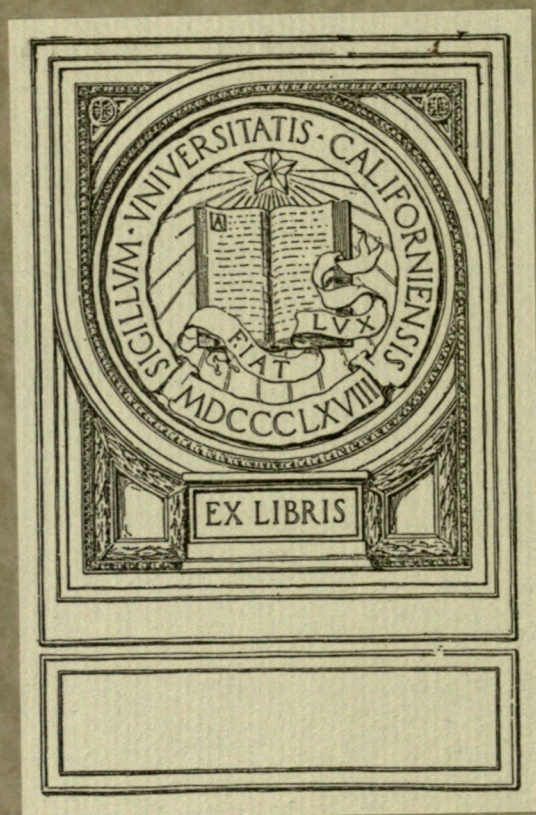


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Gr. B. AGRICULTURAL COSTINGS COMMITTEE.

# INTERIM REPORT

ON AN

# INVESTIGATION INTO THE COST OF MILK PRODUCTION.

From 1st OCTOBER, 1919, to 30th APRIL, 1920.

Presented to Parliament by Command of His Majesty.



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M. N. W.

# AGRICULTURAL COSTINGS COMMITTEE.

## INTERIM REPORT

ON AN

### INVESTIGATION INTO THE COST OF MILK PRODUCTION.

#### I.—ORIGIN AND ORGANISATION OF THE INVESTIGATION.

The Food Controller in September, 1919, requested the Agricultural Costings Committee to undertake an investigation into the cost of producing milk in Great Britain for a period of seven months from 1st October, 1919. (This period was subsequently extended to twelve months). The object of the investigation was to obtain information from detailed cost records kept on the necessary number of farms during this period.

The necessity for the investigation arose out of the importance and urgency of the question of milk prices, and the lack of reliable data as to the cost of production.

This Report covers the first period of the investigation (from 1st October, 1919, to 30th April, 1920, for England and Wales, and 1st November, 1919, to 30th April, 1920, for Scotland), and summarises the information obtained on some important items.

The time available for the preliminary arrangements of the Scheme, engaging a temporary staff, and organising the co-operation of the necessary number of farmers throughout the country, was very limited. A conference was immediately convened by the Costings Committee with representatives of the National Farmers' Union, British Dairy Farmers' Association, Consumers' Council, the Ministry of Food, and other organisations interested, to determine the best methods of undertaking the investigation, and to obtain their co-operation in carrying out the Scheme.

It was necessary to approach a large number of farmers throughout the country to obtain their co-operation in keeping the necessary detailed Cost Records, and in doing this considerable assistance was received from the above organisations and other sources. From the names of farmers so ascertained, a selection was made of those considered to be the most typical producers in the various districts.

England and Wales was divided into twelve local districts and Scotland into six districts. Each district comprised one or more counties, which were grouped so far as possible in accordance with similarity of local conditions. Table "E" in the Appendix shows the areas covered by these various districts, and the distribution of the farms.

A temporary staff of 14 Milk Costing Officers for England and Wales, and 7 Officers for Scotland, was engaged. The officers were selected primarily for their agricultural experience, and also their knowledge of accounts and costing methods. The Chief Costings Officers of the Agricultural Costings Committee were responsible for the supervision of the local recording work done by the Milk Costings Officers.

In each local district a Group of Farms was formed which was placed in the charge of one of the Costings Officers. These officers visited the farms under their supervision as frequently as possible, supervised the detailed records, assisted in their compilation where necessary, and verified the Milk Yields and the Rations fed. The detailed records kept on each farm were completed by the Costings Officer each month, and transmitted to the Head Office of the Costings Committee for tabulation.

The Costings Records were kept in considerable detail on the farms for each week of the Costing Period. Account was kept of the time spent by the dairy workers on Milk Production, and in the case of part-time workers the necessary apportionment of hours was made. Records were kept of the quantities and value of the various Purchased and Homegrown foods fed to Cows in Milk, Dry Cows, and Other Dairy Stock respectively. The total yield of milk was recorded each week, together with the manner of its disposal. A Herd Register was also kept which contained the detailed Inventory and Valuation of the Herds at the beginning and end of the period, and also a record of all sales, purchases, transfers, births and deaths, of the stock. An account was kept of the Cash Receipts and Payments in respect of the Dairy or of the Farm as a whole, but in a number of cases difficulty was experienced in keeping these cash records satisfactorily.

These records were kept on a uniform system on all the farms so that the final cost results could be presented on a comparative basis.

An Inventory and Valuation of the Dairy Stock and Foodstuffs was taken on each farm at the commencement and close of the Costing Period. The Dairy Equipment was inventoried and valued at the commencement, and the value at the close obtained by taking account of purchases and sales in the meantime. The basis of Valuation of the Equipment was either cost, less depreciation, or, where this information was not available, at rates somewhat under the present market value.

## II.—PARTICULARS OF THE FARMS ON WHICH THE INVESTIGATION WAS MADE.

The number of farms and town dairies on which the costs were recorded is as follows :—

—	Town Dairies.	Suburban Farms.	Country Farms.
England and Wales (Northern Division) ... ..	2	—	44
" " " (Southern " ) ... ..	1	—	65
Scotland ... ..	5	6	42
Totals ... ..	8	6	151

The milk was produced on commercial lines and the farms may be regarded as fairly representative of the various districts. It has not been practicable to report separately on the costs of Town Dairies at this stage, but it is hoped to do so in a further Report.

More than half of the farms may be described as " Dairy Farms," dairying being the sole or chief department. The following summary shows the general classification :—

—	Town Dairies.	Dairy or Mainly Dairy Farms.	Mixed Farms.
England and Wales (Northern Division) ... ..	2	27	17
" " " (Southern " ) ... ..	1	30	35
Scotland ... ..	5	33	15
Totals ... ..	8	90	67

In England and Wales (Northern Division) there were 23 tenant farmers and 23 owner-occupiers; in England and Wales (Southern Division) 47 tenant farmers and 19 owner-occupiers (including 4 Home-farms); in Scotland 52 tenant farmers and 1 owner-occupier; the totals for Great Britain being 122 tenant farmers and 43 owner-occupiers.

The average acreage of the farms (excluding Town Dairies) is as follows :—

—	England and Wales (Northern Division).	England and Wales (Southern Division).	Scotland.
Arable ... ..	79	110	167
Permanent pasture ... ..	139	157	21
Hill and rough pasture ... ..	13	5	48
Total acreage ... ..	231	272	236

It will be noted that in Scotland the acreage of pasture as compared with England and Wales is very much smaller, while the proportion of arable land is much greater, but to avoid misunderstanding it should be borne in mind that a considerable proportion of the land classed as arable would in the ordinary course of rotation be under temporary grass. In Scotland the number of cows kept per farm was 37·8 as against 33·3 in the Northern district of England and Wales and 35·68 in the Southern district of England and Wales, whilst cheaper milk was produced.

Six of the farms in England and Wales produced Grade " A " milk.

Milk records are kept on 18 of the farms in England and Wales (Northern Division); on 34 farms in England and Wales (Southern Division); and on 20 of the Scottish farms.

On a large majority of the farms in England and Wales male hired labour was mainly employed, with a comparatively small amount of female and household labour.

In two of the Scottish districts female labour was largely used and much work was done also by household labour. In three other districts similar conditions prevailed but with less female and household labour, and in the remaining Scottish districts the work was mostly done by contract, female labour being largely used.

The Costings Officers report that on a large majority of the farms the buildings were comparatively good and more suitable and convenient for dairying than the average farm buildings.

The conditions as to handling and cleanliness of the milk were in a large majority of cases reported to be comparatively good.

On a very large majority of the farms in England and Wales, the milk was sold wholesale, and comparatively little cheese and butter was made.

In Scotland 30 of the farms disposed of the milk wholesale, 8 retail, and in two cases part of the milk was sold retail and part wholesale. On the remaining 8 Scottish farms the milk was sold wholesale in Winter, and cheese made in the Spring and Summer.

The conditions under which the solid manure was stored were reported generally to be fair, having regard to present possibilities on the farms. In only a small minority of the farms was any serious attempt made to utilise the liquid manure.

### III.—PARTICULARS OF THE HERDS.

The total average number of cows in the herds in Great Britain was 5,891; 3,887 of the cows being in England and Wales and 2,004 in Scotland.

The Average Number of Cows per farm was as follows :—

Great Britain	...	...	...	...	...	...	...	...	35·7
England and Wales	...	...	...	...	...	...	...	...	34·7
Scotland	...	...	...	...	...	...	...	...	37·8
England and Wales (Northern Division)	...	...	...	...	...	...	...	...	33·3
England and Wales (Southern Division)	...	...	...	...	...	...	...	...	35·68

In 111 of the herds the cows were classed as commercial cows; the remaining 54 herds being either pedigree, or mixed commercial and pedigree herds.

The herds on the various farms and Town Dairies are maintained as follows :—

	By Breeding.	By Purchase.	By Breeding and Purchase.
England and Wales (Northern Division) ... ..	4	20	22
" " " (Southern " ) ... ..	44	20	2
Scotland ... ..	28	23	2
<b>Total</b> ... ..	<b>76</b>	<b>63</b>	<b>26</b>

Eight of the herds are Town Dairy Herds proper, or are on farms worked on the Town Dairy system.

As regards the valuation of the herds :—Pedigree herds were, with the exception of one or two special cases, valued at commercial prices, and Pedigree values eliminated as far as possible from the Cost Figures.

In a large majority of cases, the valuations were taken by the farmer in collaboration with the Costings Officer. In the remaining cases the Valuations were taken either by a Licensed Valuer or the farmer alone, except in one or two cases where Cost Accounts had previously been kept. In valuing the herds, the general basis was that of a moderate or low market value, and it is considered that the valuations were conducted in a fair and reasonable manner.

### IV.—COSTING METHODS.

The several items of cost appearing in the Cost Summary (Table A of Appendix) are made up as follows :—

#### *Wages.*

This item includes all labour of feeding and attending to cows, both in milk and dry, and other dairy stock, but excludes delivery and retail labour and also management charges. The manual labour of the farmer and any family labour has been charged at the local rates of wages.

#### *Foods and Litter.*

Purchased foods are charged at cost delivered at the farm.

Homegrown foods are charged at the Average Market Prices for each District as ascertained by the Local Costings Officers.

Difficulty was experienced by some of the Costings Officers in ascertaining these prices owing to there being no market or very little market for the commodities, and in these cases the prices charged may be taken as the nearest obtainable.

Grazing has been charged at estimated cost.

#### *General Expenses.*

The amount charged is the proportion of the various general expenses chargeable to Milk Production. This proportion, which includes a charge for rent and rates of buildings, has been ascertained as closely as possible by the Costings Officers, after careful investigation of the accounts kept, and from other sources.

*Depreciation of Machinery and Utensils.*

This has been charged at the rate of 10 per cent. per annum. The value of Butter and Cheese-making utensils has been excluded for this purpose.

*Maintenance of Herds.*

This is a net figure of increase or decrease after taking into account the opening and closing Valuation, Purchases, Sales, Transfers, Deaths, &c., as shown in Tables B, C, and D, in the Appendix.

*Other Dairy Stock.*

The cost of foods was ascertained separately, but it was not considered practicable to keep a separate account of the other items of cost. All the transactions relative to Other Dairy Stock have accordingly been included in the costs.

*Credit for Manurial Values of Food.*

The manurial values of all foods, Homegrown and Purchased, have been calculated—for England and Wales on the basis of Messrs. Voelcker and Hall's Tables, revised to 1920—and for Scotland on the basis of the Tables of the Committee appointed under the Board of Agriculture for Scotland in 1917, 40 per cent. being added to these figures in order to bring them up to date.

The manurial values of the large number of proprietary foods, not included in these two Tables of Manurial Values, have been calculated according to the chemical contents, on the best information that was available for this purpose.

The manurial values so obtained have been regarded as gross manurial values, and from this figure a deduction of a certain percentage has been made where necessary for each farm, according to the conditions under which the manure was kept, as reported by the Costings Officers. This deduction left a net manurial value, which is the figure that has been credited in the Cost Statement.

These gross Manurial Values for Great Britain amount to £25,485 9s. 9d.—equal to 3·61 pence per gallon. The net Manurial Values are £16,787 17s. 9d.—equal to 2·38 pence per gallon.

In the majority of farms the deduction in respect of storage conditions was at the rate of 50 per cent., the average deduction from the gross Manurial Value being about 33½ per cent.

In respect of straw used for litter, an additional credit has been given at the rate of 7s. per ton in respect of its mechanical value.

*Horse Labour.*

Horse Labour carting foods has been charged to foods at a uniform rate of 9d. per hour.

*Management and Interest on Capital.*

In arriving at the cost of production nothing has been included in respect of Interest on Capital, while in the great majority of cases no management was paid for, Managers' salaries to the extent of £409 2s. 9d. only having been included. In considering the margin of profit which should be allowed, these two items should be taken into consideration.

## V.—RESULTS OF THE INVESTIGATION.

## COSTS.

For the purpose of considering the general results of this investigation, it is important that the statement of methods adopted, which have been previously given, should be read with care, and continually borne in mind. For instance, although the cost of labour for Great Britain is 4·51d. per gallon, the labour represented by this charge was not all directly expended upon the dairy cows on the farms. A part of this charge for labour was incurred in respect of the "Other Dairy Stock," but because the accounts have not distinguished between the labour given to dairy cows (in milk and dry) and Other Dairy Stock, the cost is given as one item.

In the course of future investigations, this may prove to be an important matter, for during this period there is a net charge on the cost of milk, arising from the difference between the cost of food of Other Dairy Stock, and the appreciation of such stock, amounting (with the Home-grown Foods charged at Market Prices) to £11,628, or 1·65d. per gallon, and had the cost of labour expended on the Other Dairy Stock been charged directly to these, the total net cost would have been higher, although the total costs would have remained the same.

In arriving at these costs, the Homegrown Foods are charged at the following average Market Prices, less cost of marketing:—

										Per ton.		
										£	s.	d.
Hay	...	...	...	...	...	...	...	...	...	14	6	5
Straw	...	...	...	...	...	...	...	...	...	6	13	9
Roots	...	...	...	...	...	...	...	...	...	2	5	2



A certain element of profit is therefore included, and this must be taken into consideration in forming any conclusions upon the figures.

The full statement of the cost of producing milk at the farm during the period will be found in Table A in the Appendix, but the following summary gives the chief items.

TABLE I.

## SUMMARY OF COSTS OF PRODUCING MILK—AT THE FARMS.

*Homegrown Foods Valued at Market Prices.*

	Great Britain.	England and Wales.	Scotland.
	Pence per gallon.	Pence per gallon.	Pence per gallon.
<b>CHARGES.</b>			
Labour expended on all stock in the herds ...	4·51	4·99	3·55
Foods and Litter—			
Cows—			
Purchased foods ... ..	9·87	10·06	9·49
Home-grown foods ... ..	19·42	20·88	16·54
Grazing ... ..	·45	·61	·14
Other dairy stock (all foods) ... ..	5·68	5·98	5·08
Proportion of general expenses ... ..	1·29	1·47	·93
Depreciation on machinery, &c. ... ..	·14	·16	·15
Maintenance of herds ... ..	·24	·09	·54
<b>Total charges ... ..</b>	<b>41·60</b>	<b>44·24</b>	<b>36·42</b>
<b>CREDITS.</b>			
Credit on other dairy stock ... ..	4·03	4·06	4·00
Manurial value ... ..	2·38	2·62	1·91
<b>Total credits ... ..</b>	<b>6·41</b>	<b>6·68</b>	<b>5·91</b>
<b>Net cost ... ..</b>	<b>35·19</b>	<b>37·56</b>	<b>30·51</b>

It will be seen the total net cost per gallon at the farm, taking homegrown foods at market prices, is :—

	Pence.
Great Britain ... ..	35·19
England and Wales ... ..	37·56
Scotland ... ..	30·51

The costs per gallon and yield of milk for each district are shown later in Tables 5 and 6.

For the effect of varying prices of homegrown foods on costs of production see later, Table 4.

The cost per gallon in the several local districts varies in England and Wales from 30·60 pence in the district comprising Hants, Berks, Bucks, and Oxon to 45·77 pence in the district comprising Somerset, Wilts, Gloucester, Worcester and Hereford.

In Scotland the cost per gallon varies from 25·41 pence in the district comprising Dumfries, Kirkcudbright and Wigtown to 35·00 pence in the district including Renfrew, Dumbarton, Bute, Argyle and Stirling.

The maximum number of farmers was not obtained until the work had been in progress for about two months, with the effect that the comparatively lower cost obtaining in October did not exercise its proper weight in the figures owing to the comparatively small number of farms then being costed.

## VI.—YIELD OF MILK.

The total yield of milk during the period was : in England and Wales 1,122,990 gallons, and in Scotland 572,196 gallons, the total for Great Britain being 1,695,186 gallons.

The average yield of milk per cow per day was as follows :—

	Cows in Milk.	Total Herd.
	Gallons.	Gallons.
Great Britain ... ..	1·942	1·517
England and Wales ... ..	1·84	1·476
Scotland ... ..	2·13	1·574
England and Wales (Northern Division) ...	1·86	1·53
England and Wales (Southern Division) ...	1·83	1·45

The percentage of Dry Cows in the Herds for the Costing Period was as follows :—

	Per cent.
Great Britain ... ..	21·8
England and Wales ... ..	19·61
Scotland ... ..	25·9
England and Wales (Northern Division) ... ..	17·56
England and Wales (Southern Division) ... ..	20·93

#### VII.—GROSS AND NET COST OF FOODS.

The cost of food is the most important item in the total cost of producing milk. The results of this Investigation show the following costs per gallon due to food supplied to cows alone :—

	Cost of food to Cows per gallon of milk.	Percentage of gross cost. (Per Table I.)	Percentage of net cost. (Per Table I.)
	Pence.	Per cent.	Per cent.
Great Britain ... ..	29·74	71	84
England and Wales ... ..	31·55	73	84
Scotland ... ..	26·17	72	85

Taking the whole cost of food, including the quantities fed to both cows and other dairy stock, the following summary shows the proportion of food to total cost :—

	Cost of all foods per gallon of milk. (Foods supplied to all stock in herds.)	Percentage of gross cost.	Percentage of net cost.
	Pence.	Per cent.	Per cent.
Great Britain ... ..	35·42	85	100
England and Wales ... ..	37·53	84	100
Scotland ... ..	31·25	86	102

The gross cost of food, however, is subject to reduction for the value of manurial residues. Taking food supplied to cows and other dairy stock, the following figures show the net cost of food, with the proportion to total net cost per gallon of milk :—

	Gross cost of food.	Manurial values.	Net cost of food.	Proportion of net cost of food to total net costs.
	Pence.	Pence.	Pence.	Per cent.
Great Britain ... ..	35·42	2·38	33·04	94
England and Wales ... ..	37·53	2·62	34·91	92
Scotland ... ..	31·25	1·91	29·34	96

#### VIII.—COMPARISON OF RATIONS.

The following Table (2) shows for England and Wales and for Scotland separately the average weight and cost of the ration per cow per day, and also per gallon of milk. The most striking feature is that, although the weight of purchased foods fed in Scotland is much greater than in England and Wales, and the cost also is slightly higher, the whole ration is cheaper, both per cow day and per gallon of milk than in England. Taking the whole ration this fact is partly due to the large quantity of comparatively cheap roots fed on the Scottish farms. The weights and costs of roots are :—

	Quantity of roots fed per day.	Cost of roots fed per day.
	lbs.	pence.
England and Wales ... ..	30·32	8·61
Scotland ... ..	57·10	11·16

Other noticeable differences are to be found in the quantities of hay and straw fed on the farms of the two countries; much more hay and somewhat less straw being fed in England than in Scotland. All these facts—the heavier quantities of roots, straw, and the smaller quantities of hay fed in Scotland—might have been expected from what is generally known of systems of cropping and feeding followed on Scottish farms.

TABLE 2.

*Comparative Statement of the weight and cost of ration per cow day, and for gallon of milk in England and Wales and in Scotland. (All cows in herd.)*

	Average weight of ration per cow per day.		Average cost of ration per cow per day.		Average cost of ration per gallon.	
	England and Wales.	Scotland.	England and Wales.	Scotland.	England and Wales.	Scotland.
	lbs.	lbs.	Pence.	Pence.	Pence.	Pence.
Purchased foods ... ..	9·87	16·09	14·85	14·94	10·06	9·49
Homegrown foods—						
Hay ... ..	9·04	2·95	14·09	4·05	9·55	2·57
Straw ... ..	7·07	10·89	4·55	8·97	3·08	5·70
Roots ... ..	30·32	57·10	8·61	11·16	5·83	7·09
Other foods ... ..	6·65	2·12	2·86	1·43	1·94	·91
Total—Homegrown ...	53·08	73·06	30·11	25·61	20·40	16·27
„ Purchased and Homegrown.	62·95	89·15	44·96	40·55	30·46	25·76
Grazing ... ..	—	—	·90	·22	·61	·14
			45·86	40·77	31·07	25·90
					Litter ·48	Litter ·27
					31·55	26·17

NOTE.—Purchased foods are taken at cost prices and homegrown foods at market prices, less cost of marketing. The period covered is—For England and Wales 1st October, 1919, to 30th April, 1920, and for Scotland 1st November, 1919, to 30th April, 1920. The above figures are gross; manurial values have not been deducted.

#### IX.—HOME-GROWN FOODS AND COST OF PRODUCTION OF MILK.

In connection with the ration and its cost, the method of valuation of the different food materials is of great importance. Throughout the records the charge for purchased foods is the cost, plus any charge for cartage and preparation, or in other words, at the actual total cost. In the case of homegrown foods, however, the position is not so simple. When the investigation commenced there was no knowledge of the cost of growing these crops on the farms. Moreover, had such information been obtainable, there is much controversy on the question whether home-grown foods should be charged at cost, or at market prices. In compiling the cost records from week to week, the farmers who supplied the records stated their own prices for their home-grown foods, and the cost has been calculated both on the estimated market prices for each district, and on the values of home-grown foods as estimated by the farmers. The figures used in this Report are those obtained by costing on the basis of market prices (less cost of marketing) for homegrown foods. Taking Great Britain as a whole, there is little difference between the resulting costs based on the two systems of valuation, the comparative figures being as follows:—

	Net Cost per Gallon.	
	Based on Farmers' Valuation of Home-grown Foods.	Based on Market Prices for Home-grown Foods.
	Pence.	Pence.
Great Britain ... ..	34·41	35·19
England and Wales ... ..	36·23	37·56
Scotland ... ..	30·84	30·51

In respect of certain District Groups, however, the differences are much greater. The most striking is that in the case of Group No. 3, England and Wales, where the cost per gallon at farmer's prices is 38·21d., and on market prices 45·20d.; but Groups Nos. 5 and 10, England and Wales, also show comparatively large differences.

The following Table (3) shows the actual average prices charged for homegrown foods, on the basis of market prices, over the whole of the farms in Great Britain from which records were obtained.

TABLE 3.

*Average Market Price of Homegrown Foods Fed to Cows in Great Britain.*

(FIRST PERIOD.)

—				Quantities Fed,	Value at average Market Prices.	Average Rate Per Ton.	Cost per Gallon.
				Tons.	£	£ s. d.	Pence.
Hay	...	...	...	3,546	50,785	14 6 5	7·19
Straw	...	...	...	4,168	27,881	6 13 9	3·95
Roots	...	...	...	19,567	44,163	2 5 2	6·25
Other Foods	...	...	...	2,602	11,401	4 7 8	1·61
Total	...	...	...	29,883	134,230	—	19·00 Litter ·42

The method of valuing Homegrown Foods on the basis of market prices has been adopted in this Report, and as it is recognised that the cost of these foods is one of the chief determining factors in the cost of milk, and that the market prices adopted contain an element of profit, the Committee have prepared the following Table (4). This Table gives an alternative scale of market prices, so that the effect of varying prices on the cost of production of milk may be readily seen.

If the quantities of food fed to cows during this period remained the same when changes in prices occurred, the costs per gallon of milk would vary, as shown in the second column under the heading of each food item in Table 4. Thus, in the case of hay, the average cost of hay per gallon of milk was 7·03d. when the price was £14, but should the price fall to £6, the quantity fed remaining the same, the cost would be 3·01d. per gallon of milk.

TABLE 4.

*Cost per Gallon on Milk at varying Prices for Homegrown Foods Fed to Cows.*

(Showing Effect on Gallon Cost of Milk.)

Hay.		Straw.		Roots.	
Price per Ton.	Cost per Gallon.	Price per Ton.	Cost per Gallon.	Price per Ton.	Cost per Gallon.
£	Pence.	£ s. d.	Pence.	£ s. d.	Pence.
14	7·03	6 0 0	3·54	2 10 0	6·92
13	6·53	5 10 0	3·25	2 5 0	6·23
12	6 02	5 0 0	2·95	2 0 0	5·54
11	5 52	4 10 0	2·66	1 17 6	5·19
10	5·02	4 0 0	2·36	1 15 0	4·85
9	4·52	3 10 0	2·07	1 12 6	4·50
8	4·02	3 0 0	1·77	1 10 0	4·15
7	3·51	2 10 0	1·48	1 7 6	3·81
6	3·01			1 5 0	3·46
				1 0 0	2·77

It is necessary to point out that the method of valuing Homegrown foods applies not only to those fed to cows, but also those fed to other dairy stock, and that the method of valuation has some influence on the net charge on the cost of producing milk as a result of the keeping of these stocks. The loss shown on other dairy cattle, which has been charged to the milk, would certainly have been less, and might not have appeared at all, had Homegrown Foods fed to them been charged on a cost basis.

## X.—MAINTENANCE OF HERDS.

The net cost of maintaining the cows in the herds—after taking into account the opening and closing valuations and including a loss of £3,233 arising from deaths of cows—was £1,677.

The value of the cows in the closing valuations was £3,568 less than in the opening valuations, but the values of the cows sold and transferred out exceeded by £1,891 those purchased and transferred in, leaving the net decrease of £1,677 mentioned above.

The number of cows in the closing valuation was 255 less than at the commencement.

The average value per head was slightly greater at the close of the period, the figures being—at commencing valuation £39 10s. per head; at closing valuation £40 13s. per head.

The market prices for cows in England and Wales were reported on the whole as somewhat higher in April than in October, but in Scotland a slight fall as between the beginning and end of the costing period was reported.

The average prices for the cows in the herds bought, sold, and transferred, are shown in Table B in the Appendix.

Of the 7,316 cows passing through the herds during the period, 867, or twelve per cent., were purchased, and 481 others, or seven per cent., were transferred into the herds. The number in the herds at the time of the commencing valuation was 5,968, or 82 per cent. of the total number of cows accounted for during the period. At the time of the closing valuation there were 5,713 cows in the herds, 1,361, or 19 per cent. of the total accounted for, having passed out by sale; 77, or one per cent., by death; and 165, or two per cent., had been transferred out of the herds. These total figures are for Great Britain. Separate particulars for England and Wales and Scotland are given in Tables C and D in the Appendix.

#### XI.—COMPARISON OF COSTS PER GALLON AND YIELD OF MILK.

The results of the enquiry indicate some principles in the economical production of milk during the winter months. Taking first the relation of the yield of milk per cow day to the cost per gallon, it is found that in England and Wales, where the daily yield is 1·84 gallons per cow in milk and 1·48 gallons per cow in herd (including dry cows), the average cost per gallon at market prices is 37·56 pence; while in Scotland, where the daily yield is 2·13 gallons per cow in milk and 1·57 gallons per cow in herd, the average cost per gallon at market prices is 30·51 pence. The difference in yield is not sufficient to account for the difference in cost, but it is quite an important factor. Tables showing the yield of milk and cost per gallon in each of the districts in England and Wales, and Scotland, are given in the following Tables (5 and 6):—

TABLE 5.  
*Comparison of Costs per Gallon and Yield of Milk.*  
ENGLAND AND WALES.

	Costs per Gallon of Milk.	Yield of Milk per Cow per Day.	
	At Market Prices for Foods.	Cows in Milk.	Total Cows in Herd.
	Pence.	Gallons.	Gallons.
Group 1... ..	42·87	1·86	1·47
" 2... ..	34·71	2·09	1·94
" 3... ..	45·20	1·60	1·26
" 4... ..	34·75	1·85	1·52
" 5... ..	32·74	2·00	1·66
" 6... ..	30·60	2·02	1·61
" 7... ..	39·28	1·64	1·27
" 8... ..	45·77	1·53	1·14
" 9... ..	41·70	1·79	1·58
" 10... ..	39·75	1·70	1·22
" 11... ..	43·31	1·68	1·21
" 12... ..	39·70	2·02	1·71
Average ... ..	37·56	1·84	1·48

This Table shows that, with one exception, Group (No. 12), a comparatively high yield is accompanied by low costs, and that low yields are accompanied by comparatively high costs.

TABLE 6.  
*Comparison of Costs per Gallon and Yield of Milk.*  
SCOTLAND.

	Costs per Gallon of Milk.	Yield of Milk per Cow per Day.	
	At Market Prices for Foods.	Cows in Milk.	Total Cows in Herd.
	Pence.	Gallons.	Gallons.
Group A ... ..	25·41	1·87	0·97
" B ... ..	32·72	1·99	1·33
" C ... ..	35·00	1·92	1·45
" D ... ..	32·02	2·45	2·22
" E ... ..	27·80	2·34	2·18
" F ... ..	32·28	2·23	1·97
Average ... ..	30·51	2·13	1·57

On the Scottish farms the lowest cost is found to be accompanied by the lowest yield, and the highest cost of all by a yield which is below the average. It is not suggested, however, that the yield is the only factor in the low cost of milk. Other factors will be indicated in relation to the number of cows calving during the winter, and the proportion of dry cows maintained.

## XII.—INFLUENCE OF WINTER CALVING ON COST PER GALLON.

The following Tables (Nos. 7 and 8) show the proportion of the cows dry and the proportion of the cows calving during the period. The summary figures are:—

	England & Wales.	Scotland.
	Per cent.	Per cent.
Proportion of cows dry during period ... ..	19·61	25·9
Cows in milk ... ..	80·39	74·1
Proportion of cows calving during period ... ..	43·00	52·0
Yield per cow per day (all cows in the herd) ... ..	1·48 gals.	1·57 gals.

In England and Wales the high proportion of cows in milk, the low proportion of cows dry, and the comparatively low proportion of cows calving during the period, are accompanied by a lower milk yield than in Scotland where a higher proportion of the cows calved during the winter, and where, consequently a higher proportion were dry, and a lower proportion were in milk. The difference, however, is very small, as it amounts to only six gallons in each hundred, i.e., the Scottish farmer obtained 106 gallons to every 100 gallons per cow obtained by the English farmer.

TABLE 7.

### *Influence of Winter Calving on Cost Per Gallon of Milk.*

#### ENGLAND AND WALES.

Group	Proportion of Dry Cows during Period.	Proportion of Cows Calving during Period.	Costs per Gallon of Milk at Market Prices for Foods.
			Pence.
Group 1 ... ..	Per cent. 21·40	Per cent. 38	42·87
" 2 ... ..	7·03	25	34·71
" 3 ... ..	20·83	48	45·20
" 4 ... ..	17·33	42	34·75
" 5 ... ..	16·66	43	32·74
" 6 ... ..	19·82	56	30·60
" 7 ... ..	22·13	58	39·28
" 8 ... ..	25·71	56	45·77
" 9 ... ..	11·41	16	41·70
" 10 ... ..	28·46	50	39·75
" 11 ... ..	27·57	44	43·31
" 12 ... ..	15·99	26	39·70
Average ... ..	19·61	43	37·56

The influence of the winter calving of cows on the gallon cost would be much more clearly indicated if the loss due to keeping other cattle were eliminated. It is shown clearly in the case of Group 5, where there were few such cattle, and the loss was very small. But in Groups 3, 7 and 8, where the proportion of cows freshening during the period was high, and yet costs were high, these costs are partly due to the losses on the other dairy stock. In two cases the losses amount to over 3d and in one to over 5½d. per gallon.

TABLE 8.

### *Influence of Winter Calving of Cows on Cost per Gallon of Milk.*

#### SCOTLAND.

Group	Proportion of Cows dry during period.	Proportion of Cows calving during period.	Cost per Gallon of Milk at Market Prices for foods.
			Pence.
Group A ... ..	Per cent. 48·0	Per cent. 76	25·41
" B ... ..	33·4	65	32·72
" C ... ..	24·4	58	35·00
" D ... ..	11·6	31	32·02
" E ... ..	6·6	22	27·80
" F ... ..	11·3	37	32·28
Total ... ..	25·9	52	30·51

In the Scottish Groups, again, the effect of the loss on Other Dairy Stock has to be taken into consideration. For instance, although in Group C the highest proportion of cows calving is accompanied by the highest cost, there is a charge from Other Stock of 3·63d. per gallon. The herds of three districts, A, B and C, differ from the others in respect of the numbers of "Other Dairy Stock" kept, for the greater part of these stock in the whole of the Scottish herds are in the herds of these districts

## XIII.—APPLICATION OF RESULTS.

When considering the results shown in this Report in relation to the costs of the present or later winter periods, changing conditions must be taken into account, and care must be taken that all the factors affecting the various items of cost are borne in mind.

The Agricultural Costings Committee desires to express its thanks for assistance in carrying out the Investigation to the Co-operating Farmers on whose farms the necessary cost records were kept, to the National Farmers' Union, Dairy Farmers' Associations, Agricultural Colleges, Live Stock Commissioners, County Agricultural Organisers, and others; to the Reading University College; and also to the Institute of Agricultural Economics at Oxford for assistance throughout the Investigation and in reporting on the results.

## XIV.—APPENDIX.

TABLE A.—Summary of Costs.  
 " B.—Herd Transactions—Great Britain.  
 " C.— " —England and Wales.  
 " D.— " —Scotland.  
 " E.—County Areas covered by the various Local Districts.

SUMMARY OF COSTS.  
 (1st October, 1919, to 30th April, 1920.)

TABLE A.

	Great Britain.			England and Wales.	Scotland.	
	£	s.	d.	Pergallon.	Pergallon.	
Wages, including feeding and attending cows and other dairy stock, but excluding delivery and retail labour, and management ... ..	—		31,822 18 8	4·51	4·99	3·55
Food and Litter :—						
Cows—Purchased (cost delivered at the farm)	69,688	19	10	9·87	10·06	9·49
Home-grown (at market prices after deducting cost of marketing) ... ..	137,139	13	5	19·42	20·88	16·54
Grazing (at estimated cost) ... ..	3,195	10	1	·45	·61	·14
Total Foods—Cows ... ..	210,024	3	4	29·74	31·55	26·17
Other dairy stock (on same basis as above and including milk fed to calves) ... ..	40,106	10	8	5·68	5·98	5·08
Total Foods ... ..			250,130 14 0	35·42	37·53	31·25
Proportion of General Expenses allocated to milk production ... ..	—		9,142 10 2	1·29	1·47	·93
Depreciation on dairy machinery and utensils at 10 per cent. per annum, excluding butter and cheese-making utensils ... ..	—		993 2 0	·14	·16	·15
Maintenance of Herd :—						
Cows—Cost, after taking into account valuations of cows at beginning and end of period, purchases, sales, transfers, deaths, etc. ... ..	—		1,677 15 11	·24	·09	·54
Total Charges ... ..	—		293,767 0 9	41·60	44·24	36 42
CREDITS.						
Other dairy stock—Credit, after taking into account valuations at beginning and end of the period, births, purchases, sales, transfers, deaths, etc....	28,478	9	9	4·03	4·06	4·00
Manurial Values of Foods ... ..	16,787	17	9	2·38	2·62	1 91
Total Credits ... ..			45,266 7 6	6·41	6·68	5·91
Net Cost... ..			248,500 13 3	35·19	37·56	30·51
Yield of Milk ... ..				Gallons. 1,695,185	Gallons. 1,122,990	Gallons. 572,196

Note.—No interest on capital included. Management salaries included, £409 2s. 9d.

## HERD TRANSACTIONS—GREAT BRITAIN.

TABLE B.

—	Cows.			Other Dairy Stock.			—	Cows.			Other Dairy Stock.			
	No.	£	s. d.	Average Price.	No.	£		s. d.	No.	£	s. d.	Average Price.	No.	£
Commencing valuation.	5,968	235,793	13 5	£39 10s.	3,121	63,368	8 10	Sales ...	1,361	} 51,284 13 5	£37	} 1,985	} 14,741 16 9	
Number of calves born.	—	—	—	—	2,772	—	Deaths ...	77	14s.		191			10,997 14 7
Purchases ...	857	40,720	7 2	£46 19s.	187	5,159	17 11	Stock transferred out.	165		8,259 10 0			£50 1s.
Stock transferred in.	481	16,932	16 9	£35 4s.	10	235	3 10	Closing valuations.	5,713	232,224 18 0	£40 13s.	3,463	—	
Balance Credit on maintenance of stock.	—	—	—	—	—	28,478	9 9	Balance, being cost of maintenance.	—	1,677 15 11	—	—	—	
Total ...	7,316	293,446	17 4	—	6,090	97,242	0 4	Total ...	7,316	293,446 17 4	—	6,090	97,242 0 4	

Notes.—The loss by deaths included is:—

On 77 cows ... .. £ s. d. 3,233 4 10

On 23 other dairy stock ... .. 496 11 2

168 calves died.

The cost of foods for other dairy stock was (on basis of market prices) ... 40,106 10 8

The number of farms in the area is 165.

## HERD TRANSACTIONS—ENGLAND AND WALES.

TABLE C.

—	Cows.			Other Dairy Stock.			—	Cows.			Other Dairy Stock.			
	No.	£	s. d.	Average Price.	No.	£		s. d.	No.	£	s. d.	Average Price.	No.	£
Commencing valuation.	4,022	157,374	10 3	£39 2s.	2,065	39,810	5 10	Sales ...	912	} 35,949 15 9	£39 8s.	} 1,334	} 10,427 2 11	
Number of calves born.	—	—	—	—	1,759	—	Deaths ...	56	£38 1s.		254			6,694 16 7
Purchases ...	528	23,112	2 4	£43 15s.	149	4,152	1 11	Stock transferred out.	93		3,538 0 0			£39 18s.
Stock transferred in.	255	8,847	8 9	£34 14s.	1	35	0 0	Closing valuations.	3,744	149,454 7 0	—	—	—	
Credit Balance on maintenance of stock.	—	—	—	—	—	18,943	0 9	Balance, being cost of maintenance.	—	371 18 7	—	—	—	
Total ...	4,805	189,314	1 4	—	3,974	62,970	8 6	Total ...	4,805	189,314 1 4	—	3,974	62,970 8 6	

Note.—The loss by deaths included is:—

On 56 cows ... .. £ s. d. 2,256 4 4

On 20 other dairy stock ... .. 460 11 2

75 calves died.

The cost of foods for other dairy stock was (on basis of market prices) ... 27,995 6 10

The number of farms in the area is 112.

## HERD TRANSACTIONS—SCOTLAND.

TABLE D.

—	Cows.			Other Dairy Stock.			—	Cows.			Other Dairy Stock.			
	No.	£	s. d.	Average Price.	No.	£		s. d.	No.	£	s. d.	Average Price.	No.	£
Commencing valuation.	1,946	78,439	3 2	£40 6s.	1,056	23,528	3 0	Sales ...	449	} 15,834 17 8	£31 3s.	} 651	} 4,314 13 10	
Number of calves born.	—	—	—	—	1,013	—	Deaths ...	21	£65 12s.		197			4,302 18 0
Purchases ...	339	17,608	4 10	£51 19s.	38	1,007	16 0	Stock transferred out.	72		4,721 10 0			£42 1s.
Stock transferred in.	226	8,085	8 0	£35 16s.	9	200	3 10	Closing valuations.	1,969	82,770 11 0	—	—	—	
Credit Balance on maintenance of stock.	—	—	—	—	—	9,535	9 0	Balance, being cost of maintenance.	—	1,305 17 4	—	—	—	
Total ...	2,511	104,132	16 0	—	2,116	34,271	11 10	Total ...	2,511	104,132 16 0	—	2,116	34,271 11 10	

Note.—The loss by deaths included is:—

On 21 cows ... .. £ s. d. 977 0 6

On 3 other dairy stock ... .. 36 0 0

93 calves died.

The cost of foods for other dairy stock was (on basis of market prices) ... 12,111 3 10

The number of farms in the area is 53.



## AREA OF LOCAL DISTRICTS.

TABLE E.

		No. of Farms.	No. of Town Dairies.	Total.
ENGLAND AND WALES.				
<i>Northern Area.</i>				
Group 1.	Northumberland, Cumberland, Westmoreland, Durham ...	11	—	11
" 2.	Yorkshire ... ..	8	1	9
" 3.	Notts, Derby, Leicester, Rutland, Lincoln .. ...	6	—	6
" 9.	Salop, Staffs and Warwick ... ..	8	—	8
" 11.	Anglesey, Carnarvon, Denbigh, Flint, Merioneth, Montgomery	6	—	6
" 12.	Lancashire and Cheshire ... ..	5	1	6
		44	2	46
<i>Southern Area.</i>				
Group 4.	Lincs, Hunts, Beds, Herts, Northants, Cambs, Essex, Norfolk, Suffolk.	8	—	8
" 5.	Kent, Surrey, Sussex, Middlesex, Wye ... ..	11	1	12
" 6.	Hants, Berks, Bucks, Oxon ... ..	13	—	13
" 7.	Cornwall, Devon, Dorset ... ..	11	—	11
" 8.	Somerset, Wilts, Glos., Worcester, Hereford ... ..	10	—	10
" 10.	Monmouth, Glamorgan, Carmarthen, Pembroke, Cards., Brecknock, Radnor.	12	—	12
		65	1	66
SCOTLAND.				
Group A.	Dumfries, Kirkcudbright, Wigtown ... ..	8	—	8
" B.	Ayr, Lanark ... ..	9	—	9
" C.	Penfrew, Dumbarton, Bute, Argyll, Stirling ... ..	9	1	10
" D.	The Lothians ... ..	4	2	6
" E.	Fife, Kinross, Clackmannan, Perth, Forfar, Kincardine ... ..	9	1	10
" F.	Seaboard from Aberdeen to Inverness ... ..	9	1	10
		48	5	53

TABLE OF LOCAL DISTRICTS

TABLE I

No. of Parishes	No. of Inhabitants	Name of District
11	11	...
8	8	...
3	3	...
3	3	...
0	0	...
0	0	...
43	43	...
8	8	...
13	13	...
13	13	...
11	11	...
10	10	...
12	12	...
40	40	...
8	8	...
9	9	...
19	19	...
3	3	...
10	10	...
10	10	...
48	48	...

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