

THE CAPITALISATION OF IRISH* AGRICULTURE.

By SENATOR JOSEPH JOHNSTON, M.A., F.T.C.D.

[Read on Friday, 27th February, 1942.]

The value of a farm from a strictly agricultural point of view is a capitalisation of the income which a purchaser, whose principal occupation is farming, might hope to make in virtue of his ownership as such. In making his valuation the purchaser considers the farm as a whole—land, buildings, fences, situation, water supply, etc., as well as rates and annuity charges, and does not consciously assign a specific value, positive or negative, to each item. All the elements of value which analysis may distinguish are in fact inseparable parts of a common whole. Nevertheless for our purposes it is necessary to analyse and distinguish.

Our primary concern is to place a financial valuation on the various assets associated with Irish agriculture. One should note at the outset that a farm may be worth a certain amount from a strictly agricultural point of view and worth considerably more by reason of its residential or situation amenities. Actually in 1935 there were 376,000 holdings divided between 374,000 occupiers, but there were (according to the 1936 Census) only 260,000 persons whose principal occupation was farming. (*Banking Commission Report*, p. 52, and *Statistical Abstract*, 1940, Table 32.) We are not concerned with the residential or amenity value of agricultural holdings, but only with their value from a strictly agricultural point of view.

As elements in the capital value of a farm one may distinguish land *per se*, accumulated fertility, fences and drains, farm buildings, etc. The unexhausted manurial content of land is *apparently* inseparable from the land itself. Nevertheless a purchaser will give more for land which is "in good heart" than for land which has been exhausted by continual wheat-cropping without adequate manuring. Frequently farms are provided with stone-built farm buildings which would cost thousands of pounds to produce at present costs of labour and material. To a prospective purchaser much of them may be quite superfluous, and all of them are worth only the expenditure he would be prepared to incur to provide the farm buildings appropriate to his farming programme if they were not already *in situ*. But the farm buildings actually available, whatever their original cost of production or hypothetical cost of reproduction, are worth at least that much to a prospective purchaser, and must be recognised as a separate item in estimating the total value of the capital assets of agriculture. The same general consideration applies to fences and drains. Not all land requires draining, but all fields require fencing, and fencing, whatever the material, costs money or labour both to make and to maintain. Consequently a certain part of the price paid for a farm must be regarded as the capital value to the purchaser of the fences and drains which he would have to provide if they were not already provided.

A further important element in the value of most farms is the value of the residential accommodation available. In other gainful occupations the business man may rent his dwelling house, and need not necessarily

* Only the twenty-six county area is considered in this paper.

own the real property associated with his enterprise. But the farmer who buys a farm must buy a house to live in as well as land and buildings to serve as the principal part of his productive capital. At least that is so in Ireland in the great majority of cases. The only exceptions are the beneficiaries of the Land Commission, who acquire both dwelling-house and productive capital without the necessity of any preliminary capital expenditure on their part. Economically a dwelling-house is a form of consumer's capital and should be clearly distinguished from a cowhouse, a dairy or a hay shed, which are typical forms of producers' capital. In most farm-houses the dairy is part and parcel of the dwelling-house, and in some the cows share, or used to share, the same accommodation with the human beings, providing incidentally one of the cheapest known forms of central heating. Yet, however economically distinct, the burden of financing the purchase of a farm includes the cost of acquiring a dwelling for the farmer and his family as well as of acquiring other farm-buildings. This is perhaps only one aspect of the well-known fact that farming is a life and not merely a means of livelihood. In practice we must regard the capital value of dwelling accommodation as one of the capital assets associated with Irish agriculture, and therefore as an element in the price at which farms are bought and sold. It is an element in which the cost of production or reproduction is even more irrelevant than usual. Unless the farm-house has amenity or residential attractions for a prospective purchaser to whom agriculture is only a hobby, a farm-house of the most palatial character will be worth only the expenditure which a farmer-purchaser would be prepared to incur to provide himself with dwelling accommodation in its absence—unless it is capable of being broken up, dismantled, and sold piecemeal.

Portions of land in various conditions and degrees of natural and acquired fertility, in various conditions of fencing and draining, and in most cases associated with farm dwelling-houses and farm buildings constitute what are known as agricultural holdings. Such holdings form the major part of the fixed capital associated with Irish agriculture but by no means the whole of it. It is these units which change hands when farms are bought and sold; it is these which are capable of being mortgaged and it is these which in the vast majority of cases, are subject to Land Commission annuities. The amount of agricultural land held in fee-simple is still quite inconsiderable, though in theory all of it will be so held when the annuities, now a form of land tax, have completed the terms assigned to them in the various Land Purchase Acts.

Agricultural implements and machines form another part of the fixed capital of agriculture. Such machinery and equipment might be distinguished on a functional basis into (1) sources of power, *e.g.*, tractors, stationary engines, and (2) machines for the application of power, *e.g.*, ploughs, harrows, mowing machines, transport vehicles, cream separators. In this connection it should be noted that the horse is still the principal source of power on the farm, though for purposes of transport to and from market towns its place is taken to an increasing extent (apart from war conditions) by the motor lorry, usually owned by a merchant. Implements and machines are usually classed as "dead stock," while horses are included among "live stock." But functionally and economically the horse belongs to the same type of fixed capital asset as the tractor or other mechanical source of power. In estimating the extent to which agricultural hands are provided with labour-saving horse-power it will be convenient to consider horse-power in its literal as well as its derivative sense. Of course in the special case of farmers who breed

horses for sale much of their stock of horses will represent the type of capital known as "intermediate products" or "goods in process" and to that limited extent horses should be classed with other similar forms of live stock.

Occasionally one comes across a farm which, while maintaining a general basis of mixed farming, has developed one aspect of agricultural production out of all proportion to all the other aspects. Such a farm would be one which specialised in tomato production, or in poultry and egg production, or in the production of high-grade milk for consumption as whole milk. In such a case it seems doubtful whether, *e.g.*, portable poultry houses should be classed as buildings or as machines or as equipment. Like buildings, they give shelter, but unlike permanent buildings they can be sold apart from the farm. Tomato-houses are likely to be more permanent and so should be treated as buildings. In any case it does not greatly matter, since, from the economic point of view, all alike constitute part of the fixed capital appropriate to a particular agricultural speciality. In cases like these where agriculture is highly specialised the fixed capital appropriate to that type of farming, whether it be classed as buildings, machines or equipment, must be valued at least at production cost, less depreciation, and might well be worth, at a time like this, its replacement or reproduction cost which would doubtless be higher. In the few farms of this type which have come under my personal observation it will be noted (p. 57) that instrumental capital per person occupied is very much higher than the norm. Incidentally employment per 100 acres and output per acre are also very much supernormal in such cases.

It will be convenient to lump together as instrumental capital all implements, machines and sources of power, whether animate or inanimate, and all equipment which can be sold apart from the farm.

Coming to live stock proper, we are immediately face to face with the fact that breeding stock, male and female, are by far the most important part of the fixed capital of most farms, if we ignore the value of land and farm-buildings. Strictly speaking, we should distinguish a separate valuation for bulls and cows, rams and ewes, boars and sows, cocks, turkey cocks, drakes, and ganders, but the statistical data are not adequate. Bulls and cows are, however, of quite outstanding importance. In the farms investigated by Mr. Murphy, cows valued at about £12 each represented 13.6 per cent. of the total capital valuation (p. 9 of paper read on 25th May, 1939) while farm-buildings represented only 12.6 per cent. Bulls are also of major importance. In 1939 there were 24,809 bulls in Éire (*Statistical Abstract*, 1940, Table 62). If we value these at £40* each they represent nearly a million pounds. Cows are undoubtedly the principal item in the live stock fixed capital of Irish agriculture. Their function is to transform grass and other raw materials into milk and calves, and these, both directly and indirectly, constitute the major elements in the output of our agriculture. I am not sure that they should not be regarded as part of the instrumental capital already considered. Part of the difficulty of definition in these matters arises from the fact that one category shades into another in a most annoying fashion. Be that as it may, the valuations that will be arrived at suggest that production per person occupied, as well as per acre, varies directly with the value of instrumental capital used. An increase in the number of cows properly housed and fed would contribute just as effectively to an increase in agricultural income as an increase in the number of

* See footnote page 48.

machines used or the number of acres ploughed and put through a suitable rotation. "Other cattle" are in the main intermediate products of husbandry, *i.e.*, goods in process of completion with a view to consumption at home or abroad. But it should be noted that some proportion of the annual crop of heifers is needed for replenishing, if not increasing, the existing herds of cows. The average working life of a cow is about nine years in this country, but only about four in England and Wales. (*British Agriculture*, Astor and Rountree, p. 257.) Consequently about 130,000 heifers annually are needed for maintaining the existing number of cows. Statistics rightly distinguish the number of heifers in calf from the number of milch cows and other types of cattle.

When we come to consider sheep, pigs, and poultry it will prove impossible to make any distinction in our capital valuations between breeding stock and other kinds of stock. Indeed even in the case of cattle they will all be lumped together for purposes of capital valuation, but the distinction is one which should be borne in mind all the same.

As far as possible the capital valuations will be given with reference to the 1st June, 1939, which is the last date for which adequate statistics are likely to be available "for the duration." At that time of year the tillage crops harvested in the previous season are likely to be approaching exhaustion. Barns and hay sheds will be nearly empty, consequently we need not trouble to include their contents in our capital valuation. If a valuation were made at the 1st of November, tillage crops in store might well come to a large sum—in one case under observation £1,053 from a 211 acre farm. But on the 1st of June a farmer, though he has not yet got the return, has already incurred much of the expense in payment for labour and other requisites. It seems difficult to put a precise valuation on the capital value of this short-term investment of capital and labour (owned or hired) between ploughing time and harvest, but it should be noted that some command of capital (or credit) is needed if the farmer is to wait for his harvest even if he does all the necessary labour himself. In this connection it may be pointed out that the area of cereal crops increased by 322,000 in 1941, and of root and green crops by 104,000 (p. 144, *Irish Trade Journal*, September, 1941). The total cost of cultivating a root crop is said to be about £30 an acre, and a corn crop about £10. Consequently in the 1940-41 season Irish farmers must have financed additional cultivation to the extent of about £6,000,000. Some reduction took place in the stock of poultry and pigs, but owing to foot-and-mouth disease total cattle increased rather than diminished. During the 1940-41 season such Irish farmers as had hitherto bought most of their feeding stuffs from the shops incurred a double strain on their capital and credit resources. For while still paying off the merchants for feed bought some months previously they were also incurring the expense of additional tillage in order to provide their live stock with the only possible source of feed for 1941-42. Much of this additional tillage was financed by persons other than the owners of the land in question. Such tillage is likely to be of a predatory character, and it would have been altogether preferable if special credit facilities had been provided for farmers lacking capital in order to ensure that the additional tillage would be done as far as possible by the owners of the land.

From the point of view of capital valuation, the important figure is not the 1941 increase of tillage, but the total area sown and planted in 1941. There were 1,122,000 acres of corn crops in that year and 705,000 acres of root crops. If any reliance may be placed on the figures representing total cost of production of roots and corn crops respectively,

the capital cost in the form of labour not yet remunerated as well as direct expenditure incurred in tillage amounted to £32,000,000 in the 1940-41 season. In 1939 the area cultivated was less, and the cost on this basis of calculation amounted to £27,000,000. That total cost includes the cost of harvesting cereal and root crops of the 1938-39 season, and expenses connected with these operations could not be incurred till after 1st June. With some diffidence, I am inclined to assign some £20,000,000 as the accrued cost of current tillage operations incurred by 1st June, 1939.

In assigning values to the various items in our capital account I have been greatly assisted by the investigations of Mr. Murphy already referred to, and also by Appendix No. 7 of the *Banking Commission Report*. Mr. Murphy's valuations relate to the North Cork-Limerick border—a region which specialises in dairy farming—and were made as on 1st May, 1937. The index number for live stock (based on 1911-13=100) was 102.1 in 1937 and 119.3 in 1939. Accordingly I have raised Mr. Murphy's capital valuations of live stock by $\frac{1}{4}$ in order to bring them into line with their probable value on 1st June, 1939. The valuations of machinery and farm-buildings I have left unchanged.

Professor Duncan's valuation of stocks in Appendix No. 7 of the *Banking Commission Report* is based on 1926 prices, but current prices are calculated from a rather complicated index, and the results indicated for the years 1929 to 1936 inclusive. In trying to establish the 1939 valuation I have not been able to follow Professor Duncan's procedure, but I noted the numbers of the various categories of live stock for 1929 and 1939 respectively, the values calculated by Professor Duncan for 1929 and then, in most cases, expressed the 1939 value as a change in proportion to the numerical change in the stock in question. In the case of cattle, Professor Duncan's valuation was given for cattle as a whole. Between 1929 and 1939 important changes took place in the numbers of different categories of cattle. In arriving at the 1939 figure I added 4,000 (more) bulls at £40 per head,* 37,000 (more) cows at £15 per head, 52,000 (more) cattle 1-2 years old at £10 per head, 16,000 (more) calves at £4 per head, and deducted 188,000 (less) cattle 2 years old and over at £16 per head. Similarly in the case of sheep I deducted from the 1929 figure 124,000 (less) breeding sheep at £3 per head, and 205,000 (less) store sheep and lambs at £1 10s. per head. The prices per head were obtained from the prices shown in the *Irish Trade Journal* for June, 1939. I don't know if the procedure is in accordance with the best statistical principles, but the final result should give a sufficiently close approximation to 1939 values in terms of 1926 prices. It remains to note that the index number for live stock prices in 1926 was 147.3, in 1929, 139.4, and in 1939, 119.3. Accordingly the figures shown have been expressed in terms of 1939 prices by reducing them in the ratio of 147.3 to 119.3.

TABLE I.

CAPITAL VALUATION OF ASSETS ASSOCIATED WITH AGRICULTURE IN ÉIRE
AS AT 1ST JUNE, 1939.

	£
(a) <i>Real property capital</i> :—	
Land <i>per se</i> at £10 per acre	120
Fences and drains at £5 per acre	60
Farm-buildings at £200 per holding	75
Dwelling accommodation at £300 per holding	113
Total real property value	368

* I am informed that £30 per head would have been a more correct valuation.

	£ millions
(b) <i>Instrumental capital</i> :—	
Horses, machines, implements, and equipment at £2 per acre	24
Specialised equipment (incalculable)	x
(c) <i>Live stock capital</i> (less horses, mules, jennets and asses)	54
(d) <i>Short-term capital</i> :—	
Costs of seasonal tillage operations incurred by 1st June, 1939	20
TOTAL a + b + c + d	466 + x

This Table ignores the State's financial interest in Irish land ownership, which may be taken to be the capitalised value of the annuities at present payable.

The total of 466 million pounds arrived at is strikingly large, but, though some of the items may be questioned, I believe it errs on the side of underestimation. At 1941 prices it would be much higher.

Mr. Murphy's valuation of land as on 1st May, 1937, in the North Cork-Limerick border doubtless includes fences and drains, and works out at rather more than £13 per acre, if we ignore the value of 123 acres of waste land. In Vol. II of the *Memoranda of Evidence of the Banking Commission* on page 1163 it is stated that "roads and fences and so on will cost £104 8s" on a (new) holding of 20 to 22 acres provided by the Land Commission, that is, about £5 per acre. It does not seem wrong to assign a similar capital value to fences and drains in our 12 million acres of agricultural land as a whole. If they were not there some person or persons would have to incur the cost of putting them there. Whether £15 per acre for land fenced and drained or £10 per acre for "bare" land (doubtless an abstraction) is a fair valuation for 1939 leaves room for some difference of opinion. The average value of our 12 million acres is probably below the average value of the 7,244 acres investigated by Mr. Murphy, but the price of land, as well as of other things, was higher in 1939 than in 1937.

Mr. Murphy's valuation of farm buildings works out very close to £200 per farm, and the average size of farm investigated by him was 74 acres. On the other hand the proportion of tillage in these farms was only 6 per cent. as against 12 per cent. for the whole country in 1937, and the need for farm buildings consequently less. It does not seem unreasonable to value at £200 per holding the farm-buildings needed and actually used in the country as a whole. The Land Commission spends £357 10s. per holding of 20-22 acres in providing buildings which doubtless include a dwelling-house (*Ibid.* p. 1163). Such new holdings are by no means liberally provided with farm-buildings and "out offices." In my own 20 acre farm the Insurance Co. valued the farm-buildings actually in use at £500 for fire insurance purposes. In a neighbouring 211 acre farm farm-buildings are valued at £3,390, and all are effectively used. In normal times there is no direction in which the capital used in agriculture could be more profitably expanded than in the provision of more and better equipped housing for live stock. Warm housing for hens and pigs would to some extent replace the Indian meal ration which cannot now be obtained. A hay shed is a great convenience and a concrete silo (obtainable in 1941 for £15 15s.) is invaluable on any farm. If ever peace returns it should be a principal object of public policy to

encourage the investment of at least another £25 million in this way in the course of the next five or ten years.

In view of the fact that the Land Commission spends nearly £400 in providing 20 acre " allottees " with a home and farm-buildings it does not seem unreasonable to suppose that the average farmer would require a £300 dwelling-house, apart from the value of farm-buildings. The average farmer is, of course, a 30 acre farmer.

Instrumental capital at £2 per acre is based on Mr. Murphy's figures with some slight upward adjustment of the value of horses justified by the 1939 level of prices. In a neighbouring 630 acre farm horses and machinery are valued at £1,104 which is not far from a £2 per acre standard. It is a particularly large and well-equipped farm, and the average 30 acre farm, with horses and machines worth only £60, would be poorly equipped by comparison. A figure of £2 per acre represents the actual measure, but by no means the desirable limit, of expenditure on instrumental equipment, and this too is one of the directions in which the investment of capital might well be considerably expanded.

The item live stock capital is more or less self-explanatory. The valuations at 1926 prices arrived at for 1939 were scaled downwards in the ratio of 147.3 to 119.3.

TABLE II.

Value of Instrumental Capital (from Mr. Murphy's Tables).

Size of farms (Acres)	No. of farms	Total Area (Acres)	No. of labour units	Value of Instrumental Capital	Value per labour unit	Value per acre	Value of Farm Buildings	Value of Farm Buildings per labour unit	Value of Instrumental Capital and Farm Buildings per labour unit
				£	£ s. d.	£ s. d.	£	£ s. d.	£ s. d.
Under 20	5	75	7.62	220	28 17 7	2 18 8	292	38 6 5	67 4 0
20—39.9	18	543	36.13	1,506	41 13 7	2 15 5	1,755	48 11 5	90 5 0
40—59.9	23	1,150	53.63	2,233	41 12 9	1 18 10	3,498	65 4 6	106 17 3
60—99.9	28	2,027	83.47	4,112	49 5 0	2 0 7	5,620	67 6 8	116 11 8
100—149.9	14	1,685	48.33	2,236	46 5 0	1 6 8	4,071	84 4 4	130 9 4
150—	10	1,764	38.31	2,348	61 5 10	1 6 2	4,240	110 13 7	171 19 5
TOTAL	98	7,244	267.49	12,655			19,476		

In making out this Table the value of horses is combined with that of machinery and equipment and taken as representative of instrumental capital. The valuation of horses, mules, and asses given in Table X of Mr. Murphy's paper has been scaled up by one-sixth to allow for the increase in their price by June, 1939. The only doubt that assails me is whether I should also include the value of farm-buildings effectively used as part and parcel of the conception of instrumental capital. An up-to-date dairy farmer may have recently sunk a well, operated by a power pump, and delivering water through pipes to automatic fountains in a newly-constructed cowhouse. Are we to treat the power pump, the

pipes and the fountains as machines, and therefore instrumental capital, and ignore the value of the well and the cowhouse in this connection? There is one practical reason for leaving out the value of farm-buildings as given in Mr. Murphy's paper. I do not know the extent to which they are effectively used, though I suspect that they are inadequate in themselves and not used to anything approaching their maximum capacity. Even so the Table in its present form is not without interest and significance. The value of instrumental capital is only £28 17s. 7d. per person occupied on farms less than 20 acres in size, is nearly £42 on farms between 20 and 60 acres, nearly £50 on farms between 60 and 100 acres, drops to £46 on farms 100 to 150 acres, and rises to £61 on farms over 150 acres. On the other hand if the value of farm-buildings is combined with the value of instrumental capital the increase in value per unit of labour is quite regular.

The value of instrumental capital per acre used decreases almost regularly as the size of farm increases. The burden of owning and maintaining instrumental capital is naturally much heavier per acre on a small than on a large farm. Obviously too a 100 acre farm with instrumental capital worth £1 6s. 8d. per acre used is likely to be equipped with a greater variety of labour-saving machines than a 20 acre farm in which the value of instrumental capital is £2 18s. 8d. per acre used. This comes out clearly in the column showing value of instrumental capital per person occupied. Its ultimate significance will be seen in the next Table where the amount available per unit of labour increases with the size of farm and therefore with the "capitalisation" per person occupied.

This Table indicates also the desirability of a suitable mixture of farms of various sizes in all regions of the country. The large farmer can afford to own modern appliances and is usually willing to let his small-farm neighbours have the use of them in return for labour or money. I do not see how it can be "economic" for a 20 acre farmer to own even a horse (unless he is also a road worker). My own limited experience would indicate that a farm of that size is more appropriate to an ass than a horse. I am fortunate in being able to secure the use of an ass and cart for light transport when necessary, and to hire a neighbour's men, horses and machines for serious agricultural operations. Speaking quite generally, a farm of that size, even if owned by a person of Senatorial rank, might be said to entitle to asinine rather than equestrian status!

TABLE III.

Amount Available per Labour Unit (from Table IX of Mr. Murphy's paper).

Size of farm (Acres)	Amount available (raised by $\frac{1}{6}$)
Under 20 —	£ 74.62
20—39.9 —	65.43
40—59.9 —	73.15
60—99.9 —	86.87
100—149.9 —	99.16
150— —	107.01

Table III is simply a reproduction of column 5 in Table IX of Mr. Murphy's paper. His figures relate to the period 1st May, 1937, to 30th April, 1938, and have been scaled up in my Table by one-sixth to correspond to the 1939 level of prices. Even at that they are absurdly low. A neighbour of mine, who farms 630 acres, informs me that his net output per person occupied was in 1940 £215.* In his case non-specialised instrumental capital amounted to £48 per person occupied or £1 15s. per acre used. Specialised capital amounted to £156 per person occupied, and the high level of nett output is associated with the use of instrumental capital in both its forms.

TABLE IV.

Number of Labour Units per 100 acres (from Table VIII of Mr. Murphy's paper).

Size of farm (Acres)	Labour units per 100 Acres
Under 20 —	10.16
20—39.9 —	6.65
40—59.9 —	4.66
60—99.9 —	4.12
100—149.9 —	2.87
150— — —	2.17

Table IV is a reproduction of column 4 of Table VIII in Mr. Murphy's paper. The number of labour units diminishes as we might expect with

* Mr. Murphy's "amount available per labour unit" is based on "that portion of total output which remained after expenses other than labour costs had been met". It is not strictly comparable with "net output per labour unit" shown in Table VI below.

the increase in the size of farm. If we had more information about large farms which are well managed and fully equipped, especially those in which some agricultural speciality is highly developed, we might find that the number of labour units per 100 acres compared very favourably with the number occupied (or half occupied) on small farms. One neighbour who specialises in tomato-growing and has invested £3,600 in tomato-houses employs 3.65 persons per 100 acres. Another neighbour, who specialises in poultry and has invested £1,775 in poultry houses and appliances, employs as many as 6.63 persons per 100 acres on a farm of 211 acres.

In this connection it should be noted that in England employment (including family labour) is 3.08 on farms 20 to 50 acres, 2.99 on farms 50 to 100 acres, and 2.83 on farms 100 to 150 acres, according to *The Agricultural Output of England and Wales, 1925*, p. 105.

In conclusion it should be remembered that the gross output of our agriculture has scarcely exceeded an average of £5 per acre in the last decade and a half. On well-managed, fully-equipped farms a gross output of £15 to £20 per acre is not only possible but actual on farms of all sizes, though actual in far too few cases. It should be public policy to promote the increase of agricultural output to an average of at least £10 an acre on farms of all sizes, and to further the intelligent use of additional capital investment as a *sine qua non* of such a policy. A neighbour to whom I showed a preliminary draft of this paper wrote as follows:—"I have put a good deal of capital into this place since I started farming and from records I have kept consider that the increase of capital has had a definite influence on the output per acre of the farm. There can, I think, be no doubt that Irish farmers can and should use a great deal more capital than they do at present. Agricultural output would be increased and costs of production lowered. But I do think that we need a change of outlook among farmers, as well as more and better agricultural education. At present many farmers in this country would not know how to use additional capital to the best advantage; the general idea would be to buy extra land or buy cattle and take land to feed them on, instead of putting the money into their farms."

The capital assets associated with the agriculture of Éire have been valued in this paper at £466 millions plus an unknown quantity representing the value of the specialised instrumental capital used by a number of our most progressive farmers, which is all too small. In the main these capital assets are owned by operating farmers, and the aggregate of agricultural indebtedness is a small proportion of the total value of agricultural assets. Only £12.59 millions was owed by farmers to the joint stock banks in January, 1937, whereas the Banks owed farmers £35.61 millions on Deposit Receipt (*Banking Commission Report*, p. 206). Merchants are probably a more important source of short-term credit to Irish farmers than the Banks. In addition farms are doubtless mortgaged in a number of cases to private persons and institutions, and burdened with settlements in favour of members of the family who could not otherwise be provided for.

The custom of providing a dowry for a daughter on her marriage in the form of liquid cash is prevalent in many parts of the country. The cash has probably been accumulating for a generation as a Bank Deposit.

Such Deposits pass from hand to hand from one family and generation to another, and are never spent if it can possibly be avoided. The typical Irish farmer has more confidence in the banking system than he has in the possibility of expanding his agricultural income by the wise use of his

own or borrowed capital. One suspects that there are many cases in which "surplus" daughters could be better provided for at home if taught the up-to-date management of poultry (or even pigs) and provided with the modest cost of the specialised equipment needed, than by the transfer of a Deposit Receipt for a few hundred pounds. An average poultry population of 50 per holding and pig population of $2\frac{1}{2}$ per holding is a national disgrace. But a revolution in our social customs and national outlook may be necessary before we learn the degree of national self reliance which would be displayed if Irish farmers were prepared to use their own and borrowed capital in the expansion of their industry in those directions in which its expansion would be most easy for them, and most profitable for the country as well as for them.

EPILOGUE.

I have written this epilogue with a heavy heart. One of my principal informants died with tragic suddenness a few days after he had furnished me with some of the most valuable data included in this paper. Major Barrow of Milestown, Castlebellingham, was an Englishman, and his widow is a member of an old and well-known Co. Louth family. In 1923 the family mansion was burnt, this being the type of contribution to the New Order that was then fashionable. Returning good for evil Major Barrow and his family had their home rebuilt, and proceeded to develop a specialised poultry and egg-production business in conjunction with the cultivation of their 211 acre farm as a mixed dairy and tillage farm. By farming on these lines they managed to find useful and remunerative employment for 14 persons, which is a very high proportion of employment per 100 acres. If others had been encouraged to make similar use of the larger holdings, and had done so in a significant number of cases, the cry for "dividing up the land" would have had no economic pretext, and the absurd class antagonism between small farmers and large might have been avoided. Political freedom has hitherto been mainly productive of opportunities for creating and exploiting such class antagonisms, and only the consciousness of common peril has been able to create a temporary and precarious sense of social solidarity. Major Barrow, by his efforts and example, was making a valuable contribution to a sense of social solidarity that would enrich our national life materially and spiritually at all times, and the premature death of this Englishman, who was an Irish citizen by adoption, is a national loss which we can ill afford.

My own personal debt to Major Barrow is very great. If I have any knowledge or wisdom about Irish agricultural matters I owe much of it to my contact with him. He was always most willing to place me, and through me the Statistical Society, in possession of any records or information acquired through his farming experience or otherwise. On the Society's behalf as well as on my own I salute his memory with grateful homage.

TABLE V.

Data relating to four adequately capitalised farms.

	A.	B.	C.	D.
Area in statute acres ...	211	344	471	630
Labour units occupied ...	14	18	14	23
*Gross Output... ..	£3,937	£3,111	£3,055	£6,232
Raw materials bought in ...	£1,890	£622	£308	£1,286
Capital valuations at dates shown	1/11/40	2/3/41	1/1/41	31/12/40
Cows	£572	£875	£1,228	£819
Other Cattle	£636	£1,321	£1,144	£1,602
Pigs	£96	£20	nil	nil
Poultry	£409	£34	nil	nil
Sheep	£113	nil	£379	£387
Total Live Stock	£1,826	£2,250	£2,751	£2,808
Horses	£21	£169	£98	£180
Implements and Machines	£923	£831	£491	£924
Total Instrumental capital ...	£944	£1,000	£589	£1,104
Crops, tillages and feed ...	£1,088	£524	£811	£1,183
Farm Buildings (non-Specialised) ...	£3,390	£1,600	£1,400	£2,500
Total dead stock	£4,478	£2,124	£2,211	£3,683
Fixed poultry houses ...	£955	—	—	—
Manager's house (poultry)	£1,000	—	—	—
Food storehouses and Incubator rooms ...	£465	—	—	—
Movable poultry houses and poultry appliances ...	£355	—	—	—
Tomato houses	—	—	—	£3,600
Pump, engine, and well	—	—	£200	—
Total specialised equipment...	£2,775	nil	£200	£3,600

* Gross output includes value of produce raised on and off the farm in each case, as well as produce consumed in farm households, by only the *difference* between selling and buying in (or "valuing in" price) in the case of live stock bought in which were sold during the accounting period.

TABLE VI.

Calculations based on the data of Table V.

	A.	B.	C.	D.
Net Output	£2,049	£2,489	£2,747	£4,946
Net Output per acre ...	£9 14 0	£8 2 0	£5·17	£7 17 0
Net Output per labour unit ...	£146 4 0	£138 6 0	£196·4	£215 0 0
Labour units per 100 acres	6·63	5·23	2·97	3·65
Value of instrumental capital per labour unit	£67 8 0	£55 11 0	£42 1 0	£48·0
Value of instrumental capital per acre	£4 9 5	£2 18 0	£1 5 0	£1 15 0
Value of instrumental capital, farm buildings, and specialised equipment per labour unit	£507 16 0	£144 8 0	£156 8 0	£313 4 0

The data contained in these tables relate for the most part to the calendar year 1940, and consequently are only slightly affected by the war increase of prices.* In any case the capital valuations are all on a conservative basis, which is pre-war in the case of instrumental capital and dead stock. They indicate that employment per 100 acres, net output per acre, and net output per labour unit, are all very much supernormal on farms which are adequately capitalised as well as being well managed and of adequate size.

If reference is made to a table on page LXII of *Agricultural Statistics, 1847-1926*, where total permanent workers in the Saorstát in 1912 are compared with Denmark in 1923 for different sizes of farms, it will be found that in farms under 30 acres the number "occupied" (or sitting around) is very much higher in the Saorstát, whereas in farms of 100 to 200 acres 4·5 persons are occupied on every 100 acres of crops and pasture in Denmark as against 3 persons in the Saorstát. In the 200-500 acre class the figures are 3·4 and 1·9. The explanation almost certainly is that large farms in Denmark are better capitalised and equipped than similar farms in Éire—and the moral for us is obvious.

Output per acre is generally said to be higher with us on small farms than on large. If by output is meant gross output this is doubtless true. On my 20-acre farm I could in peace times keep 500 poultry and 10 pigs and spend about £300 a year mainly on Indian meal. In that way I could expand gross output to £800 a year at 1939 prices (whether profitably or otherwise is another question). My gross output would then be £40 per acre. The fact that output is higher on small farms only means that the Indian meal is spread more thickly over small than large farms.

The proof of this will be found on page XLVI of *Agricultural Statistics, 1947-1926*. Between 1912 and 1917 pigs diminished by 33 per cent.

* The index number of agricultural prices, based on 1911-13 = 100, was 120·7 in 1939 and 147·3 in 1940. (*Irish Trade Journal*, Vol. XVI, No. 1, page 41).

on farms under 30 acres, and only by 8 per cent. on farms of 100 to 200 acres. The small farmer was and is evidently more dependent on feed bought in than the large.

If it be legitimate to include in "output" the value of "processed" Indian meal in the case of small farms we should with equal justification include the value of "processed" store bullocks in the case of large grazing and tillage holdings. From that point of view the "rancher" who spends £10 an acre in stocking his land and sells two "crops" of fattened cattle in the year, might well show an "output" of nearly £30 an acre. Official statistics never lend themselves to this interpretation, but official statistics are framed in such a way as to suggest that "output" per acre is higher on small farms than on large, and interested persons are not wanting who seek to justify policies disruptive of our national economy by appeal to such misleading statistical facts. Some clarification of the term "output" would seem to be needed.

In any case not output in any indeterminate sense but net output is the important consideration; this varies widely on different farms, but there is no convincing evidence to show that net output per acre varies regularly and inversely with the size of the farm. On general grounds, and in the light of the facts mentioned in this paper, it seems more rational to believe that it varies with the fertility of the soil, the skill and industry of the farmer, the efficiency of his workers, the adequacy of his capital equipment, and the type of farming carried on, and varies irrespective of the size of his holding. I make this challenging statement in the hope that it will be either confirmed, modified or refuted by the collective knowledge and wisdom of the Society.

In a letter dated 24th January, 1942, six days before he died, Major Barrow wrote with reference to a preliminary draft of this paper: "I quite agree about the 20-acre holding. The communal farm is a far better proposition, and even 200 acres is far too small for really economic running or maximum production."

This paper is already too long. Perhaps on a future occasion I shall write a paper advocating 500-acre farms, one for each county, financed by the Land Commission, managed by graduates of the Agricultural College, and staffed by the "surplus" sons of small farmers on a profit-sharing basis. The successful experiment by the Mount Street Club at Larkfield offers an inspiring example.

DISCUSSION.

Mr. Menton : Mr. President, I should like to say a few words in regard to one aspect of this question of the capitalisation of Irish agriculture namely, where the money is to come from. The problem appears to contain the elements of a vicious circle. Professor Johnston has told us that we cannot expect an improvement in the rate of return on farming unless more capital is applied, while if Dr. Kennedy's estimate of the rate of return on farming in recent years is correct one wonders who is going to invest the necessary capital. This impasse presents a very serious problem.

The problem of under-capitalisation is tending to become more acute with the recent re-orientation of our agricultural economy. In our former pastoral economy the short term capital which was then mainly required was provided by the banks and shopkeepers, and the long-term capital which was needed to enable farmers to become proprietors of their holdings under the various Land Acts was provided by the State on generous terms. To-day Irish capital needs the application of a huge amount of capital for permanent improvements, repayment to be spread over a long term of years, in order to bring farming standards up to the level of their continental rivals. Professor Johnston mentioned a figure of £25 million ; Dr. Kennedy mentioned £50-100 million. Capital will not be applied in large doses until confidence in the profitability of farming as an investment returns.

There is a vast amount of savings of farmers lying on deposit with the banks, in fact the figure is nearly three times as great as that represented by advances by the banks to farmers. Further, a very large proportion of this money on deposit is really savings and not held for liquidity, per se. This is surely an anomalous position. Farmers appear to have lost confidence in farming. Many got their fingers burnt as a result of the big land investment boom of 1918-20, and have tended to be over-conservative since. Moreover, State policy in many respects does not encourage capitalisation, the enterprising farmer who improves his holding pays higher income tax and rates.

The farmer who has to borrow is forced to pay around 5-6 per cent. to-day and it has been higher in the past. This cost of capital appears to me to be at the root of the problem. It is extremely doubtful whether farming in general has given a return of anything like 5-6 per cent. in the last ten years. There is also the question of supply. Co-operative credit has failed, the banks say that it is not their function to make fixed capital available and the shopkeeper can only lend for a short time. Apart from private investment this leaves only the State and the Agricultural Credit Corporation.

The Agricultural Credit Corporation as at present constituted cannot deal with the problem on the scale required. Let the State, which in the past provided on very favourable terms the means for Irish farmers to buy out their holdings, complete the task begun then by providing them with capital at a reasonable cost to equip their land properly. The Government has borrowed recently at as low as 3½ per cent., let it make credit available at this rate or even less to ensure the application of the capital which Irish agriculture so badly needs. Commendable efforts have been made by the Government to improve the return on farming from the price end. I suggest that the solution might be found by attacking the problem at the cost end. It seems more logical at any rate. It is doubtful if it will involve greater cost to the taxpayer. In the first place the

increased fertility and improved methods of farming will increase the National Dividend; secondly, I do not believe the State will have to travel far alone on the road. The problem is largely psychological. Farmers are convinced at present that there is no future for investment in agriculture. If the State gives a lead and lays the foundation of prosperous conditions in farming, the voluntary savings of the community will do the rest.

I would like to associate myself with the vote of thanks to Professor Johnston on his excellent paper.

Mr. O Coincain: It gives me great pleasure to support the vote of thanks to Senator Johnston for his excellent paper on a most interesting subject. It is my opinion that too much light cannot be thrown on the various problems connected with Irish agriculture, and it is to be hoped that the welfare of the industry will be the paramount concern of Irish governments when peace returns.

I was particularly interested in Senator Johnston's estimation of the capital invested in Irish agriculture because some months ago I made a similar estimation and am aware of the snags and difficulties which are to be encountered. The major portion of the capital invested in agriculture, as it is the most difficult to estimate, is that described in the paper as Real Property Capital: £200 per holding for farm buildings and £300 per holding for dwelling accommodation seem rather high estimates. The average size of farm investigated by Mr. Murphy, in arriving at a valuation of £200 per holding for farm buildings, was 74 acres; and the district was situated in the Golden Vein. Over 60 per cent. of holdings in the country on the 1st June, 1940 were less than 30 acres in extent. In view of this, and also of the fact that the Golden Vein is a comparatively rich area I think that £200 per holding for farm buildings is too high for universal application.

In my estimation of the capital invested in agriculture I arrived at a figure of £400 millions. The difference between the two estimates lies in the item which Senator Johnston calls Real Property Capital, and which I referred to as Tenant's Interest. This term was obtained from an article by Mr. J. M. Adams, Department of Agriculture, published in the issue for February, 1925, of the *Journal of the Department of Lands and Agriculture*. Mr. Adams defined the Tenant's Interest of a farm as the normal market price. He investigated the financial accounts of 18 farms comprising 3,796 statute acres and estimated Tenant's Interest in 1922 as £29 per statute acre. The value of output as estimated from Mr. Adam's data was £6.2 per statute acre as against £5.1 per statute acre of agricultural land obtained from the official estimation of total output for the whole country in 1939-40. Reducing the 1922 figure in the ratio of 5.1 to 6.2 I estimated Tenant's Interest in 1940 at £24 per statute acre, and applying this to the 12 million acres of agricultural land obtained the Total Tenant's Interest as £288 millions.

The problem of increasing the output of Irish agriculture should be made a national one when peace returns. By using the power and prestige of the State as they are used to rally people for war, much can be achieved in the sphere of production, as has been seen in Germany and Russia. If agricultural production is to be increased in this country there must be a sound educational basis, to eradicate old prejudices and prepare the way for new ideas. It may be assumed, I think, that a change of outlook towards agriculture and a knowledge of modern scientific farming methods are indispensable to the prosperity of the agricultural industry. The primary school is the place in which to start the revolution.