irish migrant harvesters were claimed to have introduced the reap hook into Galloway around 1790, whence it spread to other counties of south-central Scotland where by 1811 it was already seriously threatening the hegemony of the sickle. Except in Galloway itself the transition was incomplete by 1815. In 1814, for example, it was reported from Clackmannanshire that although the reap hook was 'fast advancing', the sickle was still the predominant tool.⁽⁴²⁾

In 1813-14, at the instigation of Sir George Rose, New Forest resident and one-time Chancellor of the Exchequer, the Christchurch (Hants) Agricultural Society recruited a Flemish prisoner of war to instruct local workmen in the use of the

Hainault Scythe. In subsequent trials the new learners emerged easy winners over picked men with the reap hook and sickle. Local farmers were clearly not impressed, or at least, not enough to adopt the tool permanently. Thus, this attempt to expand the spectrum of harvest technology from without Britain, like the Northamptonshire trials of 1763 and the Highland Society trials of 1825, proved abortive.⁽⁴³⁾

PHASE II, 1815-33

The rate of adoption of the faster tool visibly slackened after 1815 and remained sluggish until the mid-1830's, when the hand tool revolution regained its lost momentum and entered upon its early majority adoption phase.⁽⁴⁴⁾ With the close of the War, harvesting change, a subject which had previously been 'a question in agriculture' and which later was to become a priority issue, ceased to interest the generality of farmers. This does not imply complete inertia. The scythe and heavy hook appear to have gained some ground, but the overall impression is that innovation was at best selective, and chiefly confined to areas where activity had been most vigorous during wartime. Over most of Britain method-dispositions remained basically unchanged. In 1825, for example, Loudon observed that wheat was still 'almost universally' cut with the sickle, and that in north Britain and Ireland spring corns were 'almost everywhere' hand-reaped.⁽⁴⁵⁾

Only north-east Scotland and a few areas of eastern and east Midland appear to have experienced dramatic change. In 1835 mowing was reported the general rule in Aberdeen,⁽⁴⁶⁾ but most elsewhere in Scotland it was still very much in the experi-

mental stage. In the Lothians it was reported as having been tried 'again and again', but, the source went on, 'whether it is from want of experience or that it cannot be done, we have not found it advisable hitherto'.⁽⁴⁷⁾ Especially indicative was the failure of the Hainault Scythe to make headway after the many and elaborate trials and demonstrations organized by the Highland Society in 1825.⁽⁴⁸⁾ There were, however, one or two minor compensating developments: the reap hook continued to displace the serrated sickle in central and southern Scotland,⁽⁴⁹⁾ while large numbers of farmers adopted the practice of cutting their corn at an earlier (yellow green) stage of ripening, a useful concomitant to mowing and smooth hook reaping which reduced grain loss during cutting.⁽⁵⁰⁾

Except in west Norfolk where, according to Hillyard, wheat was mown with the cradle scythe in 1831, and in Nottinghamshire (but perhaps, too, in Lincolnshire), where in 1840 only old men were said to know how to use the sickle, there is little evidence for spectacular change in England.⁽⁵¹⁾ As late as 1854 the Newcastle Farmers' Club was still trying to persuade its members to mow their wheat.⁽⁵²⁾ More surprising is that in Yorkshire the scythe failed to improve upon its already strong wartime position. In Holderness half the wheat was reaped in 1834, as also, a decade later were large acreages of wheat and other grains in the Vales of York and Cleveland and in the West Riding.⁽⁵³⁾

The advance of the bagging hook was similarly slow and undramatic. By the 1850's it had barely penetrated central Oxfordshire and Buckinghamshire.⁽⁵⁴⁾ According to one of George Sturt's informants, it reached West Surrey only around 1840, having taken thirty years to cover the few miles from the metropolitan parts of the county, where it was already well-established in 1800.⁽⁵⁵⁾

By 1850 bagging had gained only a slender foothold in Gloucestershire, notwithstanding its close proximity to the old Dorset and Herefordshire concentration.⁽⁵⁶⁾ Predictably, hand-reaping lost none of its monopoly in Ireland; and indeed, as late as 1839, Doyle was still trying to interest Irish farmers in the scythe and bagging hook.⁽⁵⁷⁾

Lower levels of innovating activity are best demonstrated by evidence of actual shifts into more labour-intensive methods. In Devon for example, bagging was giving way to hand-reaping in the late 1820's, just as it also appears to have done in parts of mid-Kent, where according to one farmer, not a single workman understood the method in 1826, notwithstanding Marshall's claim that it was well-established in the district in 1790. Similarly, the corn scythe lapsed in the Whitehaven district of Cumberland following the withdrawal of the Cardigan militiamen.⁽⁵⁸⁾ It would appear, though, that rather than abandon the new tools completely, most farmers now used them much less frequently and only in the exceptional season when time was short. There is indirect evidence that in parts of southern and Midland England hand-reaping became a more frequent mode for spring corns and that in central southern England (Berkshire and Oxfordshire) the bagging hook replaced the traditional scythe in the harvesting of barley and oats.⁽⁵⁹⁾ In parts of north Britain, including the East Riding, hand-reaping appears to have recovered lost ground, primarily because of the large influx of Irish migrant harvesters who were 'unacquainted' with mowing, but who could be relied upon to reap at a 'moderate [i.e. cheap] price'.⁽⁶⁰⁾

PHASE III, 1834-51.

Interest in the stroking and slashing tools revived strongly in the mid-1830's to usher in the early majority adoption phase of the hand tool revolution. 'The sickle', it was observed in 1837, 'was formerly the only implement employed for the reaping of wheat, the scythe being applied than only to oats and in some instances barley. Of late years, it has come very much into use and seems to be gaining ground for cutting down every kind of grain'.⁽⁶¹⁾ In 1839 Doyle noted that 'latterly', the scythe, 'this implement for mowing grass had been extended to grain'.⁽⁶²⁾ In his detailed 1845 review of the state of the art Sullivan attested to the, 'very considerable advances [which] have undoubtedly been made within the last few years in many parts of the Kingdom towards the adoption of a more judicious and economical mode'.⁽⁶³⁾ The recent more rapid advance of the bagging hook was alluded to in 1840.⁽⁶⁴⁾

The farming press argued the merits and demerits of the competing methods, but now, and in marked contrast to former times, urged change as a matter of economic necessity. As early as 1840, one Nottinghamshire farmer had become so convinced of the advantages of mowing wheat that he forecast it would soon become general from 'Caithness to Cornwall'.⁽⁶⁵⁾ His optimism was perhaps excessive, but by the next decade it had become almost a matter of pride to be able to report the extinction of hand-reaping, the sickle being described in one case, as now so obsolete as to deserve being 'hung up in the British Museum'. There appeared in the first volume of the Royal Agricultural Society's journal (1840) an article extolling

the virtues of the Kent cradle scythe and binding rake.⁽⁶⁶⁾ In 1837, the Library of Useful Knowledge published a series of tracts on rural affairs, of which two were devoted to the scythe and the sickle. Detailed treatments of harvesting technology appeared in all the contemporary agricultural encyclopaedias, in the case of Stephen's Book of the Farm (1844), running to some 56 pages.⁽⁶⁷⁾

Farmers' Clubs and local agricultural societies appear to have played a key rôle in the diffusion of new methods. Talks and discussions on harvesting techniques featured on many winter programmes, and here the relative advantages and disadvantages of the sickle, scythe and bagging hook, and their applicability to local situations were threshed out. Some clubs organized field trials to assist members evaluate the different methods. Newcastle Farmers' Club went so far as to offer premiums to encourage the mowing of wheat.⁽⁶⁸⁾

Innovating activity appears to have been most vigorous in east and south-east England and in Wales, and weakest in south Midland and west-central England. Bacon reported in 1843 that within the 'last few years', the spread of the practice of mowing wheat had brought about 'a new aera (sic) in this portion of husbandry work' in Norfolk, a transformation which according to C.S. Read was more or less complete by the late 1850's. In Suffolk wheat mowing gained ground considerably on the lightlands of the west of the county. Similarly in Cambridgeshire, Jonas attested to the much increased use in 'late years' of the wheat scythe, while in Essex, Baker reported in 1845 how reaping had 'of late' given way to mowing.⁽⁶⁹⁾

Similar evidence of rapid change can be cited for many other counties. 'Reaping here as everywhere.... fast growing

obsolete', was the order of the day in Kent.⁽⁷⁰⁾ The bagging hook reached west Surrey about 1840, and before the decade was out migrant workers from the Farnham area had introduced it onto the Sussex Downs.⁽⁷¹⁾ By 1841 mowing and bagging had 'quite superceeded' hand-reaping in Dorset.⁽⁷²⁾ In Nottinghamshire, 'the strong prejudices' which had once prevailed against the mowing of wheat, had by the mid-1840's, largely disappeared, except in the Trent Valley where the sickle hung on until the 1860's.⁽⁷³⁾ In the North Riding the majority of wheat was mown in 1848, the harvest being then carried on 'more rapidly than formerly'.⁽⁷⁴⁾ In Scotland the smooth reap hook continued to displace the serrated sickle while the scythe tightened its hold in the north and east and gained considerable ground in the south and centre, although by 1851 it was still not yet the majority tool in these latter areas.⁽⁷⁵⁾ In Wales, reaping and swiving had largely given way to bagging and mowing by 1850.⁽⁷⁶⁾

The early majority adoption phase was also characterised by important improvements in edge-tool design and manufacture. This may be regarded as a response by manufacturers to the demand for higher working capacity tools. But it should also be seen as an important, if little publicised, industrial input into British agriculture, in so far as the new edge-tools were by-products of a technical revolution in the Sheffield and West Midland steel and metal-working industries. The new tool forms contributed much to the success of the new 'intermediate technology'.

New constructions of hook and sickle blade, the swedge- and ridged-back types, came onto the market in the early 1830's. The traditional narrow-bladed designs gave way to broader and more rigid forms, a development which was especially important for the

bagging hook, a tool which required above all a pronounced forward balance and a heavily-weighted blade to do its slashing job efficiently.⁽⁷⁷⁾ Thick-backing had the effect of concentrating the weight more effectively over a smaller blade area.

About 1840 Messrs. Sorby of Sheffield secured a major breakthrough with their rolled-cast-steel sickles and hooks, which combined extreme lightness with greater blade strength.⁽⁷⁸⁾ Other improvements included finer and sharper serratures, more durable and better-tempered edges, and improved grips and handles. By 1851 the new tools were coming into general use and rapidly displacing the older types.⁽⁷⁹⁾ Specialist sickle-manufacturers may possibly have viewed these improvements as a last opportunity to check the competition of the scythe and reap hook in the domestic market. For a short time they may even have succeeded in stemming the defection. It was noted in 1845 that in some areas (probably in Scotland), the serrated sickle, 'now improved and with finer serratures and a broader blade', was making a modest come-back.⁽⁸⁰⁾

Equally significant advances occurred in scythe-making technology. These satisfied the need for a heavier, stiffer and more robust implement for mowing corn.⁽⁸¹⁾ It was permissible to use a grass scythe with 'bow' or 'cradle' attachment for mowing barley and oats, but wheat, on account of its higher straw resistance, demanded a more specialised tool. Manufacturers appear to have modified traditional welded-blades to meet this demand, but it was better satisfied by the appearance in 1840 of the 'patent' scythe blade on which the strengthening plate of iron along the top edge was riveted rather than welded, thus providing greater rigidity without lowering tensility. Soon afterwards,

cast-steel replaced blister-steel in the construction of the cutting edge, a substitution which made for greater strength and durability. Thus by 1850 there had evolved a specialised corn scythe with a riveted cast-steel blade, a moderate temper and a smooth durable edge.⁽⁸²⁾ At the 1851 Exhibition edge-tool manufacturers were exhibiting all three constructions over a wide range of regional designs; Ibbotson Bros. Of Sheffield displaying rolled-up strips of cast-steel to emphasise the strength and elasticity of their new products.⁽⁸³⁾

There were also improvements in sned design. Soon after 1835 the Y-shaped sned, a specialised corn-scythe mounting, was developed in north-east Scotland. It soon spread to other parts of Scotland and extreme northern England.⁽⁸⁴⁾ Other innovations included the iron-sned, which came in during the late 1830's.⁽⁸⁵⁾ There is evidence too, albeit slender, for improvements in the design and construction of the cradle attachment. It may have been that the 'forks' design of cradle underwent significant modification after 1840. On an increasing scale, cradles were made up professionally and already by the 1840's iron was being substituted for wood in the construction of stays.⁽⁸⁶⁾

PHASE IV, 1852-70.

The special significance of this, the late majority adoption phase of the hand tool revolution, was that it coincided with the initial phase of harvest mechanization in Britain. Yet neither this sudden broadening of the technological spectrum, not the fact that by 1870, 25 per cent of the British corn area was harvested by machine, seriously challenge the hand-tool diffusion model. That is, because, first, up to 1864/5 the impact of the reaping machine was slight (in 1861 probably less than 6 per cent of the corn harvest was mechanised). And second, because mechanization was in most cases preceded by switches within hand tool technology.⁽⁸⁷⁾ Between 1851 and 1865 the scythe and bagging hook appear to have gained ground faster than the reaping machine. In many parts of Britain the hand tool revolution was still incomplete in 1870, and in some areas, in western Ireland for example, it is still going on.

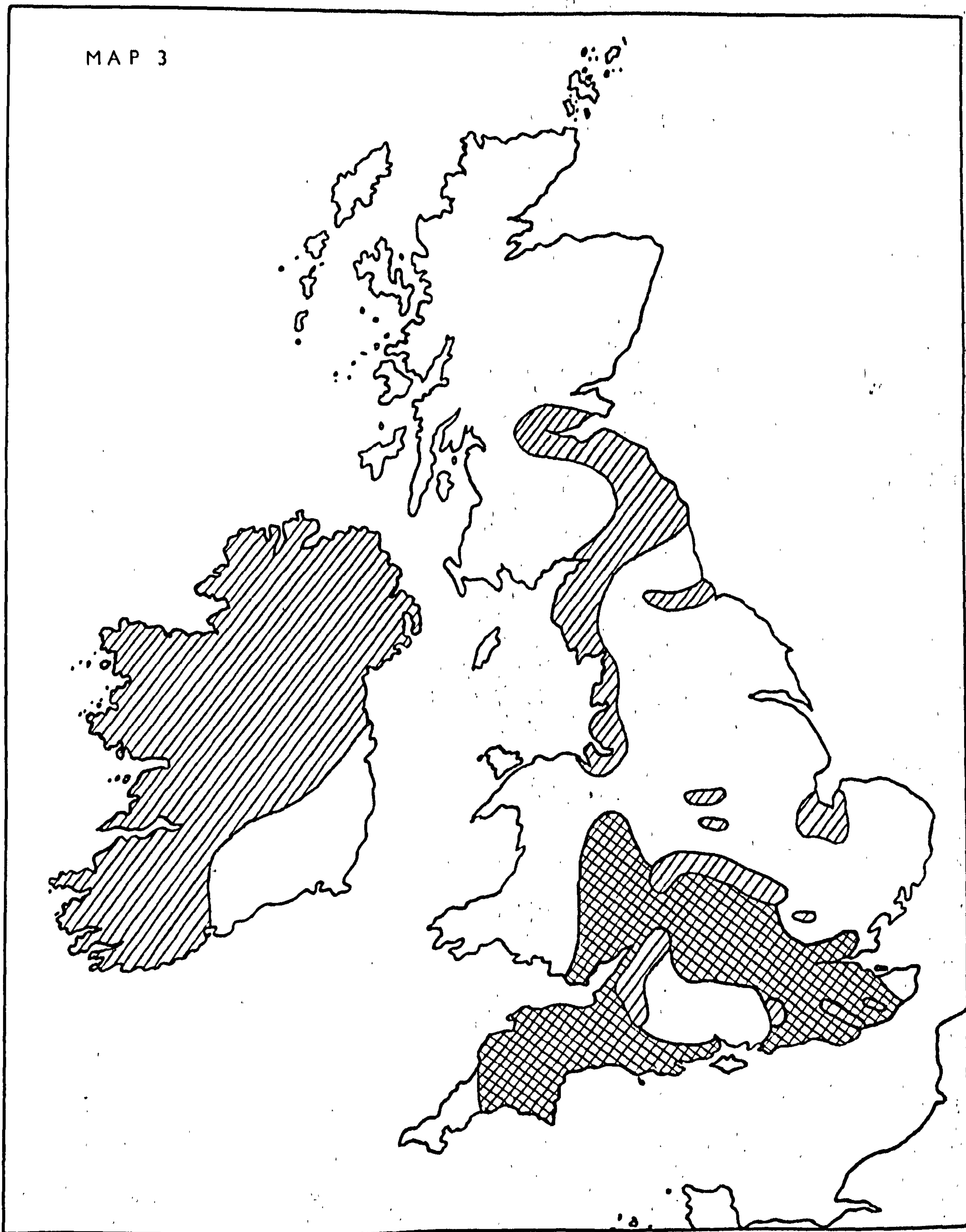
The majority adoption phase saw the most vigorous innovation in regions which hitherto had been most highly resistant to change. In 1850 the sickle was still well-entrenched in Midland and south-central England, the English Border Counties, southern and central Scotland, and Ireland. But by 1870 the bagging hook had spread northwards and eastwards to conquer most of north Hampshire, east Berkshire, Wiltshire, Buckinghamshire and Oxfordshire; eastwards and southwards to envelop Worcestershire, south Warwickshire and north Gloucestershire; and northwards and westwards to dominate Somerset, south Gloucestershire and north Cornwall. In certain areas, notably on light-soil uplands, the bagg-

ing hook and the scythe competed with each other for pride of place. Also by 1870, the scythe had become the dominant spring corn tool over most of northern Britain. In Scotland, the sickle and reap hook had more or less faded out by the late 1870's.⁽⁸⁸⁾ But although in some districts they had been displaced directly by the reaping machine, especially in the larger farms, most of Scotland experienced a sickle → reap hook) → scythe → machine progression. Primrose McConnell recollected the scythe replacing the sickle in his native Ayrshire in the 1860's.⁽⁸⁹⁾ The scythe was slower to take charge in Ireland, but even here, mowing had become the standard procedure for spring corns on the larger farms of the south and east by the late 1860's. In 1867 it was reported from the Kanturk district of Cork that, 'Corn is generally cut down with scythes, reaping hooks for the last four or five years being rarely used, and as yet only very few reaping machines employed'.⁽⁹⁰⁾

The relative abundance of evidence for the late 1860's and early 1870's makes 1870 a very convenient point at which to survey the state of the art. Especially valuable is the Agricultural Gazette's 1867 survey of harvesting techniques.⁽⁹¹⁾ This unusually comprehensive body of information, along with the other, more ephemeral, evidence, provides a unique basis for map-making. Maps 3 and 4 (opposite) denote the predominant (not the exclusive) hand tool methods in use in the different areas of Britain in 1870. It will be realized that the demarcation lines between one method and another were in practice often very blurred, particularly in areas where the hand tool revolution was still incomplete.

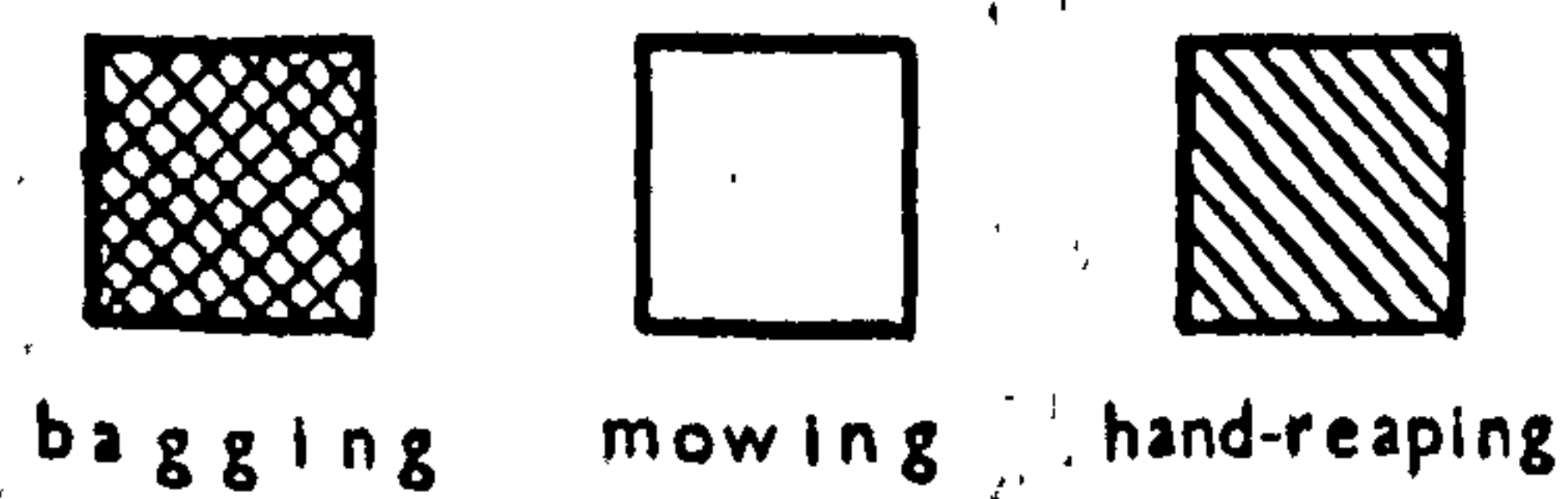
Comparing Maps 3-4 for 1870 with Maps 1-2 for 1790 (supra, opposite p. 294) we may note the following broad patterns

MAP 3

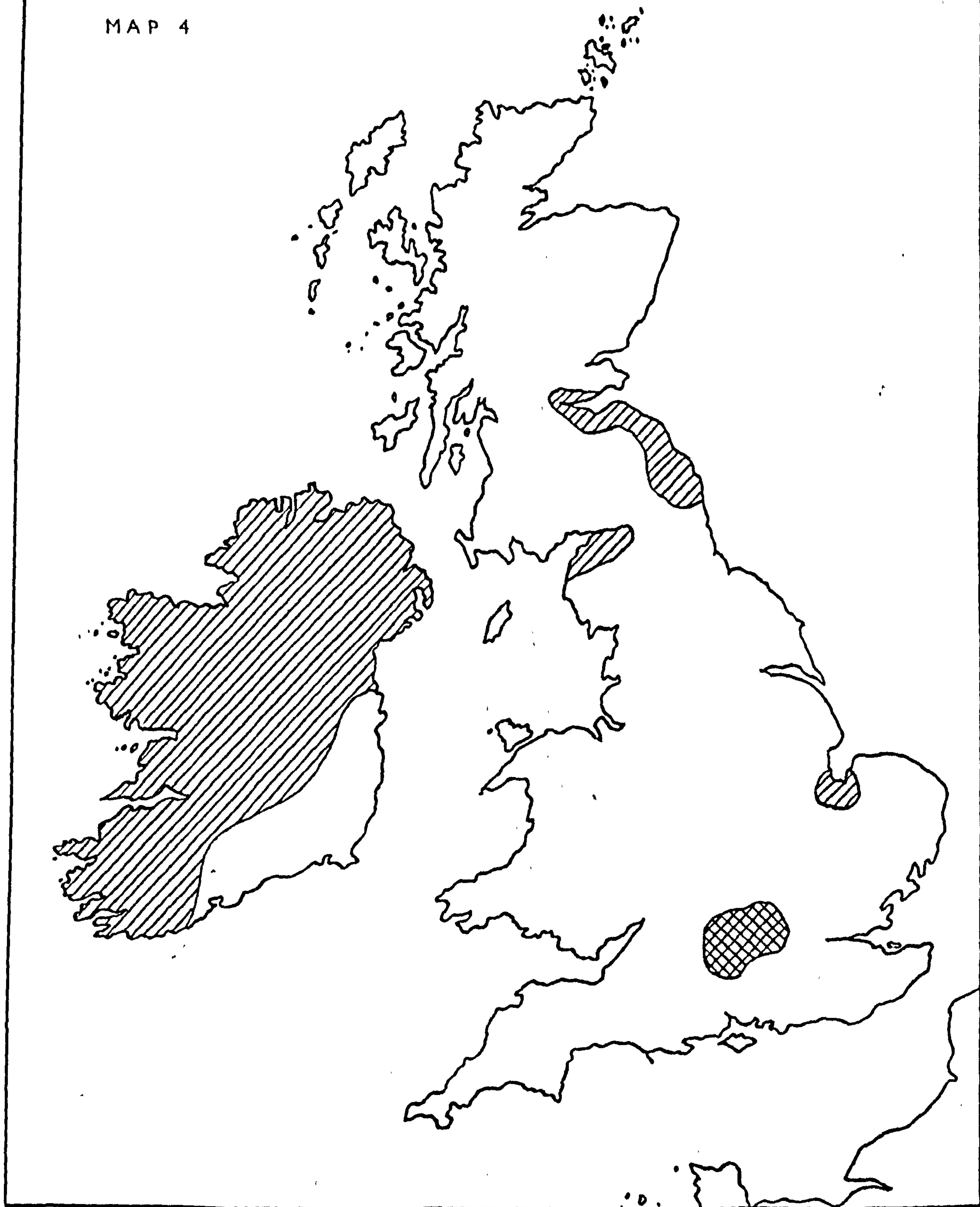


SPATIAL DISTRIBUTION OF HARVEST METHODS

1870 - WHEAT

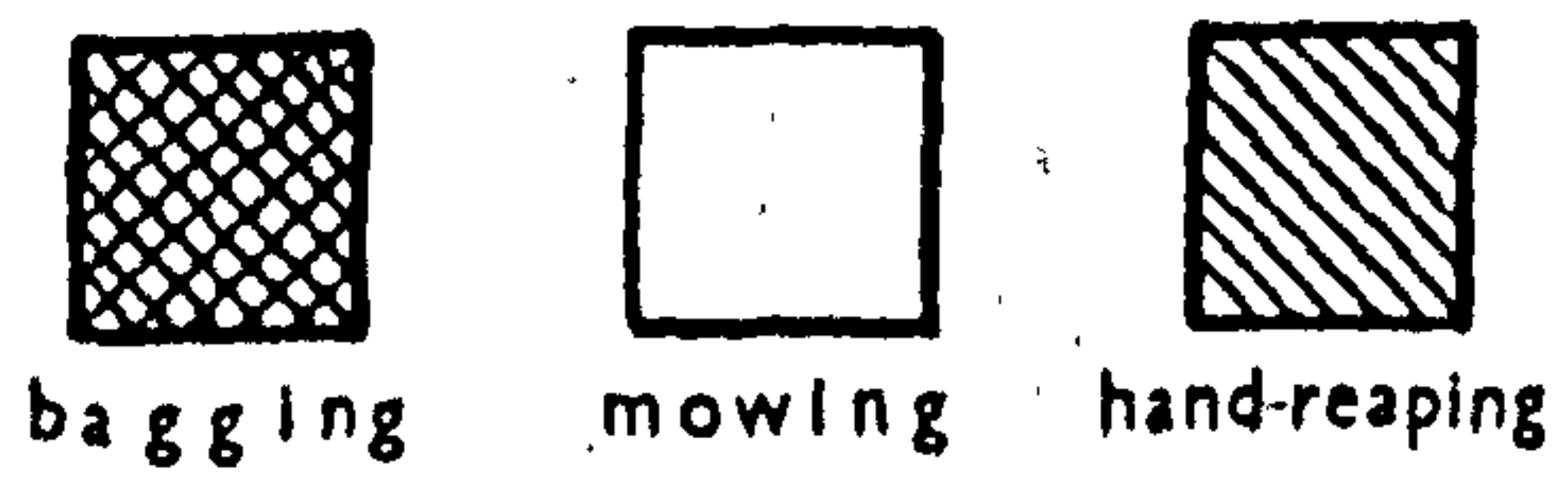


MAP 4



SPATIAL DISTRIBUTION OF HARVEST METHODS

1870 - BARLEY & OATS



of change.

(a) the northward and westward extension of the practice of mowing spring corns (in 1870 barley and oats made up 90 per cent of the Scottish and 86 per cent of the Irish small grains area)

(b) that in southern Britain, the bagging hook, and elsewhere in Britain the scythe, became the predominant wheat harvesting tool.

(c) that hand reaping persisted longest in south-Midland England, the East Anglian Fens, the Border Counties and north and west Ireland.

(d) that there was some correlation between choice of technique and soil type, e.g. the tendency for the sickle to survive longest in the richer, heavier, soil areas: e.g. the Midland Clay Vales, the Lothians, Carse of Gowrie and East Anglian Fens; the tendency in southern England for the scythe to dominate the lighter soils and the bagging hook the heavier soils. (92)

The Diffusion Model.

The model often employed by American rural sociologists to explain the process of technological diffusion is one which stresses access to knowledge about innovations and willingness to take risks as the most important factors of change. (93) The model has the limitations, one, that it is chiefly concerned with the diffusion of 'neutral', that is non-factor saving, technologies. And two, that it is appropriate chiefly to areas displaying consid-

erable uniformity of soil type, topography, farming system and market structure. By these limitations it is able to isolate the sociological factors of change from the economic and environmental, but in doing so it destroys its usefulness as a tool for describing the diffusion of factor-saving innovations on a national (macro) scale. This does not mean that our hand tool revolution lies completely outside its terms of reference. Indeed, we must concur that within the individual parish it was generally the largest and best educated farmers (i.e. those with greatest access to knowledge about innovations and most able to take risks) who were the earliest innovators. It was also true that the average farmer was loathe to innovate until he was completely convinced, by observation of his neighbours, that the new techniques would work successfully on his own farm. There was, in fact, a discernible tendency for the bagging hook to spread outwards in 'wave' fashion from its original bases in the London area, south Devon and the west Midlands.

Against these assumptions must be set the following facts. First, that whereas the reaping machine was a conspicuously new innovation, the scythe and heavy hook were already an integral part of the existing hand tool spectrum, in that they had long been used for harvesting other crops, such as grass and spring corns (scythe) and pulses (heavy hook). Which is to imply that it was the smaller working farmer and the labourer, rather than the larger farmer, who were most familiar with the different tools and methods and best able to judge their relative efficiencies. Yet except in parts of Scotland there is no evidence that the smaller farmers innovated before the larger.⁽⁹⁴⁾ The second consideration is that if, as the mid-Western model assumes, innovation was a

function of knowledge, then we have to explain some very peculiar technology mixes. There are cases where, on the same farm, steam-threshing machines, complex barn machinery and sometimes steam ploughs, co-existed with sickles and reap hooks.⁽⁹⁵⁾ Even the 'Leviathan' J.J. Mechi still used the bagging hook and scythe in 1867.⁽⁹⁶⁾

The fact that farmers innovated conspicuously in one operation and marked time in another, cannot be explained 'sociologically'. In the corn harvest the rate and scale of innovation was, as we have seen, determined by changes in the supply and supply price of labour, by the amount of labour-saving required, by farm size, by the capital cost of innovation and by farmers' anxiety to maintain employment. If we are seeking a theory of technological change, clearly we cannot, as does the 'mid-western' model, relegate the economic variables into the category of ceteris paribus. The long-run adoption curve in harvest hand tool innovation was not a regular S-shape, but conspicuously lop-sided: with the early adoption phase (1750-1835) long drawn out and the majority adoption phase (1835-70) extremely short. Long run adoption curves for individual areas exhibit all manner of irregularities, none of which conform to the standard sequence.

A major contention of this thesis is that between 1851 and 1870 a large number of farmers sought their labour savings within the 'intermediate technology' of improved hand tools rather than through mechanization, notwithstanding that a high proportion of them met the relatively modest 'threshold' requirements of the reaping machine. That they should have done so is remarkable to the point of requiring some very positive documentary proof. We

will go on, therefore, to examine in greater detail the chronology of hand-tool and machine innovation in some of the late adoption areas.

In some areas of Britain, in particular, the East Riding, East Anglia, the East Midlands, south Wales and north-east Scotland, the hand tool revolution was to all intents and purposes complete by 1860. Yet there were then still many areas where hand reaping still prevailed and where the key changes within hand tool technology were yet to occur.⁽⁹⁷⁾ In 1880, Ward and Lock pointed out that 'of late years', not only the reaping machine, but also the scythe, had been 'largely resorted' to.⁽⁹⁸⁾ Looking back, the 1891 edition of Stephen's Book of the Farm noted that:-

'As late as 1868 when the third edition of this work was being prepared for the press, the sickle was considered still to be employed so extensively as to warrant the retention of the detailed account given in former editions of the manner of reaping with the sickle Since then the scythe has supplanted the sickle and now the reaping machine has supplanted both'. (My emphases) ⁽⁹⁹⁾

South Britain, south-Midland and west-central England were the most conspicuous laggard regions. Over a broad front extending in a large semi-circle from south-east Sussex to the Essex Rodings, via the Gloucestershire Cotswolds and the Vale of Northampton, hand-reaping was standard practice for wheat in 1850. By 1870 mowing and bagging had gained considerable ground, yet it is clear from the Agricultural Gazette's 1867 survey of harvesting ⁽¹⁰⁰⁾ methods that in many areas, sickle, bagging hook, scythe and reaping machine were then still competing fiercely for pride of place, and that in some areas, notably south-east and south-west Sussex, south-east Hampshire, west Wiltshire, the Lower Cotswolds, south Staffordshire, Warwickshire and Northamptonshire, the Vale of Aylesbury, the Ouse Valley and East Anglian Fens, the sickle and

reap hook were still the predominant wheat harvesting tools.

The complexity of the situation is clearly demonstrated by the following areal breakdown of the Agricultural Gazette evidence for Warwickshire and Oxfordshire, (101)

Warwickshire.

- (a) Luddington area - 'Reaping, fagging and mowing, many reaping machines now used'.
- (b) Sickington area - 'Wheat chiefly cut with the sickle; Barley mown with the scythe; oats the same and tied up afterwards. Reaping machines are becoming general'.
- (c) Milcote area - 'Wheat generally reaped with sickle, or cut close to the ground with hook'.
- (d) Kenilworth area - 'Very few reaping machines, most of the Wheat reaped by hand A few farmers last year or two have taken to fagging, and it becomes more general every year'.
- (e) Moreton area - 'Wheat chiefly reaped. Fagging and with reaper getting very much into use'.

Oxfordshire. (102)

- (a) Eynsham area - 'Reaping machines are used but little in this neighbourhood'.
- (b) Chipping Camden area - 'Most of the crops are now fagged ... fagging has become very general in this part ...'
- (c) Bampton area - '...reaping and fagging. Fagging most general. A considerable quantity of the Barley is fagged, and nearly all the heavier crops of Oats ... Reaping machines are becoming thicker'.
- (d) Churchill area - 'Mostly by fagging'.

And similarly in other counties:

(a) Cookham (Berkshire)⁽¹⁰³⁾ '...reaping machines very little used ... fagging ... becoming more general every year'.

(b) Aylesbury (Bucks)⁽¹⁰⁴⁾ 'Fagging has now become prevalent, especially where steam culture is used. (My emphases) There are not many reaping machines in the neighbourhood'.

(c) Wix (Essex)⁽¹⁰⁵⁾ 'Wheat mostly cut by the scythe, hook or sickle ... Very few horse reapers are used here'.

(d) Winchcombe (Glos)⁽¹⁰⁶⁾ 'Wheat about one-fourth cut by machine, two-fourths by scythe or hook close to the earth, one-fourth reaped by sickle'.

(e) Northampton⁽¹⁰⁷⁾ 'Wheat-reaping is fast becoming superseded by the machine and the scythe'.

There is evidence too, that in some districts of southern England, and not always on the smaller farms, hand-reaping continued through the '70's and even into the present century. In the '70's women were still reaping in parts of Wiltshire and north and south-east Hampshire.⁽¹⁰⁸⁾ Bradley observed on one large well-farmed holding in the Vale of the White Horse, the whole harvest, 'tho' not laid', still being cut by sickle and fag hook in 1873.⁽¹⁰⁹⁾ Alfred Williams recalled sickle reaping in the south Marston district of Wiltshire up to 1882.⁽¹¹⁰⁾ The late use of the sickle is also evidenced for the Gloucestershire Cotswolds (1880's), east Oxfordshire (1880's), the Sussex Weald (early twentieth century) and south Buckinghamshire (c. 1890).⁽¹¹¹⁾

Conversely, large scale mechanization did not really begin on parts of the Wiltshire Downs until the early 1890's.⁽¹¹²⁾ One of the author's informants, an old man of 71, remembered making bands behind the 'fag hook and crock' on two large farms

in the neighbourhood of Worminghall, Buckinghamshire in 1908-9.⁽¹¹³⁾ Some east Berkshire farmers also eschewed mechanization until after 1900, relying instead on the fagging hooks of migrant workers from the Tadley area of Hampshire. There is even the suggestion that in some districts, (east Berkshire and perhaps also in Cornwall and East Suffolk), the bagging hook was actually replaced by the 'cradle-scythe' after 1880, especially in the harvesting of spring corns, where the labour-saving advantages of the scythe were greatest.⁽¹¹⁴⁾ As late as 1920 the scythe and bagging hook were occasionally used in Buckinghamshire, Cambridgeshire, Essex, Kent, Monmouth and Warwickshire,⁽¹¹⁵⁾ while up to the Great War, Irish migrant harvesters, now re-equipped with scythes and heavy hooks, were able to find plenty of work in the English Midlands.⁽¹¹⁶⁾

Similarly, in southern Scotland and the Border Counties the hand tool revolution did not properly gain momentum until after 1850, and was still going strong in the 1870's. But it was here, too, that we are most often able to observe that less common phenomenon, the displacement of the sickle and reap hook by the reaping machine without the prior intervention of the faster hand tools. It would appear, however, that the area thus affected was relatively small, being chiefly confined to the Border Counties and the Lothians, where, as we have already observed, the harvest labour force was heavily comprised of female and migrant workers who were either unable, or, (as with the Irish), unwilling, to use the heavier tools.⁽¹¹⁷⁾ On the other hand, the scythe was ascendant in north-east Scotland before 1840,⁽¹¹⁸⁾ just as over most of south-west Scotland, it invariably intervened between the reap hook and the reaping machine.⁽¹¹⁹⁾ In the late 1860's the machine ruled the lower lands of Perth and the scythe the higher, while in

the extreme northern counties of Caithness and Inverness mowing had by this stage become the more or less exclusive mode.⁽¹²⁰⁾ Moreover, even in southern Scotland, the scythe managed to establish itself on a large number of farms prior to the adoption of machinery. In the counties of Edinburgh, Fife and Linlithgow it was general on all small farms in the late 1870's, and as an intermediate step was employed on some of the larger.⁽¹²¹⁾ Irish migrant workers were mowing laid crops of wheat in the Border Counties in the early 1890's.⁽¹²²⁾

Other late adoption areas of note were, (a) the Vale of Cheshire, (b) the East Anglian Fens and, (c) Ireland. In the first area the scythe was only just coming into the Tarvin and Spital districts in the 1860's, while in Great Budworth, A.W. Boyd's "Country parish", the sickle was in common use until the 1870's, and on two farms was relinquished only in the mid-1890's.⁽¹²³⁾

The second region, the East Anglian Fens, provides perhaps the most important and best-documented example of the very late use of harvest hand tools in English agriculture. The scythe had been known there since at least the 1830's, but unfavourable crop conditions were still seriously restricting its use in the 1860's.

As late as 1910, Daniel Hall could still report of the Fens that:-

'throughout, the corn crops betray the excess of nitrogen in the soil, and are such as would cause dismay to the ordinary farmer: they are rank and full of growth, with an enormous yield of straw, and in that year, as in most seasons, were laid and twisted in every direction. The heavy twisted crops call for a great expenditure of hand labour in harvest, and this is one of the districts to which the Irish labourer, who used to be such a feature of hay time and harvest over most of England, still finds it worthwhile to come; indeed, the crops could hardly be got in without some such extraneous assistance, for the modern reaper and binder often fails to deal with them'.⁽¹²⁴⁾

On the inner Fens large scale mechanization had to await the arrival of the short-strawed 'hybrid' wheats. Yet even in 1925 storm-broken crops still debarred the machine and necessitated the bringing out of the scythe. (125)

In Ireland the adaptation of the scythe into a corn harvesting tool was almost exclusively a late nineteenth century phenomenon. By 1867 mowing was well-established only on the larger farms of the specialist grain-growing areas of the south and east. Thirty years later it had conquered most of the country except the small-farming districts of the extreme west and north. (126)

As on the mainland, the spread of the scythe in Ireland was closely correlated with changes in harvest labour supply. A tightening harvest labour market with men 'getting scarce and wages rising steadily', was reported in the southern counties in the late 1860's. The early 1890's saw a further contraction, which resulted in a 'more or less serious dearth of labour ... nearly universally experienced and complained of by all farmers', with casual labourers able to 'command what terms they chose to dictate'. (127)

One of the author's informants, an old Wexford man, recollected his father telling him that the sickle had given way to the bagging hook in the '70's and '80's, while around 1905 he himself saw the bagging hook replaced by the scythe, and on the large estate farms, by the reaping machine. (128)

According to Gailey the scythe did not really supercede the reap hook in Ulster until the very end of the nineteenth century, and in the more remote areas not until the present century. He observed hand-reaping still going on in the Isle of Aran in 1967. (129)

Another informant reports that in the Glen Columbkeel district of Co. Donegal several farmers

were harvesting with the reap hook in the summer of 1968. (130)

SUMMARY

CROP-METHOD DISTRIBUTION IN 1870 and 1790.

Thus between 1790 and 1870 the scythe and bagging hook became the predominant wheat harvesting tools, and the scythe the predominant, and the almost exclusive, spring corn harvesting tool. Below are suggested some crop/method distributions for 1870. Machine harvesting had been deliberately excluded from the calculations. Thus included under 'mowing' are areas such as the Yorkshire Wolds where in 1870 a large part of the corn area was cut by machinery, but where mowing had been and on non-mechanised farms still was, the predominant hand tool method. The basis of calculation is essentially that used for 1790. Crop/method proportions for each county have been established from the literary evidence, and these have been applied to the corn acreages given in the 1870 Agricultural Returns.

Again, the degree of error is probably not large. Admittedly, the method-mix in 1870 was much more complex than in 1790, but then the information available on method-distributions and corn acreage is that much more detailed. We can begin with the assumption that in 1870 practically all spring corns on the British mainland were mown. This leaves wheat as the doubtful quantity. However, even here it is possible to narrow down the areas of uncertainty. We know, firstly, that very little wheat was grown in north Britain and Ireland (in 1870 they contained barely 10 per cent

of the national wheat acreage). Secondly, that in south Britain the practice of reaping wheat prevailed chiefly in south midland England and in north Britain in the Border Counties. And thirdly, that bagging was a highly regionalised practice confined to the triangle, London - Exeter - Shrewsbury. The crop/method distributions for Ireland are largely guesswork. From the limited evidence available it appears that in 1870 most spring corns but still only a minority of wheat, were mown with the scythe.

For comparative purposes the 1790 values have been put alongside those for 1870.

ESTIMATED PERCENTAGE OF CROP AREA CUT BY DIFFERENT HAND TOOL METHODS
IN 1790 AND 1870

	Wheat		Barley		Oats	
	1870	1790	1870	1790	1870	1790
<u>Sickle or Reap Hook</u>						
Great Britain	15	92	10	30	25	75
England & Wales	13	90	1	25	3	35
Scotland	50	100	15	100	15	100
Ireland	70	100	40	100	40	100
<u>Scythe</u>						
Great Britain	60	3	90	70	75	25
England & Wales	65	5	95	75	90	65
Scotland	50	-	85	-	85	-
Ireland	30	-	60	-	60	-
<u>Bagging Hook</u>						
Great Britain	20	5	1	1	2	1
England & Wales	25	7	2	1	5	2
Scotland	-	-	-	-	-	-
Ireland	-	-	-	-	-	-

If anything the tabulation underates the true volume of hand tool change, for it does not allow for the fact that often there occurred not just one, but often two or even three tool changes, most commonly, sickle → reap hook → scythe and sickle → reap hook → bagging hook, but in some cases, sickle → reap hook → bagging hook → scythe. Nor does it include the spread of the 'cradle', the transition from full-ripe to early cutting, and not least, the improved designs of hand tool introduced between 1830 and 1850.

IMPROVEMENTS IN HARVEST LABOUR PRODUCTIVITY.

It is one thing to talk about and another thing to measure the improvements in harvest labour productivity stemming from hand tool change. The problem is not so much the lack of statistical data, but rather, that even if these were available it would prove virtually impossible to isolate the contribution of hand tool change from those of other variables such as effort expansion and more efficient labour deployment.

However, it is obviously important to establish some gross magnitudes. The exercise becomes easier if we can ignore the reaping machine, which can be done if we use 1860 as our second benchmark instead of 1870.

Method.

We will assume:-

- (a) that in 1790 the wheat area of England and Wales was 2.8 million acres and average wheat yield 20 bushels per acre. and the spring corn area 4.0 million acres and average yield

28 bushels per acre.

(b) that in 1860 the corresponding values were 3.4 million acres and 29 bushels (wheat) and 4.0 million acres and 35 bushels (barley and oats).

(c) that 1790 crop/method distributions were as suggested infra pp.292-3 and that in 1860 20 per cent of wheat was reaped and 20 per cent bagged (cf. 10-15 per cent and 25 per cent in 1870) and that 90 per cent of spring corn was mown and 10 per cent reaped (cf. c95 and c5 per cent in 1870).

(e) that the labour requirements of the different methods were those suggested infra pp. 256, 258.

METHOD

W1 = wheat area 1790

S1 = spring corn area 1790

W2 = wheat area 1860

S2 = spring corn area 1860

Total Labour Requirements = (Area under crop) (percentage of crop harvested by each method) (labour requirements in worker days per acre.)

1790 WHEAT

		Worker Days
Reap	$W1 \times \frac{90}{100} \times 4.1^1$	10,332,000
Mow	$W1 \times \frac{4}{100} \times 2.7$	302,400
Bag	$W1 \times \frac{6}{100} \times 3.0$	504,000

1 Average work rate of three reaping methods; reap hook, sickle high and sickle low.

1790 SPRING CORN

		Worker Days
Reap	$S1 \times \frac{30}{100} \times 4.0^2$	4,800,000
Mow	$S1 \times \frac{70}{100} \times 1.125^3$	3,150,000
TOTAL		7,950,000
2, Assumed all cut with sickle		
3, Assumed half bound, half left loose		

1860 WHEAT

Reap	$W2 \times \frac{20}{100} \times 3.8^4$	2,564,000
Mow	$W2 \times \frac{60}{100} \times 2.7$	5,085,000
Bag	$W2 \times \frac{20}{100} \times 3.0$	2,040,000
TOTAL		9,689,000

4. Assumed higher proportion now cut with reap hook thus lowering average labour requirement.

1860 SPRING CORN⁵

Reap	$S2 \times \frac{10}{100} \times 3.75^6$	1,500,000
Mow	$S2 \times \frac{90}{100} \times 1.25^7$	3,900,000
TOTAL		5,400,000

5 Excludes a small proportion which was bagged

6 Assumed that higher proportion now cut with reap hook thus lowering average labour requirement.

7 Assumed that the spread of the scythe into northern England and north Wales resulted in a larger proportion of spring corn being bound and sheaved, thus raising the average labour requirement.

SUMMARY

TOTAL LABOUR REQUIREMENT 1790 and 1860 (IN WORKER DAYS)

1790	19,088,000	
1860	15,089,000	- 21 per cent

REAL AVERAGE (per acre) LABOUR REQUIREMENT 1790 and 1860 (IN WORKER DAYS)

	1790	1860	
Wheat	4.0	2.9	-27%
Spring Corn	2.0	1.4	-30%

REAL AVERAGE (per 100 bushels) LABOUR REQUIREMENT 1790 and 1860
(IN WORKER DAYS)

	1790	1860	
Wheat	19.9	9.0	-55%
Spring Corn	6.7	3.8	-43%

The results appear not too unrealistic. Least explicable is the 21 per cent decline in total labour requirement (from 19 million to 15 million worker days). It is possible, of course, that the corn area in 1790 was much smaller, or conversely, that the corn area in 1860 was much larger, than we have assumed. On the other hand, a 21 per cent decline may be reasonable if, in fact, we have seriously underestimated the numbers of casual and part-time industrial harvesters (cf. full-time agricultural workers) in 1790 and the magnitude of their subsequent reduction. More pertinent, however, is that the figure of 21 per cent relates to acreage rather than output. We cannot assume work rates per acre to have remained constant over time because higher yields (20-30 per cent) and poorer crop conditions (lodging and tangling) would have rendered the average per acre labour requirement in 1860 a good deal (at least 25 per cent) higher than in 1790. This is to say that in practice and notwithstanding the adoption of faster tools, total labour requirements may have been no lower, and perhaps even higher, in 1860 than in 1790. The 'real average' value is perhaps the more reliable guide to productivity change.

Further analysis would serve only to enhance the crudeness of the calculations. They reinforce only what we already know, that over the proto-industrial period changes within hand tool technology contributed substantially to improvements in harvest labour productivity.

1. 'Fitzherbert's Book of Husbandry', in, Ancient Tracts concerning the Management of Landed Property (new edn, 1747), pp. 27-8. Fitzherbert observed the mowing of rye but condemned it as wasteful. ibid, pp. 27-8: See also, T. Tusser, Five Hundred Pointes of Good Husbandrie (Eng. Dialect Soc. Publication), 21 (1878), p. 37.
2. Farming and Account Books of Henry Best (Surtees Society, 1857), pp. 48-51.
3. Museum Rusticum II (rev. edn, 1764), pp. 29-33, and also, 92-7, 219-22, 244-8, and also, David Henry, The Complete English Farmer (1771), pp. 216-8.
4. Museum Rusticum, I (edn, 1766), pp. 158-60, 235-7, 437-41.
5. Mr. Stillingfleet, The Farmer's Kalendar (1771), pp. 234-6. See also, F. Miller, The Husbandman's Directory (1770).
6. William Ellis, Husbandry (edn 1772), p. 37; Thomas Hale, A Compleat Body of Husbandry (1759), IV, pp. 359-61.
7. W. Marshall, Rural Economy of Norfolk (2nd edn, 1795), II, pp. 22, 228.
8. See in particular, H. Stephens, Book of the Farm (1844), III, pp. 1048-1105, which provides the best and most comprehensive account. Stephens, however, was a Scot, and it is clear that he was unfamiliar with certain southern British practices, particularly those of bagging and carting corn loose.
9. Smith's Key (1816), only known copy in Sheffield City Library.
10. Henry, op.cit, pp. 216-8; W. Davies, General View South Wales (1815), I, pp. 424-8; W. Davies, General View North Wales (1810), p. 132; W. Marshall, Rural Economy of the Southern Counties (1798), II, p. 24; Farmers Magazine, Nov 1841, p. 368 (for Romney Marsh c 1817); A. Young, General View Essex (1807), I, p. 304; Marshall (Norfolk), op.cit, p. 22; J. Plymley, General View Shropshire (1803), p. 142; A. Young, General View Hertfordshire (1804), pp. 86-7; Communications to the Board of Agriculture, V, pt 1 (1806), p. 49.

11. Young (Herts), op.cit, pp. 86-7; Marshall (S. Counties), op.cit, II, p. 98; W. Stevenson, General View Surrey (1809), p. 215; P. Foot, General View Middlesex (1794), pp. 28-9; J. Duncumb, General View Herefordshire (1805), p. 64; Davies (South Wales), op.cit, I, p. 425; W. Marshall, Rural Economy of the West of England (1797), pp. 121-2; W. Stevenson, General View Dorset (1812), p. 218.

12. Davies (South Wales), op.cit, I, pp. 427-8.

13. Davies (North Wales), op.cit, pp. 162, 173, 182; T. Wedge, General View Cheshire (1794), p. 24; W. Stevenson, General View Lancashire (edn 1815), pp. 302-5, 330, 332; Thomas Brown, General View Derbyshire (1794), p. 39; Messrs. Rennie, Brown & Shirreff, General View West Riding (1794), p. 135; Henry, op.cit, pp. 216-8; J. Tuke, General View North Riding (1800), pp. 119-22; J. Bailey & G. Culley, General View Northumberland (1794), p. 36; J. Bailey, General View Durham (1810), p. 119; A. Pringle, General View Westmoreland (1805), p. 334; B. Quayle, General View Isle of Man (1794), pp. 14-16.

14. C. P. Le Cornu, 'Agriculture of the Islands of Jersey, Guernsey, Alderney & Sark', J R A S E, XX (1859), p. 46; Davies (North Wales), op.cit, pp. 173, 182; A. Young, Eastern Tour (1771), I, pp. 467, 491; W. Gooch, General View Cambridgeshire (1811), p. 137; Stevenson (Surrey), op.cit, p. 229; Foot, op.cit, pp. 28-9; Young (Essex), op.cit, I, p. 349; Anon, The Practical Norfolk Farmer (1809), p. 125. In South Wales it was stated that 20 per cent of barley and 33 per cent of oats were reaped. Davies (South Wales), op.cit, I, pp. 424-8.

15. For example, Berwickshire, where it was stated in 1809 that barley and oats were often mown. R. Kerr, General View Berwickshire (1809), pp. 239-40, 244. For Ireland, see, W. Tight, Statistical Survey of Kilkenny (1802), p. 214; L. Coote, Statistical Survey of the Queens County (1801), p. 50; J. Archer, Statistical Survey of the County of Dublin (1801), p. 43.

16. Davies (South Wales), op.cit, I, p. 426.

17. J. Holt, General View Lancashire (1795), p. 66; Stevenson (Surrey), op.cit, p. 244; J. Boys, General View Kent (1794), p. 23; W. Mavor, General View Berkshire (1809), p. 208; Young (Herts), op.cit, p. 96; W. Marshall, Rural Economy of the Midland Counties (1790), I, pp. 218-20; Marshall (Norfolk), op.cit, I, p. 241. This does not however mean that the 'cradle' was not known elsewhere. Edward Lisle, (Observations on Husbandry (1757), p. 183) refers to the cradle mowing of barley in Wiltshire in the early eighteenth century. But the prominence given to the cradle in the 1830's and 1840's does suggest that it was not general in 1790. In southern Britain the spread of the cradle was closely associated with the spread of wheat mowing.

18. The literary sources used here are very largely the General Views and the Statistical Accounts (Scotland and Ireland).
19. Davies (South Wales), op.cit, I, p. 427.
20. Thus bagging was objected to as wasteful and untidy while the practice of mowing wheat, though 'a great deal used', was condemned as 'very injurious' and 'a plan to be abandoned'. T. Tibbs, The Experimental Farmer (1807), p. 101 (cf. Farmers Magazine, Nov 1806, p. 537).
21. Dreweatt, Watson & Barton, 1759-1959 (privately printed, Newbury, 1959), p. 27; Farmers Magazine, June 1811, p. 181; A. Young, The Farmer's Calendar (6th edn, 1805), p. 425; A. Young, General View Suffolk (1794), p. 55. See also, C. Hassall, General View Pembrokeshire (1794), p. 19.
22. T. Potts, The British Farmers Encyclopedia (1807), 'Scythes'.
23. Communications to the Board of Agriculture, V pt I (1806), p. 49; Stevenson (Dorset), op.cit, pp. 217-8.
24. W. Pitt, General View Leicestershire (1809), p. 102.
25. G. B. Worgan, General View Cornwall (1815), p. 61.
26. Davies (South Wales), op.cit, I, p. 427; Farmers Magazine, Nov 1803, p. 494.
27. Tuke, op.cit, pp. 113-4, 119-20, 122.
28. J. Bailey, General View Durham (1810), p. 126.
29. G. S. Keith, General View Aberdeen (1811), p. 258. In one parish 9 of the 12 acres under wheat were mown in 1809, a year when wages were high and reapers scarce. ibid, p. 258. Keith forecast, correctly as it turned out, that the scythe would extend to oats as long as care was taken in the gathering and binding. See also, Farmers Magazine, Feb 1813, p. 99.
30. Farmers Magazine, Nov 1806, p. 537.

31. W. Leslie, General View Nairn & Moray (1811), p. 180. In 1819 it was reported that in these counties the scythe had made considerable headway on barley and oats but not on wheat, and that workmen once they had got used to it did not wish to return to the sickle. Farmers Magazine, Nov 1819, p. 502.
32. J. Headrick, General View Angus & Forfarshire (1813), p. 315; Farmers Magazine, Nov 1814, p. 502.
33. The scythe extended in Berwickshire and to a lesser extent in East Lothian. Kerr, op.cit, pp. 225-9, 239, 240; R. Somerville, General View East Lothian (1805), p. 72. See also, Farmers Magazine, May 1802, p. 187, in which a Carse of Gowrie farmer asks for some information on the relative merits of scythe and sickle.
34. W. Dickinson, 'On the Farming of Cumberland', J R A S E, XII (1850), p. 233.
35. Dickson (Lancs), op.cit, pp. 302-5, 322, 330.
36. See, supra, fn. 15.
37. Stevenson (Dorset), op.cit, pp. 217-8.
38. A. Young, General View Oxfordshire (1809), p. 318. There were similar advances in Surrey. Stevenson, op.cit, p. 215, and probably too in Hertfordshire. Young (Herts), op.cit, pp. 86-7.
39. Davies (South Wales), op.cit, I, p. 425; J. Duncumb, op.cit, p. 64.
40. Stevenson (Dorset), op.cit, p. 217.
41. Dreweatt, Watson, Barton, op.cit, p. 27.
42. J. E. Handley, The Agricultural Revolution in Scotland (Glasgow, 1963), p. 203; Farmers Magazine, June 1811, p. 181; P. Graham, General View Clackmannan (1814), p. 273.
43. Farmers Magazine, Aug 1825, p. 340, and Minute Books of the Christchurch Agricultural Society, (presently in the hands of the Secretary of the Stour & Avon Agricultural Society). An attempt was also made to introduce the tool into Ireland. Irish Farmers Journal, 11 Sept 1813. The results of the Christchurch trials are detailed in Irish Farmers Journal, 16 Sept 1814.

44. supra, pp. 167-74.
45. Loudon's Encyclopedia (edn 1825), pp. 753-4, 762.
46. Rev. J. Farquharson, 'On cutting grain-crops with the common scythe', Prize Essays & Trans. Highland Agricultural Soc, new ser, IV (1835), pp. 186-97; Aberdeen, so Farquharson claimed, was the only area where this method was general, even on small holdings. J. M. Wilson (Dictionary), op.cit, II, p. 231.
47. S.C. on the State of Agriculture (1836), Third Report, p. 32. Writing of Lothian's agriculture in the 1820's G. Robertson stated that although the scythe had been introduced and used at times on almost every farm, its use was limited to smooth fields and upright crops. Rural Recollections (Edinburgh, 1829), pp. 247-8.
48. 'On the Flemish Scythe', Prize Essays & Trans. Highland Agricultural Soc, new ser, I (182()), pp. 244-9; S.C. on the State of Agriculture (1836), Third Report, p. 32. Interest in the Hainault Scythe was stimulated by the very high wages, 'as high as ever known', in the boom of 1825. Farmers Magazine, Nov 1825, p. 490. Interest soon evaporated when the labour market returned to normal.
49. British Husbandry (1837), II, pp. 188-9. However it appears that many of the Irish harvesters still used serrated sickles. Sketches of Rural Affairs (SPCK), The Sickie (1845), p. 30.
50. The need for early cutting became an important theme in the Napoleonic Wars, when many farmers took it up in order to extend the cutting period, and so indirectly to save labour. Practical Norfolk Farmer (1809), p. 130 ('so that labourers can be obtained early'); Potts, op.cit, 'Harvest' (upon account of all sorts requiring attention); Th. Davis, General View Wiltshire (1811), pp. 66-7; Farmers Magazine, Feb 1806, p. 79; Aug 1809, p. 286; Middleton, op.cit, p. 183. And later, Baxter's Library of Agricultural & Horticultural Knowledge (2nd edn, 1832), pp. 617, 454; R. Low, Practical Agriculture (1837), p. 212; British Husbandry, op.cit, III, p. 7; Farmers Magazine, July 1841, pp. 19-23; Aug 1845, p. 99; Stephens, op.cit, III, pp. 1056-7.
51. C. Hillyard, Practical Farming & Grazing (3rd edn, 1840), p. 48; British Farmers Magazine, Oct 1840, pp. 350-2.
52. Farmers Magazine, Oct 1854, p. 355.

53. Reports for Selected Farms (bound as Vol. III British Husbandry (1840)), p. 139; M. M. Milburn 'On the farming of the North Riding of Yorkshire', J R A S E, IX (1848), p. 501; Agricultural Gazette, 2 Sept 1848. See also, C. Howard, 'A General View of the Agriculture of the East Riding of Yorkshire', British Husbandry (1840), III, pp. 7-8.
54. C. S. Read, 'Report on the Farming of Buckinghamshire', J R A S E, XVI (1855), p. 313; C. S. Read, 'Farming of Oxfordshire', J R A S E, XV (1854), p. 213.
55. E. D. Mackerness, (ed), The Journals of George Sturt, 1890-1927 (Cambridge, 1967), II, pp. 455-6.
56. J. Bravender, 'Farming of Gloucestershire', J R A S E, XI (1850), p. 141.
57. Doyle, op.cit, p.p. 402-4.
58. Thomas Moore, The History of Devonshire (1829), I, p. 429 (I am grateful to Mr. C. A. Jewell, University of Reading, for this reference); Dickinson, loc.cit, p. 233; Farmers Magazine, Nov 1841, p. 368.
59. This was particularly so of central southern England. Compare, for example, the following reports for the 1850's, Read (Bucks), loc.cit, p. 313; Read (Oxon), loc.cit, p. 213; J. B. Spearing, 'On the Agriculture of Berkshire', J R A S E, XXI (1860), p. 22, in which a great deal of spring corn was 'tagged' with the corresponding Board of Agriculture Reports for 1794-1815, in which it was chiefly mown. These counties were, of course, among the most labour-flush during the period 1815-34.
60. British Husbandry, op.cit, III, pp. 7-8, 139.
61. British Husbandry, op.cit, II, p. 189.
62. Doyle, op.cit, p. 416, and also G. H. Andrews, Modern Husbandry (1853), p. 373 - scythe 'much' used 'of late' and 'is getting general'.
63. Farmers Magazine, Aug 1845, p. 96. See also, ibid, Sept 1845, pp. 211-3; Sketches of Rural Affairs (1845), The Sickle, p. 31
64. Farmers Magazine, Oct 1841, pp. 280-1.

65. British Farmers Magazine, Oct 1840, pp. 350-2.

66. John Boys, 'On the Kentish corn scythe and binding rake', J R A S E, I (1840), pp. 444.

67. Sketches of Rural Affairs (Scythe), op.cit; Stephens, op.cit, III, pp. 1048-1105.

68. The evidence suggests that between 1838 and 1850 probably the majority of Farmers Clubs became involved with the subject. In 1840-42 alone harvesting was discussed by the following clubs: West Herefordshire, Mark Lane Express, 10 Jan 1842; Beccles (Sfk), British Farmers Magazine, Oct 1840, p. 352; Debenham (Sfk), Braintree & Bocking (Essex), Framlingham (Sfk), Gt. Oakley (Essex), Ixworth (Sfk), Hadleigh (Sfk), Fairford (Sfk), Halesworth (Sfk), Woodbridge (Sfk), Maidstone (Kent), Richmondshire (Yorks), Illogan (location unknown), Farmers Magazine, Mar 1842, p. 186; April 1842, p. 249; Jan 1842, p. 8; April 1842, pp. 293-4; July 1841, p. 17; Feb 1841, pp. 132-3; April 1841, p. 254; May 1841, p. 337; Dec 1841, p. 453; Nov 1841, pp. 367-8; June 1842, p. 426; June 1842, pp. 427-8. This represents only a very small sample of Clubs which reported their proceedings to the Farmers Magazine. For later examples, see, Agricultural Gazette, 2 Sept 1848 (Darlington, Yorks); Farmers Magazine, Aug 1845, p. 140. Individual farmers also carried out trials, e.g. Wilson (Dictionary), op.cit, II, pp. 452-3; Wilson (Cyclopedia), op.cit, IV, p. 27; Farmers Magazine, July 1845, pp. 64-5.

69. R. N. Bacon, Report on the Agriculture of Norfolk (1844), p. 264; C. S. Read, 'Recent Improvements in Norfolk Farming', J R A S E, IXX (1858), p. 285; British Farmers Magazine, Oct 1843, pp. 435-6; S. Jonas, 'On the Farming of Cambridgeshire', J R A S E, VII (1846), p. 49; G. Murray, 'On the Farming of Huntingdon', J R A S E, new ser, IV (1868), p. 270; R. Baker, 'On the Farming of Essex', J R A S E, V (1844), pp. 38-9. Other East Anglian references as follows: Raynbird, op.cit, pp. 125-6; E. Roberts, 'On the Management of Wheat', J R A S E, VIII (1847), pp. 284, 302; Farmers Magazine, Dec 1841, p. 453; July 1842, p. 73. It was not, however, complete in the heavyland districts of Essex & Suffolk until the late 1860's, and in the Rodings not until the 1870's. This is apparent from farm account evidence. Essex Records Office, D/Dop Ell; D/Du 49/2; D/Du 168/1; D/DQ4; D/DTa A52; D/Du 441/53. Compare these with a farm at Packsfield, Norfolk, where mowing was first introduced in the 1830's. The progression is an interesting one. Mowing was introduced on a limited scale in 1830, but subsequently, due no doubt to the effects of the Swing Riots, was abandoned, and reintroduced again in 1833. Public Records Office, Chancery Masters Exhibits, C114/171. For 1867 method dispositions in East Anglia see the harvesting methods survey in Agricultural Gazette, 24 Aug 1867, pp. 889-91.

70. G. Buckland, 'On the Farming of Kent', J R A S E, VI (1845), p. 225.
71. G. Bourne, Lucy Bettsworth (edn 1913), pp. 141-2; Mackerness, op.cit, II, p. 455; G. Jekyll, Old West Surrey (1904), p. 182.
72. Farmers Magazine, Oct 1841, p. 265.
73. British Farmers Magazine, Oct 1840, pp. 350-2; R. W. Cunningham, 'Agriculture of Nottinghamshire', J R A S E, VI (1845), pp. 15-16, 28.
74. Milburn, loc.cit, p. 501, but cf. p. 513.
75. The position of the scythe was weak in Scotland in 1835. In 1850 although now much more popular it had not yet established itself as the majority tool in southern and central Scotland. A major difficulty was, of course, the massive presence of Irish and female reapers in these areas. But not only was there a renewed interest in mowing (heightened by the appearance of the Aberdeen Y-scythe), but also in the previously discarded Hainault Scythe and the much despised bagging hook. The old sickle-reap hook argument revived, perhaps because the Irish had decided to chance their arm at slashing, and some farmers began to bring back the sickle in an attempt to stamp it out. Aberdeen migrant harvesters mowed oats in southern Scotland. In East Lothian in 1843, large areas were thus harvested, with farmers keen to extend the practice. See, Stephens, op.cit, III, p. 1080; Farmers Magazine, Feb 1841, p. 114; Oct 1841, p. 280; July 1845, pp. 64-5; Aug 1845, pp. 96, 101; Sept 1845, pp. 210-13; Agricultural Gazette, 7 Sept 1844, pp. 611-2; 13 Sept 1851, p. 589.
76. C. S. Read, 'On the Farming of South Wales', J R A S E, X (1849), p. 133.
77. Stephens, op.cit, III, p. 1079; Farmers Magazine, Aug 1845, p. 101.
78. Stephens, op.cit, III, p. 1079.
79. At least, this is the conclusion drawn from the catalogues of edge tool manufacturers exhibiting at the Great Exhibition. Butterley of Sheffield, for example, was advertising 'patent Irish hooks' with cast-steel 'elastic back-riveted' blades, improved elastic sickles, elastic cast-steel Kent sickles, etc. Official Descriptive and Illustrated Catalogue of the Great Exhibition (1851), II, p. 619. Carfitt, Slagg, Sorby, and Hutton & Newton produced a similar range. Slagg advertised tools whose 'novelty is in the formation, easy and improved handle, suitable grinding and general completion'. ibid, p. 610. The 'patent' tools cost more than the 'common', 1s2d - 1s5d cf. 9d - 1s, but presumably labourers were prepared to pay for greater durability and higher working capacity, Stephens, op.cit, III, p. 1055. Manufacturers offered the new products over the

- 79.(cont) full range of traditional regional designs. Slagg manufactured 25 types of sickle and reap hook. Exhibition Catalogue, op.cit, II, p. 610, just as Fussell of Mells produced 25 different designs of scythe blade. Museum of English Rural Life, D67/49/1. Clearly, the technological innovations in the edge-tool industry which made these developments possible were primarily steam-driven tilt, hammers, shears and rollers. Exhibition Catalogue, op.cit, II, p. 657. See also, R. Atthill, Old Mendip (Newton Abbott, 1964); S. Timmins, The Resources, Products & Industrial History of Birmingham & the Midland Hardware District (1866), pp.656-8.
80. Farmers Magazine, Aug 1845, p. 101.
81. In 1815, R. W. Dickson stated that a proper scythe blade for mowing corn had not yet been developed. General View Lancashire (revised W. Stevenson, 1815), pp. 301-7.
82. M. Schofield, 'Five Centuries of Scythe Making', Country Life, 5 Dec 1952; Wilson (Dictionary), op.cit, II, pp. 230, 518; Andrews, op.cit, p. 373; A. H. Vickers, 'Village of Scythemakers', The Field, 10 May 1962.
83. For range of products in 1851, see Exhibition Catalogue, op.cit, II, pp. 610-19, and also Museum of English Rural Life D67/49/1.
84. Farmers Magazine, Sept 1838, p. 223; Farmers Magazine, Jan 1841, p. 30; British Farmers Magazine, April 1844, p. 19; Doyle, op.cit, p. 266; Private Communication: Mr. A. Fenton, National Museum of Antiquities of Scotland.
85. Doyle, op.cit, p. 266; And self-adjusting scythes, J. C. Morton, Cyclopedia of Agriculture (edn 1855), pt V, II; Agricultural Gazette, 8 May 1852, p. 293.
86. Most of the fork cradles in the Museum of English Rural Life suggest the hand of the skilled carpenter. Bacon, op.cit, p. 264 described iron-rod cradles on one farm as early as 1840.
87. See, infra, pp. 311 ff.
88. James Macdonald, 'On the Agriculture of the County of Fife', Trans. Highland Soc, 4th ser, VIII (1870), p. 38.
89. P. McConnell, Diary of a Working Farmer (1906), p. 237.

90. Agricultural Gazette, 24 Aug 1867, p. 891.
91. ibid, 17 Aug 1867, p. 863; 24 Aug 1867, pp. 888-92.
92. For example, Raynbird reported that in north Hampshire, 'on the clay lands the bagging hook is used, on the hills the scythe and reaping and mowing machines', ibid, p. 891.
93. A good summary of this and similar forms of diffusion model can be found in H. F. Lionberger, Adoption of New Ideas & Practices (Iowa Univ. Press, 1960). For detailed bibliography, see, Gwyn E. Jones, 'The Adoption and Diffusion of Agricultural Practices', World Agric. Econ. & Rural Sociol. Abstracts, 9, no. 3 (1967).
94. Farmers Magazine, Nov 1822, p. 491.
95. The most conspicuous being the use of the sickle and bagging hook by steam-ploughing farmers in the Vale of Aylesbury. Agricultural Gazette, 24 Aug 1867, p. 890.
96. ibid, p. 891.
97. Stephens (edn 1867), op.cit, II, p. 314.
98. Ward & Lock's Book of Farm Management (n.d.), p. 171.
99. Stephens (edn 1891), op.cit, II, p. 170.
100. The following statements and any others not specifically referenced are drawn from the Agricultural Gazette, survey, 24 Aug 1867, pp. 888-92.
101. In 1856 Evershed stated that in south Warwickshire reaping was more common than bagging and mowing but that in the north of the county (i.e. on the lighter upland soils) mowing wheat was fast on the increase. H. Evershed, 'On the Farming of Warwickshire', J R A S E, XVII (1856), pp. 480, 485.
102. C. S. Read reported in 1854 that high reaping was the usual mode in north Oxfordshire, and fagging in the south. Read (Oxon), loc.cit, p. 213. At this stage oats were fagged everywhere in the county. ibid, p. 213. In Joseph Ashby's Tysoe, abutting the Vale of Aylesbury, wheat was still cut with the sickle around 1870 but had given way to the scythe by the early 1880's. M. K. Ashby, Joseph Ashby of Tysoe, 1859-1919 (Oxford 1961), p. 25.

103. In 1860 wheat was reported as generally fagged in Berkshire. Spearing, loc.cit, XXI (1860), p. 22. In 1866 complaints of the cost of bagging summer corn (cf. mowing?), were heard in the county. Reading Mercury, 8 Sept 1866.

104. Reported in 1855 that in northern areas, 'towards Aylesbury', wheat was reaped high, that all spring corn was fagged except on Chilterns and on light soils where it was mown. Read (Bucks), loc.cit, p. 313.

105. The Essex pattern is an interesting one - wheat was mown on the very heavy soils of the eastern Marsh Hundreds, bagged along a line running north east across the county from London to Colchester, mown in the north and north west, and reaped in the Rodings, in which last area the sickle is still remembered by the very oldest inhabitants (Private Communication: J. Anstee, Kendal Museum).

106. In 1850 neither mowing nor bagging appear to have made much headway in Gloucestershire. Bravender, loc.cit, pp. 150-1.

107. In 1852 wheat was 'principally reaped' on the sothern clays and mown on the northern uplands. W. Bream, 'Farming of Northamptonshire', J R A S E, XIII (1852), p. 68. In 1861 Peter Love, one of the county's most progressive farmers was still conducting experiments. 'On harvesting corn', J R A S E, XXIII (1862), pp. 217-26.

108. R. Jefferies, Toilers of the Field (edn 1907), pp. 120-1; Reading Mercury, 5 Aug 1871: J. A. Eggar, Remembrances of Life & Customs in Gilbert White's, Cobbett's & Charles Kingsley's County (2nd impression, n.d.), p. 88.

109. A. C. Bradley, When Squires & Farmers Thrived (1927), p. 183.

110. Alfred Williams, A Wiltshire Village (1912), p. 268.

111. H. J. Massingham, Country Relics (1939), pp. 116-7; J. Halsham, Idlehurst (1908), p. 178; F. E. Green, A Few Acres and a Cottage (1911), pp. 141-58; W. Rose, Good Neighbours (Cambridge, 2nd edn, 1945), pp. 27-8, 31.

112. Private Communications: Mr. Jack Stratton, Aldbourne, Wilts; Mr. Lawrence, Idstone, Wilts.

113. Private Communication: Mr. A. Hodges, S. Benfleet, Essex. See also, Rose, op.cit, p. 27.

114. Most of the old farmers and labourers questioned by the author stated that harvest machinery was not general in lowland Berkshire in 1900. For bagging hook - scythe progression, Private Communication: F. Wyerth, Swallowfield, Berks; G.E. Evans, Ask the Fellows who cut the Hay (1956), p. 117; A. K. H. Jenkin, Cornish Homes & Customs (1934), pp. 150-2.

115. Report on Wages & Conditions of Employment in Agriculture (1919), II, pp. 20, 88, 357, 472; and in the 1890's, R.C. Labour (1893), I, pt IV, pp. 55, 67, 79, 114; I, pt V, p. 39; II, p. 7. (Counties: Glos, Mon, Worcs, Derbs, Berks, Wales).

116. ibid, I, pt V, p. 93; Private Communication: J. O'Rourke, Earley, Berks.

117. See, Agricultural Gazette, (17 Aug, 24 Aug, 1867) evidence which suggests low scythe values but high sickle and machine values in the Border counties. In the 1850's very large areas were still harvested by Irish reap hooks. J. Sanderson, 'On the Agriculture for Berwickshire & Roxburghshire', Trans. Highland Soc, 3rd ser, (1862-3), p. 345.

118. Farquharson, loc.cit, pp. 186-97.

119. Agricultural Gazette, 17 Aug 1867, p. 863; 24 Aug 1867, p. 88; J. Gillespie, 'Report on the Agriculture of Dumfriesshire', Trans. Highland Soc, 4th ser, II (1868-9), pp. 292-3; A. Sturrock, 'Report on the Agriculture of Ayrshire', loc.cit, 3rd ser, (1866-7), p. 59; J. Biggar, The Agriculture of Kirkudbrightshire & Wigtownshire (Dumfries, 1876), p. 25.

120. Agricultural Gazette, 17 Aug 1867, p. 863; James Macdonald, 'On the Agriculture of the County of Caithness', Trans. Highland Soc, 4th ser, VII (1875), p. 191; James Macdonald, 'On the Agriculture of Inverness-shire', loc.cit, 4th ser, IV (1872), pp. 19, 33-7.

121. Sanderson, loc.cit, p. 345; T. Farrall, 'On the Agriculture of the Counties of Edinburgh & Linlithgow', Trans. Highland Soc, 4th ser, IX (1877), p. 16; James Macdonald, 'On the Agriculture of the County of Fife', loc.cit, 4th ser, VIII (1876), p. 38.

122. R.C. Labour (1893), III, pt.II, p. 67; pt II, p. 200.

123. Agricultural Gazette, 24 Aug 1867, p. 889; A. W. Boyd, A Country Parish: Great Budworth in the County of Chester (1951), p. 41.

124. Agricultural Gazette, 24 Aug 1867, p. 889; Farmers Magazine, Aug 1865, p. 156; A. D. Hall, A Pilgrimage of British Farming (1913), p. 75.

125. Report on Wages & Conditions of Employment in Agriculture (1919), II, p. 30; W. J. Malden, Actual Farming (1925), II, p. 61; Private Communications: Mr. Chaplin, Fulbourn, Cambs; Mr. R. Paul, Bottisham, Cambs. Cf. Farmers Magazine, Aug 1867, p. 174.
126. Agricultural Gazette, 24 Aug 1867, p. 891; R.C. Labour (1893), IV, pt I, p. 59; IV, pt II, p. 37; IV, pt IV, p. 26; E. Estyn Evans, Irish Folk Ways (1957), pp. 155, 157, 161.
127. Agricultural Gazette, 24 Aug 1867, p. 891; R.C. Labour (1893), IV, pt I, p. 58; IV, pt II, pp. 5, 9.
128. Private Communication: Mr. J. O'Rourke, Earley, Berks.
129. Private Communication: Dr. A. Gailey, Ulster Folk Museum.
130. Private Communication: Mr. J. McKenna, Department of Agricultural Economics, University of Reading.

CHAPTER XVI

SOME CONCLUSIONS.

Historically, technological change in manufacturing industry has been more dramatic than in agriculture. J.O. Jones explained the difference thus: 'whereas in manufacturing industry mechanization tends to set the pace and govern the product in type and quantity and often in quality, in agriculture mechanization is very much subordinate to the natural and human processes, which it can help in some respects, but never replace'. Indeed, in agriculture, hand-labour using very simple equipment often sets the standard of technical achievement for the machine. Capital and labour are therefore more directly interchangeable in agriculture than in manufacturing industry in so far as technical change seldom influences either the biological cycle of events, or the quality of the end product. Compare this, for example, with the technical changes which occurred in the Enfield Arsenal in the 1850's, when the introduction of the Blanchard Lathe resulted in the manufacture of guns with interchangeable parts instead of craftsmen-made guns with non-interchangeable parts, a transformation which, as Ames and Rosenberg pointed out, could not be analysed in terms of homogeneous capital (machines for hand tools), labour (machinists for craftsmen), or output (one type of weapon for another).⁽¹⁾ Nor does labour-saving in agriculture yield the same economies of scale as in industry. Not only technical but also market constraints have made for a relative

stability of size of production unit in Britain over the past hundred years: between 1875 and 1966 the proportion of land in England and Wales occupied by holdings greater than 300 acres increased from 29 to only 33 per cent.⁽²⁾ Indeed, as far as can be determined by production function analysis the larger more highly-mechanized farm-size groups show little general increase in efficiency over those of 50-100 acres,⁽³⁾ notwithstanding the fact that a high proportion of farms of less than 100 acres fail to meet the threshold requirements of many modern machines or have to operate them below optimal capacity. In the period 1750-1850 the economies of scale alleged to result from enclosure or engrossing were more illusory than real for the larger farms tended to be located on the lighter soils where the opportunity for high input-high output farming was greatest and which consequently attracted the more enterprising and more capital-flush farmers. On pastoral farms the economies were even smaller, largely because livestock responded well to the sort of individual attention which family labour could best provide.

The overall analysis is that because of the high elasticity of demand for industrial products and the prospect of 'unlimited' markets technical change in manufacturing industry often means higher fixed capital/labour/output ratios and increased employment, whereas large-scale mechanization in agriculture is generally associated with a reduction of the farm labour force, which, under certain conditions, and in developing agricultures particularly, can mean social disruption.

In agriculture variable capital tends to yield a higher marginal return than fixed capital. Increased production

is not directly correlated with labour-saving innovation but rather with increased biological efficiency - greater soil fertility, improved livestock and higher-yielding crop varieties. During the proto-industrial period heavy fixed capital investment carried the disadvantages, one, of only very limited economies of scale, and two, of possible high social opportunity costs if too much labour was displaced. Prior to 1830 output gains were secured along rather than by radical shifts of the productivity curve. The significance of Thompson's 'Second Agricultural Revolution' was that it began only after the supply of the factor, land, had run out, and that increased output per acre was secured by additions to occupiers' variable capital in the form of off-farm fertilizers and feeding stuffs, relative to which machinery inputs were of a low order.

The problems of farm mechanization are, first, that the resultant method mix may not approximate to an optimum use of factors of production, and second, that it may create unemployment or reduce labourers' earnings. The homo-oeconomicus argument, as presented by Paul A. David, in his recent study of harvesting innovation in the American mid-West, asserts that a farmer will substitute a more for a less capital intensive technology when changes in relative factor prices or scale of operation enable him to reach the 'threshold farm size', (i.e. the minimum size below which he would find it more profitable to use the more labour-intensive method).⁽⁴⁾ Here we have a theoretical argument about an historical process, which although logical, and perhaps perfectly applicable to the American mid-West, fails to explain the process of harvest mechanization in Britain. As Lance Davis, in his recent critique

of the 'new economic history', has observed:- 'As long as one is interested solely in the mathematics of an argument, its elegance and cleverness are important, but its applicability is not. If, however, one wants to employ a model to explain some aspects of reality, the latter quality assumes prime importance'.⁽⁵⁾ In short, does David's model help us to understand the process of labour-saving innovation in harvesting? It does, in so far as it offers a 'dynamic' explanation of technological change and identifies the lowest threshold of innovation. What it does not explain is why so many farmers who fell well within the threshold of the reaping machine chose not to adopt it, and why it was much slower to take command in southern and eastern England than in north Britain, notwithstanding that farms were larger, fields bigger, cereal acreages greater and harvest wages often higher in the former than in the latter region. Clearly this anomaly cannot be explained in simple technical or economic terms. This thesis has suggested that key incentives to the adoption of the reaping machine in north Britain may have been the greater discontinuity of harvest labour supply and the relatively more inelastic supply of workers able to use the slashing and stroking tools. In south Britain, on the other hand, a key constraint may often have been farmers' unwillingness to create unemployment among their resident workforces. Which is to say that the short-run crisis was more relevant to farmers' decision-making than longer-run change in relative factor prices, that the reaping machine may in some areas have been more a skill-saving than a labour-cost-saving innovation, and that not only capital and labour costs but also social costs were built into

the 'threshold'. Moreover, we have suggested that initially farmers were able to obtain the required labour-savings through the 'intermediate technology' of faster hand-tool methods, which in addition to guaranteeing employment had the advantage of low (and because labourers often provided their own tools, zero) capital outlay.

Similarly 'unreal' is the argument advanced by B.H. Slicher Van Bath that mechanization is most likely to advance when capital is plentiful, i.e. when prices and profits are high:- 'More tools and machines are invented and applied in periods of high prices for farm produce than in periods of low prices very often periods of high corn prices have been accompanied by relatively low wages, and often rents have lagged behind, so it was possible for farmers to improve their equipment'.⁽⁶⁾ Whereas David's argument was good theory but doubtful fact, Slicher's thesis is deficient on both counts.

Where capital is plentiful and labour cheap the optimal factor usage is to invest capital either in productive apparatus which will consume larger quantities of the cheaper factor of production, or alternatively, if the opportunities for non-farm investment are limited, to invest in non-agricultural enterprises. Slicher assumes that capital supply is a more critical determinant of the rate of labour-saving innovation than changes in labour supply and labour cost, a conclusion which is wholly at variance with those reached by this thesis.⁽⁷⁾ Moreover, such a model fails to explain the rapid adoption of farm machinery in Western Europe between 1880 and 1914, and in North America between 1920 and 1940, both periods of low agricultural prices and profits.⁽⁸⁾

II

Let us therefore, try to draw together the various conclusions of this thesis. We may begin by emphasising that factor proportions in proto-industrial agriculture appear to have favoured the substitution of labour for capital and the investment of capital not in plant or labour-saving machinery, but in products and biological processes amenable to an intensive use of manual labour.⁽⁹⁾ Only at a much later stage of economic development, when capital/output and capital/labour ratios were of a much higher order, did the marginal productivity of fixed capital rank more important than that of labour. Here, David's 'threshold farm size' concept becomes more relevant, but up to this point it is clear that increased production and higher labour productivity were achieved by means which did not consume large doses of 'real' capital.

In particular, we have tried to show that as a result of increased crop demand and of qualitative and quantitative changes within the proto-industrial seasonal farm labour market British agriculture was afflicted by structural shortages of labour in the work bottlenecks, especially in the corn harvest. We have discovered that initially mechanization played only a small part in raising productivity per worker, and that the following constituted the chief sources of increased work output:-

- (a) more intensive use of labour - the raising of labour participation ratios and a greater use of migrant workers (more complex and larger scale seasonal redistributions of

labour and the drawing-in of the peripheral areas [Ireland and the Scottish Highlands] into the mainstream of economic development)

- (b) the substitution of piece-work for time-work, to lengthen the working day and raise work tempos.
- and (c) the adoption of subtle non-mechanical technologies - the substitution of the scythe and bagging hook for the sickle and reap hook plus improved hand-tool designs and constructions (a technical feed-back from the industrial sector).

By these means farmers were able to raise work output at low capital cost and with little social disruption. We have noted that when, after 1851, reaping machinery was introduced, mechanization was often only partial and care was taken not to displace resident workmen.

This thesis has tried to demonstrate the success of 'intermediate technology' in raising output per worker in one farm operation. As an alternative to mechanization, faster hand-tools had the following advantages:-

- (a) low-cost and divisibility (they were purchased and owned by the labourers themselves).
- (b) simplicity and easy maintenance (they required no specialised mechanical skills).
- (c) operational flexibility (to meet varying conditions of crop and weather).
- (d) that the method changes were reversible (important in view of the highly fluctuating and unpredictable nature of the proto-industrial farm labour market).
- (e) constant returns to scale (which rendered them espec-

ially appropriate for the smaller farm which could not afford mechanization).

and (f) that they enabled the farmer to adapt his method mix to match changes in the supply and supply price of labour, providing over the medium-term modest but satisfactory labour savings without incurring serious technological redundancy.

The usefulness of this brand of technology to modern underdeveloped agricultures is at once apparent. For mechanization is not only a costly business often resulting in an inefficient factor-mix and tying poor peasant farmers to fixed payments in good years and bad, but also it usually requires a heavy complementary investment in infrastructural services, such as technical education and workshop facilities.⁽¹⁰⁾ Conversely, the chief social priority of developing nations is to create on-farm employment for rapidly expanding rural populations, thereby enabling agriculture properly to fulfill its rôle of residual employer and to release labour to other sectors of the economy at a rate commensurate with the necessarily slow and uneven growth in non-farm employment. In many developing nations the failure of agriculture to provide employment has led to massive migrations to the towns and has transferred the onus of relieving unemployment from the residual employment sector proper to the expanding industrial sector, a development which in most important respects - socially and economically - represents an inefficient use of human resources.⁽¹¹⁾

Clearly what might be done for harvesting might also be applied elsewhere in agriculture, and indeed, in any other

industry requiring low-cost improvements in work output. The historical precedents may be found, inter alia, in the development of threshing machines (especially in Japan), hoes, animal harnessings, axes, saws, water-pumps, windmills, spinning-wheels and weaving-looms.⁽¹²⁾

However the present environment for the success of such a strategy is unpromising. Like Kipling's Lascar stoker praying before his pressure boiler, policy makers have often put their faith in the products of Western technology. A few economists, disturbed at the failure of so many under-developed economies to "take-off", are now convinced that our economic principles are 'culture-bound' and too much modelled on twentieth century experience of the advanced countries; that we are blinded to the real problems of the other half world where neither production nor consumption is studded with gadgets and where the chief demand is for simple and inexpensive income flows.⁽¹³⁾ The recent setting up in this country of the Intermediate Technology Development Group⁽¹⁴⁾ holds out some promise for the future, the more so if the 'boot-straps' philosophy gains favour in the Third World, as it might, if the present hiatus in the flow of foreign funds continues. Even so, the concept of 'intermediate technology' needs to be broadened if it is ever to become a fulcrum of development strategy. At present its chief emphasis is on 'gadgetry'; it is more the playground of the mechanical engineer than the agriculturist or development economist.⁽¹⁵⁾ It tends, therefore, to ignore the fact that in agriculture more efficient biological processes have proved more effective engines of growth than tools, implements and machinery, that choice of product is often as important

a determinant of productivity and levels of employment as choice of technology, and that technology per se is but one component of a complex organic process. Moreover, it still remains to be proved that technologies are 'environmentally' neutral, that they can be transferred successfully between economies at different stages of economic development.

British historical experience may be very relevant here. Pre-1870 advances in agriculture and industry were characterised by an extremely sensitive use of factor resources. In industry the first significant shift of the production function towards high capital-intensiveness did not occur until the 1830's, and it was only in the 1840's that the rate of net capital formation first exceeded 10 per cent. Up to this point, the economy was in many important respects still pre-industrial, both in technology and industrial organization. Heaton described this stage of the Industrial Revolution as 'a study in slow motion', for as late as 1830 production was still largely concentrated on the household or small workshop and dependent on simple labour-intensive techniques.⁽¹⁶⁾ As for agriculture, this study has stressed the indivisibility of the cultural, social, economic and technical elements within the process of technological change. It has tried to analyse the effects of economic growth on the structure of the seasonal farm labour market and to expose its mechanisms. Above all, it has tried to show that given certain factor proportions, there is a stage of economic development in which, economically and socially, a scythe can be more useful than a reaping machine.

1. J.O. Jones, 'Comparisons between industrial and agricultural mechanization and their consequences', in, J.L. Meij, ed, Mechanization in Agriculture (Amsterdam, 1960), pp. 345-6. E. Ames & N. Rosenberg, 'The Enfield Arsenal in Theory & History', Economic Journal, LXXVIII (1968).
2. A Century of British Agricultural Statistics (H.M.S.O., 1968), pp. 18-21.
3. Jones, loc.cit, pp. 344-5.
4. P.A. David, 'The Mechanization of Reaping in the Ante-Bellum Mid-West', in, H. Rosovsky, ed, Industrialisation in Two Systems (New York, 1966), pp. 3-39 and subsequent paper, 'Mechanization in Nineteenth Century Agriculture - Britain and America', read at The Centre for the Advanced Study of Italian History Seminar, University of Reading, 20 Feb 1968. The chief variables in David's model are (a) capital cost of machine (b) life of machine (c) interest rates (d) labour requirement (e) labour cost. It should, however, be explained that David's 'threshold farm size' concept is no new one. It was known to Hamm the early nineteenth century German agronomist and was manipulated at great length by Gustav Fischer in his Die sociale Bedeutung der Maschinen in der Landwirtschaft (Leipzig, 1902), which (pp. 24-5, 39) establishes the threshold for 16 different types of farm machinery. For a modern statement, see, Jones, loc.cit, pp. 33-4.
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6. B.H. Slicher van Bath, 'The Influence of Economic Considerations on the Development of Agricultural Tools and Machines in History', in Meij, op.cit, pp. 4-14.
7. For a detailed exposition of the relationship between labour supply and technological change in the nineteenth century, see H.J. Habakkuk's classic study, American and British Technology in the Nineteenth Century (Cambridge, 1962), esp., Ch. V. The best available theoretical treatments of the factor mix arguments are, A.K. Sen, Choice of Techniques (Oxford, 1962) and J.C.H. Fei and G. Ranis, Development of the labour Surplus Economy: Theory and Policy (Homewood, Ill., 1964) B. Higgins, Economic Development (rev. edn, 1968), pp. 378-86.
8. See, E.J.T. Collins, 'Labour Supply and Demand in European Agriculture, 1800-1880', in, E.L. Jones & S.J. Woolf, eds, Agriculture and Economic Growth: The Historical Problems (1969), pp. 74-6; F. Dovring, 'The Transformation of European Agriculture', in H.J. Habakkuk and M. Postan, eds, The Cambridge Economic History of Europe, VI (Cambridge, 1965), p. 644; Earl O. Heady, 'Extent and Conditions of Agricultural Mechanization in the United States', in Meij, op.cit, pp. 63-97, esp. pp. 77-85; P. Lamartine-Yates, Food Production in Western Europe (1940), passim.

9. This is particularly true for agriculture, but as Higgins explains, it can break down for industry. The Ranis-Fei model assumes that under-developed (developing) economies cannot afford capital-intensive techniques but this ignores the possibility of innovations being both labour-saving and capital-saving and since capital is a more expensive factor of production than labour then clearly the capital-saving technique should be preferred to the more labour-intensive technique. Higgins, op.cit, pp. 314-5. This does not imply that agriculture requires no fixed capital investment. There are few technologies able to raise output per man-hour without also raising capital-labour ratios. But through biological processes it is possible to achieve lower capital/other factor ratios in agriculture than in industry.
10. The history of modern agricultural development is studded with failures of large-scale mechanization projects. West Africa particularly has a splendid selection of 'tractor graveyards'. Some of the problems are discussed in C. Davies, ed, Considerations and procedures for the successful introduction of farm mechanization (FAO, Rome, 1954). Underlying large-scale mechanization is the belief, first, that it will offer large economies of scale, second that it will enable the under-developed agriculture quickly to achieve the same measure of efficiency as agricultures in the advanced economies and third, that the tractor is something more than just a machine, it is an 'article of faith'. For critiques of 'socialist' farm economies, see, N. Jasny, The Socialized Agriculture of the USSR (Stanford, 1949); L.E. Hubbard, The Economics of Soviet Agriculture (1939); R.D. and B.A. Laird, Soviet Communism and Agrarian Revolution (Penguin, 1970). The present author hopes to provide a detailed appraisal of 'turnkey' mechanization projects in his forthcoming The Productive Wheel (Methuen, London).
11. See, Manpower in Economic and Social Growth (U.S. Department of Labor, 1966), pp. 26-7 and passim.
12. For fascinating studies demonstrating possibilities of 'intermediate technologies' in small-farm agricultures, see, H. Hopfen, Farm Implements for Arid and Tropical Regions (FAO, Rome, 1960) and F.C. Ma et al, A Preliminary study of Farm Implements used in Taiwan Province (JCRR, Taipei, 1955); Shin Norin Sha, Ltd. Profile of Farm Mechanization in Japan (Tokyo, n.d.).
13. For example, R. Dumont, False Start in Africa (1966); Lands Alive (1965); African Agricultural Development (U.N.O., New York, 1966); T.W. Schultz, Transforming Traditional Agriculture (Yale, 1964); Polly Hill, 'A Plea for Indigenous Economics', Ec. Devt. and Cult. Change, XV (1966), pp. 10-20; H. Lipton, The Listener, 29 March, 4 April 1968; H.A. Luning, Economic Aspects of Low Income Farming (Wageningen, 1966).
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15. A conspicuous exception here is the French Overseas Aid Programme, which following the failure of early mechanization schemes in francophone Africa, is now committed to a policy of 'development total', which places 'intermediate technology' in a far broader economic and social perspective. The technical basis of agricultural development policy is 'traction attelée' (animal traction) as opposed to 'slash and burn' agriculture and extensive grazing on the one hand and tractorization on the other.
16. See, P. Deane and W.A. Cole, British Economic Growth, 1688-1959 (Cambridge, 2nd edn, 1967), Chaps. VI and VIII; D.S. Landes, The Unbound Prometheus (Cambridge, 1969), pp. 116-23, and Ch. II, passim; J.H. Clapham, An Economic History of Modern Britain, I (Cambridge, 1850 edn), Chaps, I & V.

'HIRED' AND 'ON-FARM' WORKFORCES in BRITAIN, 1851/71, Revised Estimates

APPENDIX I

	<u>England & Wales</u>		<u>Scotland</u>		<u>Great Britain</u>	
	<u>1851</u>	<u>1871</u>	<u>1851</u>	<u>1871</u>	<u>1851</u>	<u>1871</u>
<u>'HIRED' WORKFORCE</u>						
<u>MALES</u>						
Outdoor Labourers and Shepherds	921195	787897	101443	79276	1022638	867173
Indoor Labourers	189116	134157	45346	40115	234462	174272
<u>TOTAL MALES</u>	1110311	922054	146789	119391	1257100	1041445
<u>FEMALES</u>						
Outdoor Labourers	44319	33513	26151	22174	70470	55687
Indoor Farm Servants	35100	24599	28477	20615	63577	45214
<u>TOTAL FEMALES</u>	79419	58112	54628	42789	134047	100901
<u>TOTAL 'HIRED' WORK-FORCE</u>	1189730	980166	101417	162180	1391147	1142346
<u>'ON-FARM' WORKFORCE</u>						
<u>MALES</u>						
Farmers and Bailiffs	246982	242045	50877	51311	297859	293356
Farmers 'Relatives'	111704	76466	24421	16606	136125	93072
<u>TOTAL MALES</u>	358686	318511	75298	67917	433984	386428
<u>FEMALES</u>						
Farmers	24490	24338	4865	6817	29355	31155
Farmers Wives	164618	187029	36758	35465	201376	222494
Farmers 'Relatives'	105147	92187	21857	20327	127004	112514
<u>TOTAL FEMALES</u>	294255	303554	63480	62609	357735	366163
<u>TOTAL 'ON-FARM' WORKFORCE</u>	652941	622065	138778	130526	791719	752591
<u>TOTAL 'ACTIVE' HIRED AND ON-FARM WORK-FORCE</u>	1842671	1602231	340195	292706	2182866	1894937

Appendix II

Sources for Work Rates and Linkage Labour Requirements of competing hand tool methods (fn 5, Chapter XIV).

Sickle and Reap Hook

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Scythe

Farquaharson, loc.cit.; British Husbandry (1837), II, 190; Robertson, op.cit., pp. 236-7; Stephens, op.cit., III, p. 1065; ibid., (1891 edn), III, p. 172; Wilson (Cyclopaedia), op.cit., IV, p. 27; Legard, 'Report on the Farming of the East Riding of Yorkshire', JRASE, IX (1848); Wilson (Farm Crops), op.cit., I, p. 126; Murphy, op.cit., p. 82; McConnell, op.cit., p. 393; Raynbird, loc.cit., pp. 125-6; R.C. Labour (1893), IV, pt.IV, p. 92; Quarterley J. Agric (1857-9), pp. 61-3; Return of Average Rates of Weekly Earnings of Agricultural Labourers (1860), pp. 574, 587; Farmers Magazine Sept 1845, p. 218; Oct 1845, p. 341; Nov 1838, p. 335; Oct 1841, p. 280; C.H. Warren, Happy Countryman (1946), p. 71; Private Communications; J. Stuck, Alphamstone, Essex; R. Hendry, Munden, Essex; J. O'Rourke, Earley, Berks; H. Bew, Padworth, Berks.

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This does not set out to be a comprehensive bibliography of either farm labour or harvesting technology. Nor indeed is it an exhaustive list of all the works consulted in the course of this thesis.

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The author has examined a large number of manuscript farm accounts in the course of this study. Most detailed farm records relating to this period indicate harvest methods and wage payments. In view of the relative abundance and wide coverage of contemporary literary comment farm account evidence has, for reasons of space, been largely omitted. The main archival collections examined were The University of Reading Farm Records Collection and those deposited with The Essex County Record Office. East Anglian MSS evidence is summarized in fn. 69 Chapter XV, supra.

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