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THE CHANGING STRUCTURE OF AGRICULTURE'S LABOUR FORCE

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THIS paper contains a little about a lot of things and not very much about anything. Those who have been responsible over the years for recording the numbers engaged in agriculture, their ages and sex, their status and the kinds of work which they do, seem possessed of an evil genius to frustrate one's best intentions of writing a neat and definitive account of the changing structure of the agricultural labour force. Definitions change over time and between countries, categories of workers mysteriously appear in, and disappear from, the statistics; detailed analysis of even one's own country's statistics shows that recorders in different places do not always interpret their instructions in the same way. One tries to get round the difficulties by grouping the data, by interpolation and extrapolation or, when all else fails, by 'adjusting' the data. In the end one is never quite certain that what one is left with is not some figment of one's own imagination rather than a true picture of reality. Because of these difficulties and the need for brevity, I have in general confined myself to features about which one can be reasonably certain. I have used the United Kingdom (or, more often, the England and Wales) data[1] to a greater extent than for other countries, for the obvious reason that they are more accessible to me and I can disentangle their intricacies better and also because the United Kingdom data on the hired labour force are more extensive than I have been able to find for other countries. Whenever it seems necessary, however, I have drawn parallels from other countries.

Agriculture and the Food Industry

Agricultural economists who have concerned themselves with the human aspects of the subject have generally confined themselves to the farming sector of the food industry. There has been a growing

[1] The partition of Ireland in 1921 and subsequent differences of definition and of timing of censuses between England and Wales, Scotland, and Northern Ireland make the combined data difficult to use. Since partition Great Britain = England and Wales and Scotland; United Kingdom = Great Britain and Northern Ireland.

sense of unease that this confines the subject too narrowly, as exemplified in some recent attempts at redefining the labour productivity of agriculture so as to include within it the ancillary industries which provide farming with an increasing proportion of its inputs.[1] As agriculture becomes more dependent on other sectors for its inputs the usefulness of measures of farm labour productivity is lessened. During the twentieth century, some of the more important gains in productivity in food production in several advanced countries have emanated from outside farming, and in particular from improvements in the efficiency of producing farm machinery and agricultural fertilizers. Dewhurst, Coppock, and Yates give some data for Western Europe showing that the ancillary industries supplying agricultural inputs in 1955 accounted for between 12 and 48 per cent. of the total labour embodied in food as it leaves the farm.

TABLE 1

Labour Used in Producing Supplies for Agriculture as a Proportion of Total Labour Embodied in Farm Products

	per cent.
Western Europe	22
United Kingdom	48
France	21
Sweden	23
Denmark	32
Germany	35
Belgium–Luxemburg	31
Italy	16
Greece, Portugal, and Spain	12

Source: Dewhurst, Coppock, and Yates, op. cit.

Using similar, though not identical, methods of calculation, one of my colleagues has arrived at very much the same answer for the United Kingdom. In 1952, when the agricultural manpower in U.K. agriculture was approximately 1,150,000 persons, the labour employed in ancillary industries supplying agriculture was about 850,000 persons.[2] Between 1952 and 1962 this figure dropped by 15 per cent. despite a rise of 38 per cent. in non-agricultural inputs used; a significant increase in productivity.

[1] See F. Dovring, *Labour Used for Agricultural Production—An Attempt at a Fresh Approach to Productivity in Agriculture*, University of Illinois 1963 (mimeo). Also, Dewhurst, Coppock, and Yates, *Europe's Needs and Resources*, Macmillan 1961, pp. 510–14.

[2] A slightly higher total is obtained by somewhat more sophisticated methods of calculation from the Input–Output tables of the U.K. economy, but the order of magnitude is much the same.

The labour involved in supplying agriculture with inputs is small, however, in comparison with that which is embodied in the processing, distribution, and service of food. In the U.K. we estimate that in the decade 1952 to 1962 there were roughly 3½ million persons engaged on the processing and distribution of home-produced and imported food and drink. This figure shows no significant trend in a period when the value of food and drink purchased by consumers increased by approximately a quarter in real terms: again, a substantial increase in productivity. It has to be borne in mind that the U.K. imports approximately a half, by value, of its food and drink. If we were able to produce the imported half domestically at the same average productivity as that which is home-produced, there would be a rough equivalence between the labour involved in producing food and that embodied between the farm gate and the final consumer. It is obvious that these relative proportions differ markedly between economies in different stages of economic development. At one end of the scale, subsistence agriculture, virtually all labour embodied in food is farm labour, whereas at the other, two-thirds or more of it is contributed by non-farm labour. In between these two extremes, we are able to say very little about the rate at which changes in structure occur. Yet, as a profession which is becoming increasingly involved in the planning of development, it is essential that we should be able to specify and to quantify these changes in structure. Even between the advanced economies, there are major differences of structure and of relative efficiency in the various sectors dealing with food. Some preliminary work on a comparison of the U.S.A. and U.K. suggests, despite the presumption of a higher level of food processing in the U.S.A. that the numbers of people engaged are relatively much fewer than in the U.K. There is an implication that the relative efficiency of the U.S.A. in food processing and distribution is greater than the relative efficiency in food production in the U.K. Comparative studies in this field are very much needed both in order to improve our integration of the planning of agriculture with general economic growth, and in order to isolate for further studies those areas where wide disparities occur between countries in their relative productivity and efficiency. Indeed, one can go further and say that many of the economic problems of farming in advanced economies are created, and may well be solved, in the ancillary industries which lie on either side of farming proper.

Having briefly exhorted agricultural economists to take a wider view on labour and productivity problems, I now do the opposite and confine myself to the farming labour force.

Men and Women in the Agricultural Labour Force

For many countries it would appear that economic growth leads to a reduction in the farm employment of women. As you will see from Table 2, a number of advanced countries have reached the stage where women account for 10 per cent. or less of the farm labour force and others where the trend of female employment is downwards.[1] In general, the less-developed countries show a higher proportion of female employment.

TABLE 2

The Sex Structure of the Agricultural Labour Force

(Selected countries and selected years)
Number of women per 100 men occupied

Canada	1900	10	Denmark	1901	43	France	1921	79
	1930	10		1930	30		1931	72
	1950	9		1950	22		1954	78(54)
New Zealand	1936	4	Belgium	1930	29	Fed. Republic of Germany	1957/8	113
	1956	7		1947	17			
United States	1900	10	Netherlands	1930	20	Poland	1931	81
	1930	10		1947	29		1950	115
	1950	9						
United Kingdom	1901	5	Italy	1900	49	U.S.S.R.	1926	98
	1931	6		1930	41		1959	118
	1951	10		1950	33			
Norway	1900	32	India	1901	55	Japan	1920	84
	1930	15		1931	48		1930	84
	1950	12		1951	47		1950	100
Sweden	1900	34	Philippines	1939	40			
	1930	35		1959	33			
	1950	11						

Notes on the Table. Sources: International Labour Office, *Why Labour Leaves the Land*, Geneva 1960; *F.A.O. Yearbook 1960*; Censuses of Population for Selected Countries; Professor Seiichi Tobato, *Japan's Agriculture*, Ministry of Foreign Affairs, Japan 1956. The United Kingdom figure for 1951 is not directly comparable with earlier years. In view of the variety of sources used, this table is meant to illustrate orders of magnitude only.

There is a band of countries running across the world from France, through Germany, Poland, the U.S.S.R. to Japan—most of them

[1] Where the proportion of women is very low, slight differences of definition between census dates can have a marked effect and may account for the reversal of trend shown for some countries. The increase in proportion in U.K. in 1951 is accounted for by an influx of women during the war; the subsequent trend is downwards.

relatively advanced countries—which show very different tendencies. One cannot be certain that one is always comparing like with like, either over time or between countries. For example, the inclusion of farmers' wives and daughters in the labour force may be somewhat arbitrary and may not truly reflect their contribution to farm work. This probably explains, in part at least, the high ratio of women to men in French agriculture. In 1921 and 1931 the figures for France are inflated by the fact that all members of farmers' families above school leaving age, but not reported as active in other occupations, are included in agricultural occupations. The figure in parentheses (54) for 1954 relates to those who specifically state that they are in agricultural occupation and is much lower than under the old basis. Even so, it may well include many farmers' wives who make little or no contribution to the labour force. In any case, French agriculture is a subject of great regional contrasts and this too might well affect the relative proportions of men and women in the aggregate statistics. In Germany, one authority states that farmers' wives generally help their husbands on small farms and are often included in the censuses as being in farm work.

I do not pretend to know all the reasons why this band of countries shows a divergence from the general tendency; I can only ask the questions. How much has it to do with the heavy loss of manpower in two world wars, how much with small-scale farming or the socialization of agriculture? Is it the effect, on some of them, of the growth of part-time farming in an era of very rapid industrialization, when the men rather than the women have gone out to work? How much is it the influence of tradition, and will time yet bring the balance more in line with other countries?

In the other countries, the trends shown are indicative of the changing place of women in the industry. Many developments are responsible. The growth of ancillary industries has taken out of farming many of the traditional duties of women, such as cheese- and butter-making and the marketing of products. The poultry enterprise in the advanced countries, which was at one time almost the exclusive province of the women, has become larger in scale and increasingly specialized, and has often been taken over by men. It is sometimes claimed that the mechanical revolution has also had its effect, in that women are not particularly adept at handling machinery, a claim which women will no doubt refute. Probably the real effect in this direction has been that many of the repetitive and dextrous tasks which women once performed, and still do in the less advanced countries, have become mechanized. Increasing employment oppor-

tunities for women in industry and the professions, which economic growth brings about, attract women away from farm work which, in many ways, is a less congenial employment for them. Increasing income within farming also brings a subtle change, in that there is not the same necessity for women to be the earners of income. They can devote more of their time to the domestic spheres of the home and the family and to the social life of the community. In this sense there is increasing differentiation between the business and the home in farming. This does not mean that women are any less important in agriculture, but merely that fewer of them are recorded in its labour statistics.

While women are being drawn out of agriculture into other occupations there seems little doubt that there is a push as well as a pull out of agriculture. In Britain, the labour shortage of two world wars offered women more numerous work opportunities in agriculture, and their numbers increased both absolutely and relatively for a period, only to fall again quickly. As will be seen from the more detailed information for Britain given later in this paper, the fall in the number of women does not only affect family members but also those in the hired-labour component. Of the total regularly employed labour force (excluding farmers) in 1962, only 7 per cent. were women, and the proportion has approximately halved since 1945–6. On the other hand, the number of women in 'casual'[1] farm employment has tended to increase. But the total of both casual and regular employment of women now accounts for only 16 per cent. of the hired labour force. The increasing imbalance between the sexes in agriculture can have profound social consequences, particularly when it is borne in mind that the fall in female agricultural employment has been accompanied by an even greater decline in domestic service in rural areas, which once absorbed the time of a fairly large proportion of rural women not working on the land. Some interesting work in my department[2] indicates that, at least in some rural areas with few non-farm opportunities, the flight of young women into the towns in search of work is causing a delay in the marriage age of the men who remain in farming. This has obvious repercussions on the future age distribution of rural people and probably some effect on crude birth-rates in the rural population. More significant, perhaps, is the increasing necessity for young men

[1] Casual employment is here defined as part-time, seasonal, or temporary employment. It is not clear how far these employees are recorded in the decennial censuses of population as being in agricultural employment.

[2] J. S. Nalson, *The mobility of farm families in an upland area of north-east Staffordshire*, Manchester University, Ph.D. Thesis.

in farming to seek their wives from an urban environment, thus bringing into farming and the countryside more people with an urban view of life and of living. Some will deplore the change while others welcome it; it depends on value judgements. But one thing is certain, unless we create more employment opportunities for women, and particularly for young women, in rural areas, the already narrowing difference between the urban and rural ways of life will disappear.

The Ratio of Farmers to Farm Workers

There can be little-doubt that the rigidity of land tenure systems leads to a relatively slow decline in the number of farmers compared with farm workers. In England, for example, the numbers of farmers recorded in the decennial censuses have shown little change for a century or more, whereas the number of farm workers has approximately halved. From being a prime example of a capitalist system of farming a century ago, Britain is tending towards the family-farm system of her continental neighbours and of North America. Some countries have shown a more marked reduction in the numbers of farmers, but as shown in Table 3 there has been a general tendency for the number of employees per farm to decline. The table is self-explanatory.

TABLE 3

Number of Family and Hired Workers (Male and Female) per Farmer

Canada	1901	0·6	Denmark	1901	1·9	Switzerland	1920	1·1
	1931	0·8		1930	1·7	(males only)	1950	1·0
	1951	0·5		1950	1·2			
United States	1900	0·9	Norway	1928/9	2·2	United Kingdom	1901	3·4
	1930	0·7		1955/6	1·1	(E. and W.)	1931	2·5
	1950	0·6					1951	2·0

The Age Distribution of the Labour Force

It is a truism that in countries where the large majority of the working population is employed in agriculture, the age distribution of the farm labour force cannot differ significantly from that of the population at large. The causes which give rise to differences in its age structure over time will be very largely the same causes, of changing birth rates and death rates, which affect the age composition of the total population. The further we depart from this situation, with the continued relative growth of the non-agricultural sector, the less need the age structure of the farming population reflect that of the total. On prima facie grounds we might perhaps have

expected that as employment in agriculture increases more slowly than in the non-agricultural sector, and particularly when it is declining absolutely, the tendency would be for agriculture to recruit fewer young people. If so, the age structure of its labour force would become heavily weighted with older people. That this is not so is amply demonstrated in the diagrams for selected countries, Fig. 1.[1]

The picture for all the countries shown (and for all others which we have investigated) is the same in character if not in degree: a large influx of young people into agriculture, so that agriculture employs more than its share of young people. This is followed by a rapid exodus so that agriculture has less than its share of the active population in the middle age-groups. In turn, this is followed by a more than proportionate share of older people. These features of agricultural employment are remarkably consistent through time as well as between countries. It is evident that agriculture continues to recruit a larger number of young people than can find permanent employment within the industry and the skewness of the distributions is even more marked for the hired labour force than for family members.[2] No doubt, the shape of these distribution curves is subject to general influences such as changes in school-leaving age, the age structure of the general population and military service. There is also some evidence for Britain and elsewhere that periods of economic depression lead to an increase in the proportion in the older age categories, as farm workers, who have left for other employment, return to agriculture in periods of high industrial unemployment. These influences are changes of degree rather than of the general nature of the age-distribution curves for farm workers. The contrast between the age distribution of farmers and of farm workers is marked but understandable in view of the fact that most farmers have either inherited from their fathers or have worked on

[1] In order to avoid undue complication, the analysis in these diagrams has been confined to the male workers, remembering that for most countries men constitute by far the larger proportion of the agricultural labour force.

[2] The population censuses do not always allow us to differentiate between family workers and hired workers by age groups. Even where the information is given, there is uncertainty about the inclusion of family members in the hired labour force when they are under contract of service on parental farms. We have therefore given no separate graphs for the hired component of the labour force. The population census data for many countries are also inadequate to allow us to calculate precisely the turning points between the recruitment and the exodus of young people, but other evidence for Britain (*The Wages and Employment Enquiry*: Ministry of Agriculture) suggests that the peak employment age occurs earlier and is more pronounced than in the smoothed curves which are shown. For Britain, the peak of employment of hired labour is at age 17; the exodus begins at 18 and reaches major proportions by 19 and 20. That it continues rapidly thereafter until ages 30 to 35 is shown in the diagrams.

parental or other farms until they have accumulated the necessary capital for entry as entrepreneurs. There can be no doubt, however, from the rapidity with which the farm-worker population falls between the ages of about 18 and 35, that this is a real exodus and not merely a transfer in status from farm worker to farmer. Redundancy amongst the non-farmer labour force is inevitable in a dynamic situation in which there is a relatively low and declining rate of increase in the demand for food as it leaves the farm, and a continuing and relatively rapid increase in the productivity per man engaged in farming but a relatively slow rate of decline in the number of farms. The brunt of this redundancy falls upon the hired component of the labour force, although there are periods in the history of some countries when family labour has departed at a greater rate than hired workers. But these propositions of themselves are insufficient explanation of the peculiar age distribution of the farm labour force.

Some agricultural economists have sought to explain the 'drift from the land' in terms of the relatively low incomes or wages in agriculture, the relatively long and arduous hours of work, poor living accommodation in rural areas, &c.[1] These features of agricultural employment are important and easily demonstrated, but in many ways they are only the symptoms of a more deep-rooted maladjustment. The real cause of the drift from the land is the declining demand for labour in the industry; and the real cause of the peculiar age distribution of its work force is that the industry attracts more young people than it can hope to keep in employment throughout their lives. Indeed, we can go further and state that if the economy attempts to remove the disparities which exist in earnings and conditions of work, the rate of redundancy will increase, for if you increase the real price of agricultural labour the demand for it will decline and the rate at which capital is substituted for it will accelerate. If we are to explain the divergence of the age structure of the farm labour force from that of the general population, we must ask why it is that the industry attracts so many young people. No doubt some of the causes are common to all countries. There is the universal reason, which I need not dwell on, of its aesthetic attraction for young people. The large majority of farm workers in Britain, and I suspect elsewhere, are the sons or daughters of farmers or of farm workers. Provided that the agricultural population is increasing at the

[1] See for example I.L.O. op. cit. Giles and Cowie 'An Inquiry into reasons for The Drift from the Land', Selected papers in *Agricultural Economics*, vol. v, no. 3, University of Bristol. Also *The Farm Worker—His Training, Pay and Status*, by Giles and Cowie, University of Reading, 1963.

same (or greater) rate as the general population, and so long as alternative employment increases more slowly in rural areas, young rural people will naturally gravitate towards the farming industry. There is also some evidence for Britain, though I cannot say for other countries, that farming wants them, for the disparity in earnings for young people between agriculture and industry is considerably less than it is at maturity.

TABLE 4

Relative Earnings in British Agriculture and Industry

Agricultural earnings as a percentage of industrial earnings (per week)

	Men	*Youths*
1948	76	120
1955	70	105
1962	70	94

It is tempting to suppose that the relatively high demand for young people is a function of their adaptability in an era when agriculture is passing through a major revolution. But, in view of the persistency in the shape of the age-distribution curves, I cannot give it much weight even though I do not reject it entirely. A more likely cause is the difficulty of adjustment in the size of farm business as economic circumstances change. The employment of youths, at a lower wage rate than for men, enables farmers to make a finer adjustment between labour and other inputs than would otherwise be possible. This demand for young people by agriculture helps to maintain their level of wages *vis-à-vis* industrial employment. Whatever the mixture of reasons for the attraction to agriculture, once in, this large number of recruits inevitably influences the future course of events and tends to aggravate the wage disparity between agriculture and industry at mature age. The reasons for the very rapid fall in numbers between the ages of 20 and 40, such as the increasing wages disparity, the lack of prospects, poor living accommodation, and lack of amenities, at the stage in life when family responsibilities increase have been too well written up elsewhere to require elaboration at this point, although I shall return to one of two facets later on. All I want to add here is that, if we wish to eliminate the wage disparity or if we think that the economy is allocating its young manpower badly between agriculture and other occupations, we must attack the problem where it is being formed—at the recruitment phase. Most countries pay lip service to the need for better training for entry into agriculture and many make large investments in the form of agricultural colleges, farm institutes, vocational schools, and apprenticeship

schemes to achieve this objective. The need for these things is unquestioned, but where we are failing is in not educating rural youth to the realities of the employment opportunities which agriculture offers. In view of the declining opportunities in agriculture, one of the purposes of rural education in the future must be to widen the range of choice of vocation to which rural youth is fitted. Until this is done, rural youth will continue to flock into agriculture only to be disappointed and disillusioned at a later stage. We must educate them out of agriculture as well as into it, and we have a professional duty to see that this is done.

As to the contention which is often made by farmers, and sometimes by agricultural economists, that agriculture loses the best from its labour force, I do not think that we need worry too much. It is obvious that agriculture and rural areas lose some of their most intelligent and vigorous manpower but an equal number must remain. If it were not so, and if there is any truth in the heritability of human characteristics, then the agricultural population of a country like the United Kingdom, which has seen its farming manpower drain away to less than 5 per cent. of the total population would have degenerated into morons! This is patently not so. There is no evidence to suggest that the capabilities of agricultural labour are in any way inferior to those of labour in other industries or in agriculture a century ago. Neither is there any necessary correlation between innate ability and the desire to drift out of agriculture in search of better conditions elsewhere. The challenge of agriculture and the scope it offers for improving and innovating is still sufficiently alluring to intelligent and self-reliant youth to attract them in large numbers. All we have to do is to ensure that it continues to be so.

The Division of Function

In this section, I depend almost exclusively on British data, partly because Britain, outside of the socialist countries, still employs more labour *per farm* than any other country, and therefore has greater scope for the division of function, and partly because she has better data on this question than can be found elsewhere.[1] There is hardly

[1] The data have been extracted from the annual reports of the *Wages and Employment Enquiry: England and Wales*, Ministry of Agriculture, London, Economics and Statistics Division. The labour force enumerated excludes farmers but includes farmers' relatives employed, but not hired, on family farms as well as hired labour. The inclusion of Scotland and particularly of Northern Ireland, would reduce the average size of the employment groups and the ratio of hired labour to farmers. For definitions, see the reports themselves and also H. Palca and I. G. R. Davies, *Journal of the Royal Statistical Society*, series A (general), vol. cxiv, part 1, 1951 and Central Statistical Office, *Economic Trends*, no. 103, May 1962.

any need to stress the fact that specialization and the division of function has not the same clarity of meaning in agriculture as in many other industries. Even under mono-culture or single-product farms the division of function amongst operatives is a far cry from what Adam Smith had in mind in his famous pin analogy. Although the data presented in the following diagrams and in the tables are for a relatively short period of time, they are still interesting and informative of the adjustments which agriculture makes in a period of rapid technical innovation and changing economic circumstances. There is time to comment on only a few of the changes shown.

Regular and Casual Employment[1]

As shown in Figure 2, the regularly employed labour force in Britain was increasing up to 1949, as a result of the war-time and post-war expansion plans, which were making greater demands on labour than could be met by the upward trend of labour productivity. After 1949, the increase in labour productivity reflects itself once more in the decline of the labour force. The fall in numbers, however, is confined almost entirely to regular rather than casual labour, the numbers in the latter category being well maintained until about 1960. This phenomenon is to be explained very largely in terms of the increasing labour productivity against a very slow rate of change in the number of farms. As I have remarked earlier, British farmers have been shedding labour, in response to technological and economic forces, with a result that more and more of them are taking on the characteristics of family farming, employing little or no outside labour. This is illustrated in the following summary showing the change in the employment structure in a relatively short period of time.

In this situation it is not surprising that casual employment has been well maintained. Although the mechanical revolution and the adjustments in farming systems have reduced seasonal labour peaks, they have not eliminated them, and farmers who work their farms mainly on their own have come to depend increasingly upon short-term employment in busy seasons. Indeed, since the employment figures relate only to the month of June, there is every reason for thinking that the increasing relative importance of casual labour is underestimated in these statistics. The fall in the regular labour force on farms still employing labour has also meant that many jobs

[1] Casual employment is defined, as before, as part-time, seasonal, or temporary employment.

which were customarily done by regular labour are now being executed by casual labour, hired by the day or week or employed by contractors who have taken on responsibility for some traditional farm tasks.

TABLE 5

Changes in the Employment Structure on Farms in England and Wales

The number of holdings with employment groups of different sizes

	1948		*1962*	
	Number of holdings		*Number of holdings*	
	(*000*)	%	(*000*)	%
Employing no workers	161	44·3	176	52·7
,, no regular workers . . .	25	6·9	26	7·8
,, no regular adult men . .	33	9·1	23	6·9
,, 1 ,, ,, . . .	67	18·4	55	16·4
,, 2–4 ,, ,, . . .	58	16·0	42	12·6
,, 5–9 ,, ,, . . .	14	3·9	9	2·7
,, 10–14 ,, ,, . . .	3	0·8	2	0·6
,, 15–19 ,, ,, . .	1	0·3	1	0·3
,, 20 and over regular adult men .	1	0·3		
Total	363	100·0	334	100·0

In a situation where the size structure of farms has shown itself to be very rigid, there are clear advantages from the viewpoint of productivity in sharing labour between farm and farm or between farm and non-farm employment. What is more in doubt are the advantages of this kind of working contract for labour itself. As shown in Figure 2, an increasing proportion of the casual labour force in Britain are women, presumably the wives or daughters of farm or other rural workers. Casual farm employment provides them with work which they would otherwise have difficulty in finding, but this does not mean that it is an entirely satisfactory state of affairs. Better judgements on these issues must await further research, but at least we can be reasonably certain that, since the casual farm labour is mostly drawn from local sources, the social evils of disruption of family life and problems of unsatisfactory education of children which go along with migrant casual labour in some other countries, do not apply to the same degree. I have referred earlier to the declining regular employment of women and to the continuing high ratio of youths to men in the male labour force. They are also illustrated in the diagram.

The Division of Function amongst Regularly Employed Adult Men

In employment dominated by adult men, to the extent of nearly 80 per cent. of the total regularly employed, the main interest with regard to the division of function centres on this category (see Figure 3). Apart from the decline in the proportion of horsemen and the growth in the proportion of tractor drivers, which has accompanied the mechanical revolution, the changes in the other categories are not pronounced. The fall in the proportion of general workers deserves some comment, since it is the result of two opposing forces. As the agricultural labour force has declined, the size of the employment group per farm has also become smaller and hence the opportunities for specialization of function within it have been reduced. On this count we would have expected the proportion of general workers to have increased rather than declined. During this period, however, there has been a tendency towards concentration and specialization within farming. For example, the number of dairy herds has fallen but the aggregate number of cows has increased. The number of farms producing wheat or barley or potatoes are fewer but those continuing in production have increased the area under these crops.[1] Opportunities for specialization of function have increased on this account. Even so, nearly a half of the adult hired labour force is non-specialized although, of course, this does not mean that they are unskilled. They are more accurately described as workers with a wide variety of skills. The proportion in the managerial or semi-managerial category of bailiffs and foremen remains low and has changed relatively little. Even in a country like Britain, with a relatively large labour force per farm, few farming businesses are large enough to provide a ladder of advancement into managerial positions. Such opportunities are also reduced by the existence of family workers, who take on managerial responsibilities not carried by the farmer himself. The wage structure is of some interest in relation to the division of function. Minimum wages and overtime rates are statutorily controlled and related to the number of hours in the employment contract. Premiums above the statutory wages are commonly paid, and more frequently in the case of specialized workers than for general workers. The following summary for 1962 illustrates the present position (see Table 6).

Column (3), shows that premiums over and above the statutory wages are proportionately small, except for bailiffs and foremen.

[1] D. K. Britton, 'Trends in Concentration in British Agriculture', *Journal of Agricultural Economics*, vol. xvi, no. 1.

TABLE 6

Average Wages, Premiums, and Earnings in British Agriculture 1962

Per week (to nearest shilling)

	Statutory wages due	*Premiums*		*Total earnings*
		Actual	*Per cent. of wages due*	
	(1)	(2)	(3)	(4)
Bailiffs and foremen	182	59	32	263
Cowmen	216	27	13	264
Other stockmen	186	23	12	233
Tractor drivers	176	15	9	222
General workers	179	13	7	212

Notes. 'Statutory wages due' is made up of minimum wage (173*s.*) plus contractual overtime. Premiums are the difference between the above and the actual contract wage paid. Earnings include additional overtime as well as certain bonuses and payments-in-kind which are not in the contract wage.

Agriculture pays poorly for special skills, even when these skills are used to handle large capital resources in the form of livestock or machinery, often with the minimum of supervision. These figures in conjunction with Figure 3, which shows the limited opportunities for specialization, illustrate the poor prospects for advancement. This feature goes a long way towards explaining the timing of the exodus of labour from agriculture even though it does not explain the exodus itself. As I have stated earlier, the drift from the land is inevitable in the process of economic growth and it will continue in major proportions so long as we attract so many young people into agriculture. Provided labour stays in the industry until the age of 30 to 35, the evidence of Figure 1 suggests that they will remain within it, for the trend of numbers is not very different from what we should expect on actuarial grounds. Some people will regard this as a reflection of the continued attraction of agriculture despite its relatively poor pecuniary rewards. Others will use it as a measure of the difficulty of moving from agriculture to other industries in middle age. The truth probably lies somewhere between.

Acknowledgements

I am indebted to my colleagues T. Kempinski, R. J. Perkins, and R. P. Sinha for much of the work which has gone into this paper. I have drawn extensively from the work of others, and particularly from the late A. W. Ashby, from J. H. Smith, D. K. Britton, and G. P. Hirsch, without being able to acknowledge their work and

ideas in full in the footnotes. The latter section of the paper would not have been possible without the help of the Economics and Statistics Division of the Ministry of Agriculture, Fisheries, and Food, London, for which I am greatly indebted.

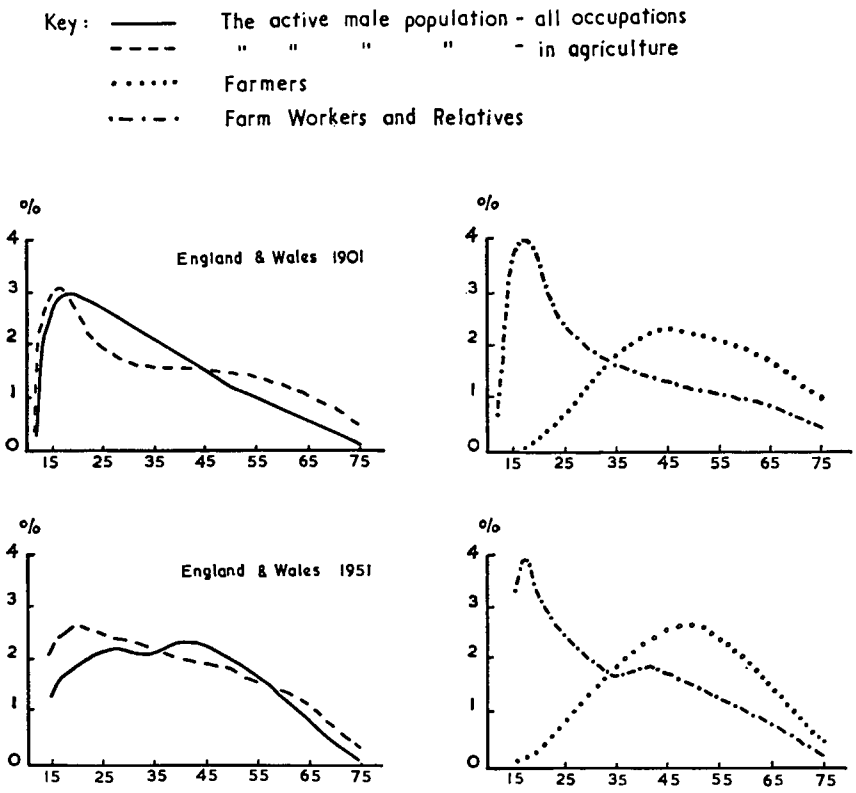


FIGURE 1. The Age Structure of Agriculture's Labour Force (Males only). The graphs represent the percentage of the total for each category in each year of age.

FIGURE 1 (*contd.*)

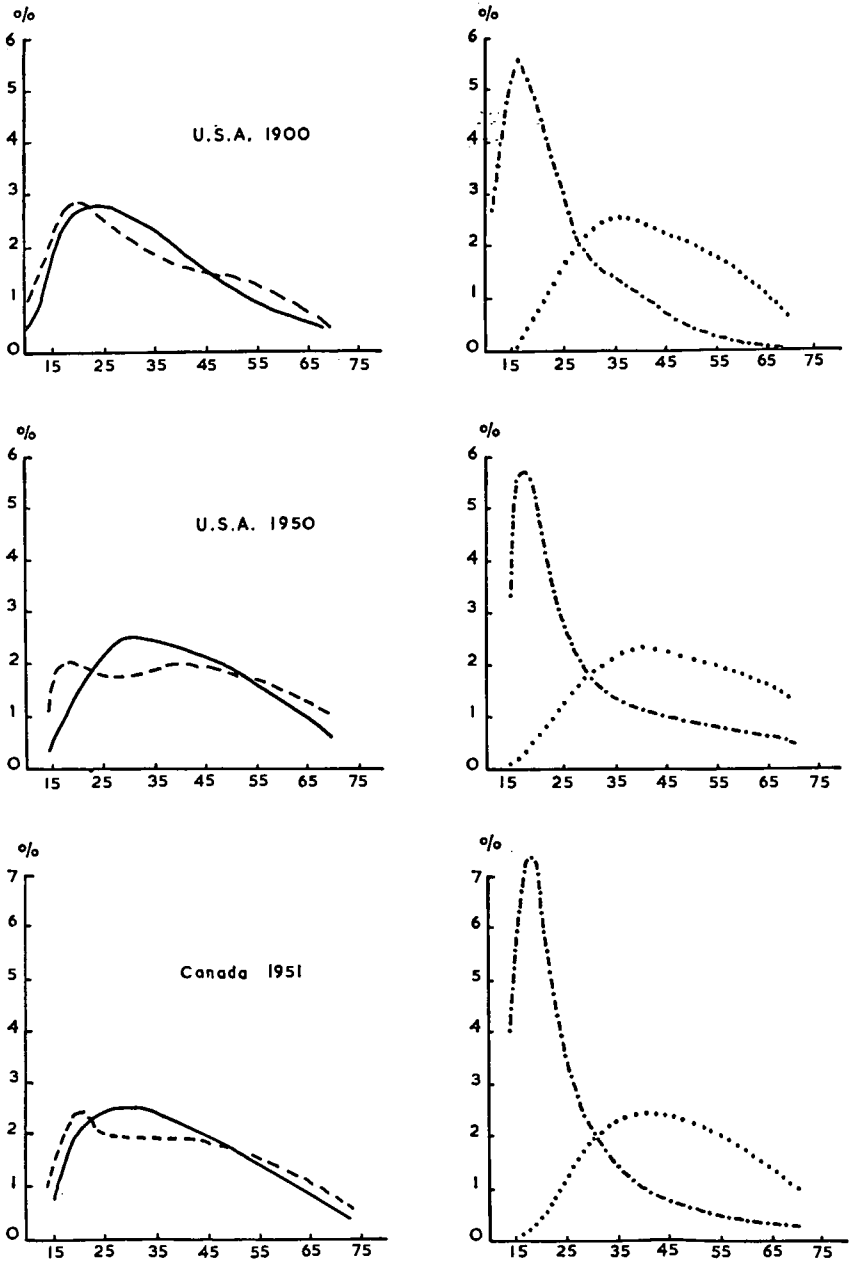
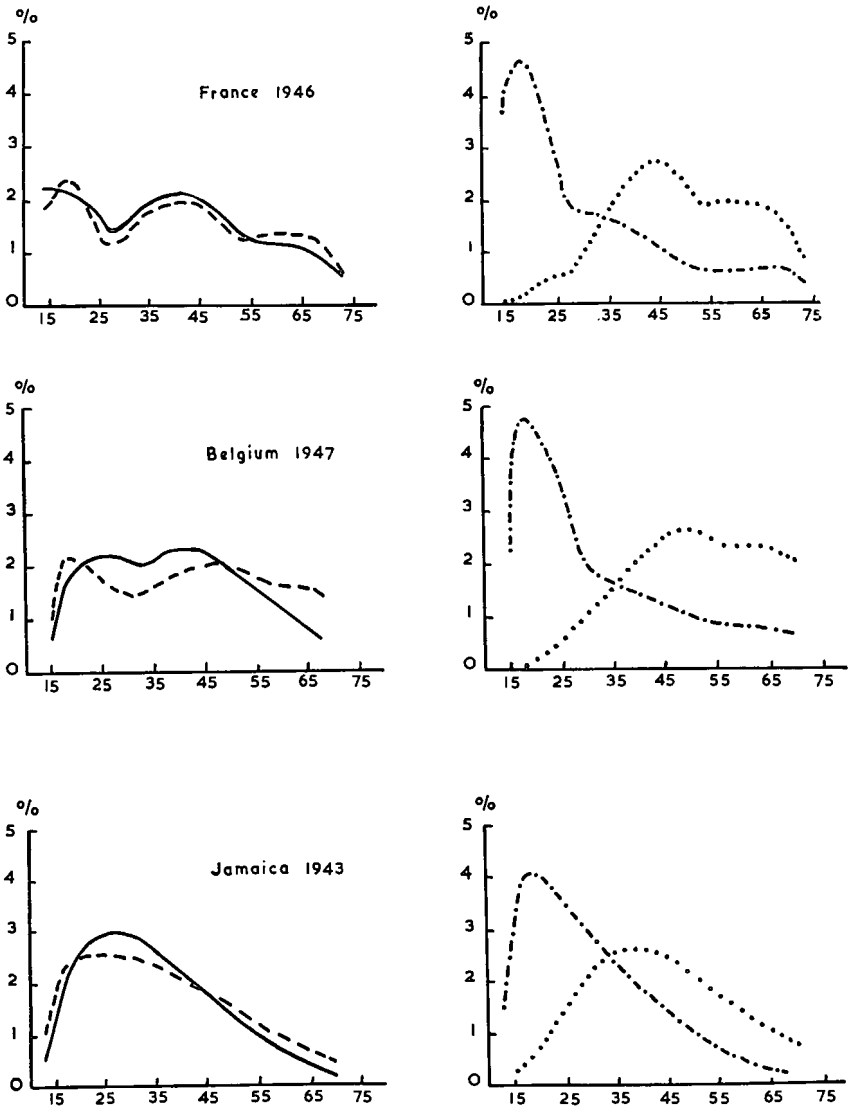
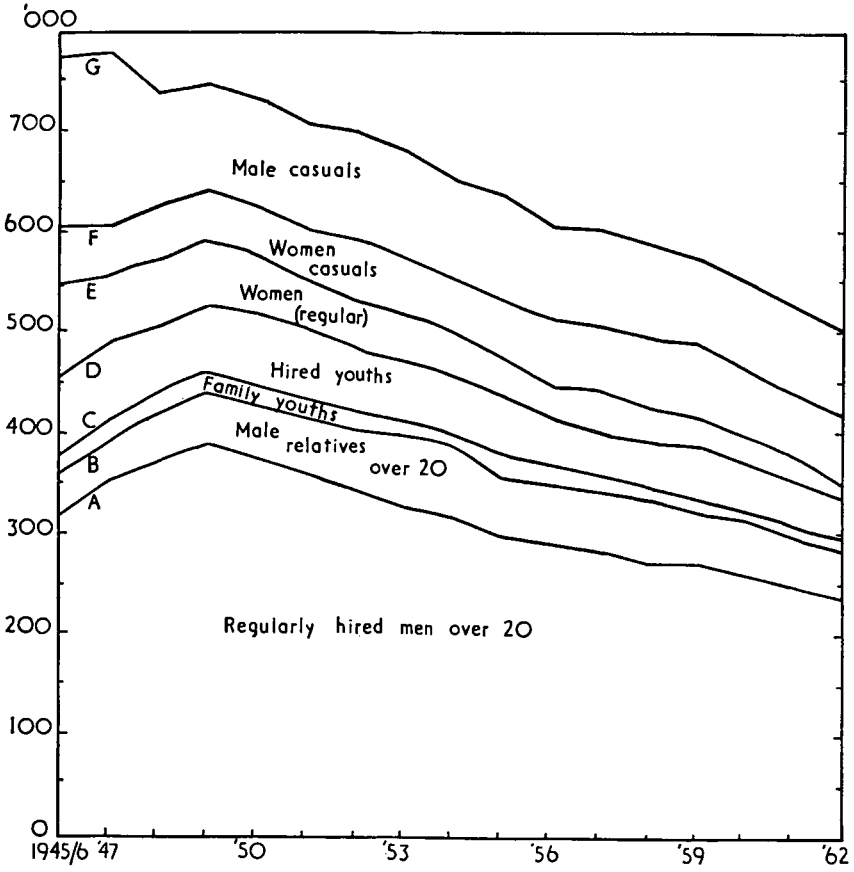


FIGURE 1 (*contd.*)





Key: Reading from bottom –

A regularly hired men over 20
B = A plus male relatives over 20
C = B plus male relatives under 20
D = C plus hired youths (all regular men & youths)
E = D plus regular females
F = E plus casual females
G = F plus casual men & youths (all employed)

FIGURE 2. The Structure of the Agricultural Labour Force England and Wales.

Notes: The intervening spaces between lines measure the particular category named on the diagram. Farmers are not included. Before 1955 the division between men and youths was at age 21 and not 20.

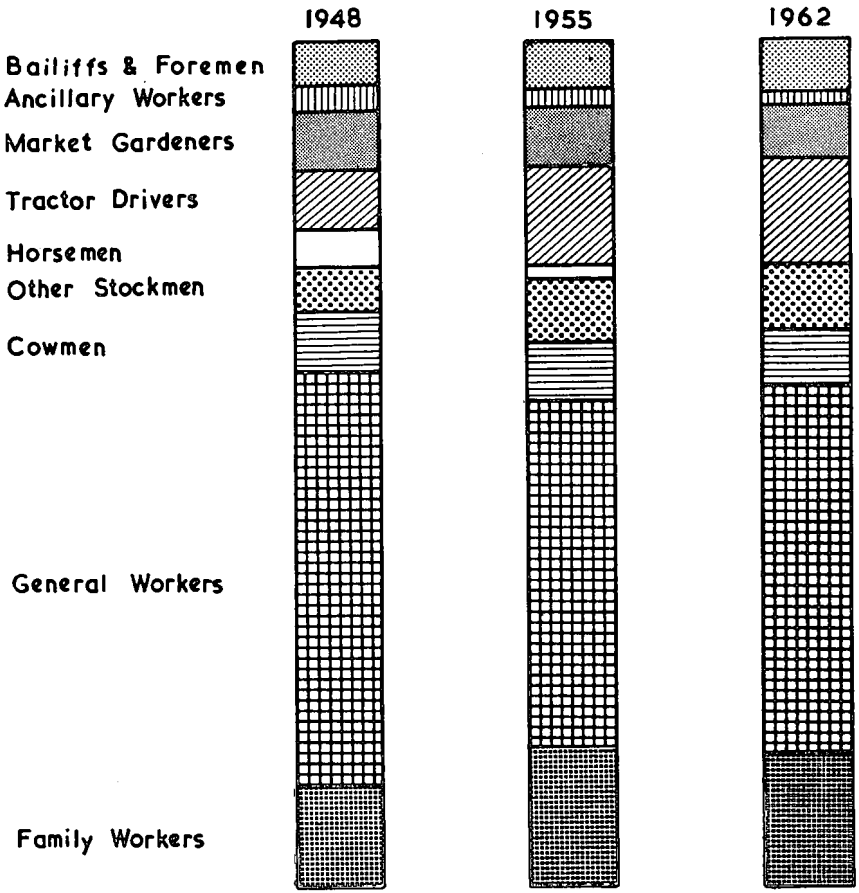


FIGURE 3. The Division of Function amongst Farm Workers in British Agriculture.

ERIK KRISTENSEN, *Royal Veterinary and Agricultural College Copenhagen, Denmark*

I am in agreement with Mr. Thomas's statement that farm labour statistics is a difficult field to work in for the following reasons: (*a*) different definitions from time to time in the same country; (*b*) different definitions at the same point in time in different countries; (*c*) difficulties encountered in getting the correct answers at interviews.

In absolute figures the gap between the farm labour force actually registered and the true one must, however, decrease when more and

more people leave the farming business. Mr. Thomas says that as agriculture becomes more dependent on other sectors for its inputs, the usefulness of measures of farm-labour productivity is lessened. It seems to me that it would be advisable to add the proviso: 'when we are speaking of the economy as a whole or at least of agri-business as it has been defined in the United States of America.' For an individual farmer labour productivity is still very important. On an increasing number of farms the farmer must do the work himself or with his family, and if he is not achieving good productivity, he must be either using too much time on his operations or earning too little. For the consumers it may not matter in what section of the agri-business the highest productivity is to be found, but it will surely be important for the entrepreneur no matter whether he is in farming proper or in some other sub-sector.

One may imagine a day in the future when almost all chores in farming will be performed by electronically steered equipment or by contractors. In such an extreme case the farmer's 'work' will be: (1) to make decisions; (2) to implement the decisions by using the telephone for communication with the merchant handling the inputs to be used on the farm and the outputs to be sold, and with the contractors; (3) watching some sort of radar and a number of gadgets, and to push various buttons connected with the equipment still to be found on the farm. It may then be rather difficult to find a real background for the term labour productivity as it has been used in the past, but there will be more use for the terms 'managerial productivity' with all the difficulties of measuring it. If Mr. Thomas has this situation in mind, I fully agree with him, but I do not think many farmers have reached that stage yet.

Mr. Thomas's observations from a number of countries on the large differences between the number of women per 100 men occupied are very interesting, and it is difficult to give better explanations of this phenomenon than he himself has already given.

So far as the statement about the intelligence of people remaining on farms is concerned, I think I agree with it. It is a very delicate question, and I would not like to be a judge on the matter. The idea of giving all rural youth the best possible information about the future outlook for agriculture compared with that for occupations in other sectors of the economy will be supported by everyone here. But the task may be difficult. At this point I would mention that in Denmark, as presumably in other countries, a number of young people each year enter agriculture from urban areas. It is not a great number, but it is there. In many instances these youngsters have some

difficulties in getting adapted to the new environment. For this reason, the Danish agricultural organizations have started this summer for urban youth three months' courses in agricultural phenomena (theoretical as well as practical), so that young urban people may be better equipped to enter farms. Plans to get more people to choose farming as their occupation may seem strange to agricultural economists who for a considerable time have made much effort to get people moving the other way. We have had some discussion about the advisability of this new course in Denmark but so far we have no experience. However, I agree that farming should not be a closed compartment from which the traffic would be only one way, namely out.

I am completely in agreement with Mr. Thomas when he says that we must educate into and out of agriculture, but I would add that such education should take place in all sectors of the economy. However, even with all possible education of this kind there will still be quite a number of people presumably who can only find their 'right' place in society by trial and error.

U. A. Aziz, *University of Malaya, Kuala Lumpur, Malaysia*

In the brief time available I will try to supplement Mr. Thomas's excellent paper by discussing some aspects which are more relevant to developing countries especially the South-east Asian region where I come from. First, I would suggest that in addition to the method of analysing labour in the food industry, into farm and non-farm labour, one might look at rural labour from another point of view, i.e. the farm and non-farm jobs available to rural labour. This is rather akin to our discussion on part-time farming the other day. Non-farm jobs for rural labour in our part of the world include fishing, which has not yet been mentioned, extraction of forest produce, small industries, and service or tertiary occupations or even manufacturing industries located in the rural areas. It is also important in our part of the world (I want to avoid keeping on saying developing or under-developed countries) to distinguish between the rural labour-force concept and the concept of agriculture's labour force. This is because of the wide range of non-farm jobs, that I have mentioned. Since I do not have any data about these things in the South-east Asia region I will confine myself to conceptual aspects. The supply of rural labour can be analysed in at least three different ways: the aggregate number of the total labour force; the numbers in different categories (males, females, aged, &c.); and

the amount of effort or labour input any specific category of worker is prepared to supply which in the language of the economist is referred to as the elasticity of demand for income in terms of effort.

Changes in the supply curve, whether they be aggregate by categories or elasticity of individual supply curves, are likely to be significantly influenced by four situations commonly found in the rural sectors of developing economies. These are (1) the degree of monetization of economic relationships, (2) the dynamic changes in the distribution of incomes (that is where the incomes are rising or where poverty is increasing), (3) the extent of unemployment or underemployment, and (4) large-scale migration of rural labour. Regarding the degree of monetization of economic relationships, I firmly believe that the orthodox dichotomy between cash crop farming and what is called 'subsistence' or sometimes 'peasant farming' is very fallacious and misleading and it arises largely because certain people have been reading books and not walking around the farms and looking at the areas that are supposed to be subsistence areas. I feel that a comprehensive, analytical framework should embrace a range or a spectrum of economic relationships based on the degree of monetization of these relationships. It is not only the fact that crops are produced for home consumption or for cash sale in the market, that is relevant. There are other things. The supply curve of labour and especially the speed or effectiveness of a worker's reaction to changes in earnings will be different, depending whether wages are on a share system paid in kind or are cash wages on piece rates or time rates. Also, whether interest is in kind or a share or a fixed quantity of the crop. We should know whether the rent is paid in kind, very often a half share or more of output, or whether the rent is a cash rate for a unit of land. It is the monetization or the degree of monetization of these relationships, employment, tenancy, and credit, that is very significant in influencing the supply curve for labour, whether in aggregate or for individuals. In the case of a low degree of monetization rural labour tends to earn in terms of real wages at a low level. Rural labour on a higher degree of monetization tends to be more responsive to innovations and is more rational in enconomizing economic resources. You might say, its economic calculus is more subtle.

My second point concerns the changes in the distribution of income. Of particular significance is the distribution between rural incomes and urban incomes which may be widening or narrowing, irrespective of changes in the average income level. Increasing inequality in the distribution of incomes, may be associated with

sub-division of farm land into small uneconomic pieces, fragmentation of farms, indebtedness of farmers and farm workers who mortgage their labour and monopoly or monopsony in rural trade. All these causes tend to increase poverty or the disparity in incomes in the rural sector and they affect the supply of labour and the motivation for work. This is also very much connected with the urban drift of rural youth. Thirdly, I want to discuss increases in unemployment, underemployment, disguised unemployment, &c., and structural changes in the rural labour force. These concepts are very easy to discuss on the platform here, but when it comes to observing them and measuring them exactly in the field over a period of time, you encounter very serious difficulties. If people are not working at certain times of the year, people who are willing and able to work but lack jobs, then I would submit that this is a form of unemployment. It is really a semantic issue as to whether it is to be called concealed unemployment, underemployment, or disguised unemployment. The concealed nature of the unemployment may occur because a full day's work is not possible or a full week's work is not possible. We should also make allowance for sickness, obligatory festivals, and we should be sure that the unemployment is involuntary.

Finally, I want to mention an aspect, which is quite important in the Asian region. That is labour migration on a large scale. These migrations have occurred because of political upheavals, nationalistic struggles for the achievement of independence, or because of insurgency. The result has been that millions of rural people have become refugees. In addition, to this, a number of Asian states have large-scale settlement or resettlement programmes. These two influences have had and will continue to have considerable impact on the rural labour-force structure by altering its supply in particular areas. In conclusion I would say that I have confined myself to a conceptual discussion, because this should precede data collection and analysis. If as Mr. Thomas suggests the data are difficult to use to compare the structural changes as between areas and between periods in the United Kingdom and Europe then for the developing countries the difficulties are very large because of the fantastic data gaps. A few scattered surveys have been carried out. Much of the discussion is impressionistic. There is a real need for professional economists to work hard and to meet often, to clarify and if possible to unify terminology and concepts as well as units of measurement and to co-ordinate their efforts, so that we may understand better the changing structure of agriculture's labour force.

E. KARNAUKHOVA, *Moscow, U.S.S.R.*

Some notion of changes which are taking place in the structural composition of the labour force in the Soviet Union may be of interest.

The mechanization of agriculture and its specialization leads to a further rise in cultural and technical qualification of agricultural workers, and to further division of labour processes. At the present stage of its development Soviet agriculture is being organized on a scientific basis. The decisive role now belongs to specialists directly participating in farm production. The number of such specialists with middle or higher education has risen by eight times as compared with 1940, there being on average six on each farm. Industrialization of agriculture has brought sharp changes in the composition of the labour force. The number of machine operators, under which term we include tractor and truck drivers, operators of combines and so on, has become twice as great as in 1940. The schools for mechanization are training operators at the rate of 600,000 a year.

We have now a consistent labour force in live-stock breeding and production, constituting one-quarter of the whole labour force in agriculture. This process is being carried on not only in breadth but also with an eye to still further raising skills in operating particular machines employed in any given branch of farm production. At the same time, those workers who are usually engaged in seasonal processes are mastering other professions. The agricultural educational establishments at all levels—higher and middle schools, schools of mechanization, schools of advanced experience—are spread all over the country.

We also attach great importance to raising the material and cultural standards of living of agricultural personnel. Much has been done already in this respect: building of clubs, cinemas, kindergartens, nurseries, dining-rooms, &c., but still more remains to be done. One further major task here is the training of personnel for communal services; they are greatly needed in rural areas.

M. A. TRACY, *O.E.C.D., Paris, France*

Mr. Thomas has given us a lot of interesting ideas, but I think he might have said a little more about the ratio between the numbers of farmers and of farm workers. He has observed that the number of farmers usually falls less rapidly than the number of farm workers. This is correct as a general rule, but there are some quite interesting exceptions. I would refer to the trends in the more-developed

countries during the course of the 1950's. In this period there was a relatively large fall in the number of farm workers, generally of over 20 per cent., sometimes considerably more than this. The number of family workers—that is to say, members of farm families—has also fallen fairly rapidly in most cases, but the number of farmers has fallen relatively little. The exceptions include, in the first instance, Sweden. There the number of farmers has fallen even faster than the number of hired workers. This can be taken to reflect the relatively large fall in the number of farms and the policy of structural reform which has been pursued more vigorously in Sweden than in most other countries. The other main exceptions are Canada and the United States. In both these countries there has been a relatively large fall in the number of farmers and family workers. The number of hired workers fell much less, and in Canada during the 1950's scarcely at all. This reflects the fact that the number of hired workers had already been reduced to small proportions in these two countries. This is brought out very clearly by Table 3 in Mr. Thomas's paper. In fact, on a large number of farms in these countries, the hired labour force has probably been reduced to a minimum and, as a result, structural change in their agriculture consists primarily of a reduction in the number of farms and of families. Most of the European countries have not yet reached this stage, but it seems likely that they will do so in due course.

Agricultural economists tend to emphasize the need for a reduction in the agricultural population as a whole if incomes per head in agriculture are to rise, but I think it might be useful to lay more stress on the importance of a reduction in the number of farms and of farm families.

W. Harwood Long, *University of Leeds, U.K.*

Mr. Thomas has drawn attention to the trend in farm populations. May I say a brief word on the effect which this trend may have on the attractions of the countryside to those who remain, at any rate in Great Britain, which is the only country about which I can speak with any authority? The fall in the numbers of farmers and farm workers reduces the demand for those who traditionally provided the services on which the countryside largely depended: the village shopkeeper, and those whose vocations demand reasonably large numbers, like the ministers of religion and the schoolmasters. The smaller families which are a feature of the twentieth century intensify the same trend. Unless there are

other factors at work in the opposite direction, those who might otherwise remain in the countryside will drift into the towns for the sake of the social life which is being denied to their wives, and the better education which larger schools offer to their children. Central schools and the extension of cars may provide a solution, but some parents lament the journeys which the central schools impose on their offspring, and all regret the isolation imposed on wives and mothers during the working day. For some farm families, the solution may be to reside in the nearest town and to travel by car or motor cycle to the farm and back each day. This will even further denude the countryside. It will provide no solution to the problem of the stockman, but there is no reason why it should not be satisfactory for the tractor driver or general worker on an arable farm. The alternative is for the villages to offer residential accommodation for others than agriculturists. Coal mining has kept the villages full in certain parts of industrial Yorkshire for at least two hundred years, and the boot and shoe industry is often localized in a number of fairly small towns: Raunds, Irthlingborough, Higham Ferrers, Desborough, Rushden, places not large enough for most of you to know even by name, but none of them far from each other, and all of them large enough to be community centres. In the Yorkshire dales retired townsmen help to delay the depopulation which is, nevertheless, a serious demographic feature of this part of the countryside.

The erection of council houses (houses built by the public authority) in the villages within a bus ride of industrial centres, seems a way of maintaining the viability of the villages as much as a means of accommodating workers, many of whom, one would think, might prefer to live nearer the towns. And there seems no reason why some industries themselves which are usually found in big cities should not be located in the countryside, such as country milling which historically took place in every manor, but which has now been superseded almost entirely by millers at the ports.

These are problems which have got to be faced as a development of the present trends which this paper has brought before us so clearly.

M. BANDINI, *Rome, Italy*

The paper we have heard is very important, not only because of its contents, but also because of the questions it raises, especially from the point of view of international comparisons.

The basic facts, in general, are known to everyone. There are great differences between one country and another. England has approximately 4 per cent. of its population engaged in agriculture; the United States 8 or 9 per cent.; Germany 12 to 13; France 20; Italy 25; Russia, I believe, between 40 and 50; until we reach the eastern countries, where there are agricultural populations reaching 70 per cent. of the total, or something near it.

But these are very general data and extremely superficial. When we try to go into the matter more deeply we find that there are differences, too, in the method of calculating the agricultural population. These differences are so serious that sometimes they prevent any penetration beyond the superficial data of which I have spoken. The reasons which produce such great differences are of varying kinds. I may quote, first, the example of a developing country, where the rural industries leave the farm and establish themselves, in independent form, away from it. Yet the workers are the same. They are the sons of the peasantry, doing the same work as before. For example, they make grapes into wine, or make cheese, in a different place, but by the same procedure, or in an independent co-operative. Naturally, they are no longer at the farm, and are no longer counted as agricultural workers, but as industrial or co-operative workers. On the other hand, the forces working in agriculture are still the same.

Another observation I might make concerns the work of women. Here there are really very great difficulties of interpretation. I agree with the somewhat light-hearted remarks at the beginning of Mr. Thomas's paper. The evaluation of this situation is very difficult. We must take into account that, according to the methods used in the various reckonings, the women are often classed as housewives, that is to say, as not working. In other reckonings the same women are classed as farm workers. This may explain many of the differences we observe. The facts are not comparable with those of other situations, in which only working women are counted as agricultural workers, and housewives are not.

But there are other situations, which are sometimes very interesting. For example, in the south of Italy there is a considerable rural exodus, and depopulation of rural areas. On the other hand, we have noted that the number of women has increased, sometimes very considerably. The reason is very simple, but one needs to know it. It is that the men have left the farm, and the women who were classed as housewives are now classed as working women for a very practical and comprehensible reason, in order to benefit from social insurance.

They have become eligible for social security benefits. They have moved into a 'professional' category, but they are doing exactly the same work as before. There has been an illusory change, not a real one. And this is why, if I have to construct an argument on the variations of the population employed in agriculture, I prefer the simplest solution, which is to ignore the women and take into account only the men, since any other method would cause great difficulties of interpretation.

There are also other reasons which produce a false estimate of the relative and absolute quantity of agricultural labour. I may quote the case of work done at home, which is now done on many farms close to the great industrial zones. These are workmen, or working women, who work for an industry, but in reality they spend only a half or one-third of their time in industrial work. Again there is the example of agricultural mechanization. If one makes comparisons between farms on one of which the tractor is owned by the farmer and on the other of which, otherwise entirely similar, the tractor is hired from an independent enterprise or a co-operative, or in France from the C.U.M.A. or something of the sort, the comparison is no longer valid.

The examples I have given are sufficient to explain why it would be useful, especially when making comparative studies of different countries, to have some means of going to the heart of the matter, and to set oneself critically the problem of the evaluation of the labour force. The superficial results are sometimes used for very detailed and precise calculations, often using electronic computers. For example, to calculate the variation of the productivity of labour, as a function of the labour units employed. Here we have such enormous sources of error, that I feel that the computer is out of the question; it would be better to use a simpler means of calculation. If we go on constructing such hazardous calculating systems, subject to such differences of interpretation, we act like a man who buys a glamorous dress for an ugly woman.

DANIEL THORNER, *Ecole Pratique des Hautes Etudes, Paris, France*

Mr. President, I have no intention of giving you a paper, merely a bibliographical reference, since Mr. Thomas in his fine address kindly invited references to work in areas other than Europe that might be of interest. The study which I would like to draw to your attention was carried out in India from 1957 to 1960 under the auspices of the Indian Statistical Institute. It is called 'The Working Force in India' and covers from 1881 to 1951. My name figures on the title-page, but

it was done overwhelmingly by my wife and by the staff. It is in 300 pages, of which 200 are made up of statistical tables. The work rests on the successive Indian censuses of population. Now I know the criticisms that have been laid against India's statistics, and I have put a few of them down on paper myself. Subject to correction by Dr. Ohkawa, I believe, none the less, that for the study of the working force in Asia, these are the best statistics we have for any country for the past eighty years. There are several problems which I will mention to you which will perhaps explain why, although our study was ready in cyclostyled form in 1960, we have not yet seen fit to issue it as a printed book.

Ours is a study of the working force, and we thereby presume that those who work can be distinguished from those who do not work, and this distinction is worth making. Is the accepted distinction really valid, between working and not working? Very distinguished Indian economists have told me that for economies like theirs the distinction leads nowhere, it is not valid, it collapses, especially for women. Women, particularly in censuses, always give great trouble! In other words, it is an unresolved question whether the usual distinction between the 'active' population and the economically inactive population is valid and fruitful for the economies of the so-called under-developed countries.

Another series of questions that is plaguing us concerns the owners, tenants, and labourers, or, in other words, the structure of rights in land, the agrarian structure. I will not burden you today with the ways in which different definitions of ownership and tenancy have been used for twenty recording areas in nine successive censuses. Rather I shift from the agrarian side to agriculture proper, the pattern of cultivation. Who is doing the work, who is the cultivating owner, or if you want to use a fancier Western term, who is the agricultural entrepreneur, and whom does he employ? Suppose he only 'employs' himself and his immediate family members, is he really an employer, or is he something else which you should call neither? The same questions can be posed for cultivating tenants. So, cultivating owners, cultivating tenants, agricultural labourers, &c., may all sound cosy, but where do you put the different kinds of cropsharers? (I have deliberately avoided the American word 'sharecroppers'). For a number of regions in India for many censuses I can give you a single word, the *same* Indian word, depending on what language you prefer, used indifferently for a cultivating tenant, a cultivating cropsharer, and an agricultural labourer, paid in part at least by a cropshare. What are you going to do? Suffer!

On some other occasion I would like to take up with you the problems which arise in connexion with the overall industrial distribution, that is, the distribution of the 'working' population among the three great sectors, agriculture, manufacturing, and the services.

There are equally interesting problems connected with the distribution of the working population by occupations. Suffice it to say that a scheme of occupational distribution devised for Indian conditions and economic structure was successfully used in the Censuses of 1891 and 1901. Unfortunately this was given up on the altar of international comparability in the Census of 1911. As in so many other sacrifices on the same altar, it is by no means clear that the results obtained were worth the blood-letting.

In closing, if I may add a word to what Dr. Aziz has just said, I would also like to express reservations about the use of the terms 'subsistence', 'subsistence economy', or 'subsistence sector'. These terms are so replete with confusion and contradiction that they are best avoided, at least for India and most other so-called 'underdeveloped' countries. If possible, the term 'dual economy' is even worse than the term 'subsistence economy'. The position of Professor Boeke, who is generously credited with introducing the term 'dual economy' for Indonesia half a century ago, has been thoroughly demolished, so far as I can see, by the criticisms of subsequent Dutch writers (we are indebted to Professor W. F. Wertheim of Amsterdam for arranging the translation into English of some of these critiques). Despite the destruction of Boeke's position for Indonesia, the economy he knew best, his term 'dual economy' seems to be spreading relentlessly today in Africa, Latin America, and elsewhere. Could we not persuade those of our colleagues who are aiding in this spread to pause a moment, and to take a closer look at the fate of the term 'dual economy' in Indonesia?

W. J. Thomas (*in reply*)

First, I should thank my two able openers for supplementing rather than criticizing my paper. Mr. Kristensen reviewed once more, as did several others, the difficulties inherent in analysing labour statistics. Dr. Thorner was really graphic about these problems. He suggested that the words of my first paragraph were written in blood; I could add a few more descriptive and famous words, such as sweat, toil, and tears! Mr. Kristensen, in referring to the emphasis I gave to the need for taking a wider view of productivity problems so as to include the whole food industry and not merely farming, reminded

us of the continuing importance of farm productivity to the individual farmer. Of course, I agree with him. My remarks were not intended in any way to belittle the importance of this aspect of productivity. He also mentioned the movement the other way—of urban youths into farming—and questioned whether this was to be welcomed. Personally, I am in no doubt. I think we need new blood in agriculture; we need the new ideas which outsiders may bring. Some who enter from an urban environment also bring with them the very necessary capital which the industry requires, particularly for innovation and improvement.

Professor Aziz made some pertinent remarks about the dichotomy of cash crop and subsistence farming; he was eloquent too about the way of looking at the many questions which arise from the viewpoint of developing countries. He mentioned also the importance of industrial employment or unemployment as a determinant of the rate of migration from agricultural to non-agricultural employment in the developing countries. It turns out that this factor is an equally important feature of the rate of migration in the advanced countries. In some recent work in my department, which we hope to publish shortly, we have found, for example, that the relative agricultural/industrial wage position is a good deal less important than the rate of industrial unemployment in explaining the drift from the land.

Dr. Karnaukhova gave us some interesting data from the U.S.S.R. on the methods being currently adopted to raise the productivity of agriculture in her country. That these will have an effect upon the future structure of the labour force goes without question.

Mr. Tracey criticized me for the little that I had said about the changing ratio of farmers to farm workers. I can only plead shortage of space. He also pointed out that there are exceptions to the general rule that the ratio of farm workers to farmers declines. He instanced Sweden, Canada, and the United States in recent years, where the decline in numbers of farmers and farmers' relatives has been greater than in most European countries, and sometimes greater than the movement of hired labour. I was not entirely unaware of this situation, as evidenced in my paper. The interesting question is: why is it that in the particular countries mentioned the exodus of farmers and relatives has been so much greater than in many other advanced countries in Europe? More work needs to be done in this field.

Mr. Long pointed out that the movement from agriculture into industry tended to leave the countryside bare of people, and to increase the cost per head of providing social services for those who remain. I think we have to distinguish here between the drift from

agriculture and the drift from rural areas. In many areas of England which are still rural in character, the rural population is increasing even though the agricultural population is declining. Improvements in transport, and particularly the possession of a motor car, enable an increasing number of people who work in urban areas to reside in country districts. The real problem in these areas is how to weave two separate groups, the one agriculturally orientated, the other urban orientated, into one cohesive society. Not only are the two groups often divided by their background and interests, but all too frequently by their disparate levels of living. The future planning of these rural areas embodies a great challenge of how to make one society out of what is now a mixture. There are many other areas where rural population is declining absolutely, and Mr. Long has suggested that we look more closely at the possibilities of bringing industry to them as a means of their regaining some of their lost population. Grounds for optimism in this direction are contained in an important study by C. D. Harbury in Britain on the relative productivity and efficiency of rural and urban labour in industrial undertakings. He found that after a transition period rural labour in industry compared favourably with the urban. There are many lessons to be drawn from this study.

Lastly, to Professor Bandini and to Dr. Thorner again. They both explained penetratingly, and more amusingly than I could have, the nature of the problems of interpretation of the statistics. In reply to Professor Bandini, I can say that I did not use the electronic computer on my data, although I would not have hesitated to do so had I felt it necessary. Of course, one knows about the difficulties of interpretation but one has to interpret in the light of the knowledge and methods at one's disposal which, in truth, may be far from the ideal. But not to interpret is escapism. What is more, the consistency with which trends and occurrences appear over time and across national boundaries gives one at least some confidence in the conclusions to be drawn.

CO-ORDINATING ECONOMIC RESEARCH AND TECHNICAL RESEARCH IN AGRICULTURE

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THROUGHOUT a varied career as school-teacher, professor, scientist, farmer, and now banker on the international development front, I have been in many strange and difficult places. None has been more strange or difficult than this, my present role amongst economists of world stature. I am not an economist, so that on this programme I feel very much alone. No longer am I engaged in agricultural research so that on this count too, I could be disqualified as unsuited to handle the topic now before this conference. Yet I am proud to be here and deeply conscious of the honour accorded me by your invitation. I might add that none has been more surprised than my colleagues at the World Bank to see my name on your programme. The Bank prides itself on its collection of high-powered economists. It certainly does not count me amongst their number. In all these circumstances, I can but try to justify the confidence your programme committee has placed in me in respect to the important assignment with which I am entrusted. My only qualification for attempting the task is that I am supposed to have achieved some practical success in co-ordinating economic and technical research in agriculture. Apparently, I am credited with actually doing this job over the last twenty-five years when I led fairly large groups of research workers in my native land. With this background, perhaps the best way of leading into the subject is to outline my personal philosophy on the issues involved, and thereafter describe the methodology and results which have been the inevitable outcome. From such an outline, the prerequisites and conditions for a more widespread application of co-ordination may emerge.

Throughout my research life I have always believed firmly that the prime responsibility of the agricultural scientist is to serve the industry of which he is a part. In any developing country, this defines very clearly the work to be done. In practice it means applied rather than basic research. It leaves basic research to the more wealthy, developed countries which can afford the luxury of the pursuit of