Agricultural Economics Department

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ECONOMICS OF COMMERCIAL EGG PRODUCTION

by

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The Agricultural Economics Department is indebted to the farmers who gave of their time and provided the information upon which this survey is based. We are grateful for their interest and co-operation.

The two lower photographs on the cover are by courtesy of the Farmers Guardian.

SUMMARY

1. The report covers information on costs, returns, profits and physical requirements obtained from fifty-nine poultry flocks in the North West for the accounting year ending September 30th, 1960.

2. Comparisons have been made with the results of earlier surveys to indicate changes in standards of production.

3. The battery system was more profitable on average than the deep litter system. The free range system incurred a loss, on average.

4. There was a wide range in the individual results, particularly in the deep litter group.

5. Variations in margins between farms were mainly influenced by differences in yield and feed coversion rates. Average yields were 213 (B.), 190 (D.L.) and 154 (F.R.) eggs per bird.

6. By changing to the more labour saving systems of housing and increasing the size of their flocks, co-operating farmers have nearly succeeded in counteracting the continuous increase in the unit cost of labour.

7. The retention of a flock for a second year is not considered worthwhile.

8. Savings in the cost of production through bulk buying and economies of scale were achieved by owners of large flocks.

9. Hybrid flocks tended to be more profitable than non-hybrid flocks, but both types showed a fairly wide range in the individual results.

10. Owners of free range flocks tend to sell a higher proportion of eggs retail at the farm gate, than owners of intensively housed stock.

THE ECONOMICS OF EGG PRODUCTION

The Sample

The information for this study was collected from 59 flocks kept on farms in Lancashire, Cheshire, Shropshire and Staffordshire. Each farm account relates to the twelve months ending September 30th 1960, but comparisons have been made with earlier surveys made by this department, where this is considered to be of particular interest.

Since the main purpose of the investigation was to examine the more important relationships in the economy of egg production and also to compare the relative merits of the three main systems of housing, the sample has been divided into three main groups of Battery, Deep Litter and Free Range flocks.

TABLE I

Distribution of Flocks by Size and System of Housing

System of Housing - Average Number of Birds per Flock	Battery	Deep Litter	Free Range
0 - 100	-	-	2
100 - 250	4	6	3
250 - 500	7	7	1
500 - 1000	7	6	3
1000 - 1500	9	-	-
1500 - 2000	1	1	-
2000+	2	-	-
Total Number	30	20	9
Average Size of Flock	871	489	327
≠(Average Size of U.K. Flocks according to system of housing)	761	210	93

≠ Source - British Egg Marketing Board

During the past 15 years there has been a trend in the U.K. towards the intensive systems of housing, and recently it is evident that there has been a shift of emphasis from the deep litter to the battery system.* After the war many farmers broke with the traditional free range system and they changed to the deep litter system. This did not involve a great deal of capital expenditure since existing buildings could be readily converted to this system of housing. The battery system offers more control over the management of a flock, and farmers appear to be ploughing back the profits made on the deep litter system in the past, into purchasing battery cages. Nevertheless a high proportion of the national flock is still kept on deep litter.

It is becoming increasingly difficult over the years to obtain records of the free range system, partly because of the change to the intensive systems and partly because most of the farmers who still keep their flocks on free range tend to be traditionally minded and disinterested in keeping records. This accounts for the small sample of free range flocks, but it has been included since a fair proportion of the national flock is still kept on free range, and the results are therefore of interest.

The distribution of the flocks by size and method of housing is shown in Table I. The sample is considered to be reasonably representative of commercial egg production in the North West but it does not claim to be representative of the poultry industry as a whole. The average size of the flocks is larger than is generally found in the poultry industry, because the sample probably contains a higher percentage of specialist poultry farms.

Costs, Returns and Profit Margins

The average costs, returns and profit margins per bird and per dozen eggs are set out in Table II. The results, of the surveys made in 1953/54, 54/55 and 55/56, are also averaged and entered to indicate changes which have taken place in recent years. It should be noted that only the costs and

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* R. Coles - Development of the Poultry Industry

Table II

Average Costs, Returns and Profit Margins Per Bird

System of Housing	Battery	Deep Litter	Free Range	Average 1953/54 54/55, 55/56
Costs	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Purchased Feedingstuffs	1 13 11	1 12 6	1 8 2	1 14 0
Home Grown "	2	1 9	2 3	2 4
Total "	1 14 1	1 14 3	1 10 5	1 16 4
Labour	7 2	6 10	10 0	6 11
Livestock Depreciation	10 2	8 5	7 7	7 8
Miscellaneous	1 5	10	8	1 2
Deadstock Depreciation	2 4	9	7	1 6
Total Costs	2 15 2	2 11 1	2 9 3	2 13 7
Returns				
Market Eggs	3 0 7	2 15 2	2 2 7	3 2 6
Eggs to House	8	1 1	2 9	2 1
Miscellaneous	8	3	0	1
Total Returns	3 1 11	2 16 6	2 5 4	3 4 8
Margin	+ 6 9	+ 5 5	- 3 11	+ 11 1
	Per Dozen Eggs			
Costs				
Feedingstuffs	1 11	2 2	2 4½	2 4¼
Labour	5	5¼	9¼	5½
Livestock Depreciation	7	6¼	7	6
Deadstock Depreciation and Miscellaneous	2	1	1¼	1¾
Net Costs	3 1	3 2½	3 10	3 5½
Returns	3 5½	3 6½	3 6½	4 2
Margin	+ 4½	+ 4	- 3½	+ 8½
Number of Flocks	30	20	9	179
Average Yield	213	190	154	185

returns of the laying flocks have been included. Pullets reared as additions and replacements to the laying flock during the year have been valued at 16s.0d. per pullet (15s.0d. for the 1953-56 results).

Table II shows that the battery group is more profitable than the deep litter group but there has been a tendency for these two systems to alternate in profitability from year to year, and the evidence suggests that there is very little difference in profitability between the two systems over the years in which the survey has been running.

The free range system is usually less profitable than the other systems, largely because of much lower yields. It is noticeable that eggs and culls to the farm house are very much higher for this system, and it is likely that many free range flocks are only retained on farms to serve the traditional function of supplying the needs of the farmer and his family, any surplus eggs being sold and kept as "pin money" by the wife as a reward for her unpaid labour.

The distribution of profit margins by system of housing is set out in Table III. It is perhaps of more interest than the average profits shown in Table II in that it indicates the range of profits or losses made within each group.

The wide range in the results reflects the importance of management, particularly in the deep litter group. It is much easier to manage a flock in battery cages and this is reflected in the narrower range of results for this system. Two-thirds of the flocks on free range made losses, and one-third made losses even when family labour was not charged. Farmers who keep these inefficiently managed flock should consider changing over to the more intensive systems of housing or giving up poultry keeping altogether. The overall picture for 1959/60 shows that 25 per cent. of the flocks made losses, whereas only 10 per cent. incurred losses in the 1953-56 surveys. The table shows that high profits are not necessarily associated with a particular system of housing but are the result of efficient management, although it is obvious that good management is difficult to achieve under free range.

TABLE III

	Distribution of Profit Margins per Bird Number of Flocks			Distribution of Profit Margins as Percentage of Total Number of Flocks in Survey	
	Battery	Deep Litter	Free Range	1959/60 %	1953-1956 %
Losses					
20s. - 15s.	-	1	-	2	-
15s. - 10s.	1	-	2	5	1
10s. - 5s.	2	1	2	9	4
5s. - 0s.	-	3	2	9	5
Profits					
0s. - 5s.	8	5	2	25	16
5s. - 10s.	8	5	1	24	19
10s. - 15s.	9	3	-	20	24
15s. - 20s.	2	-	-	3	15
20s. - 25s.	-	-	-	-	10
25s. - 30s.	-	2	-	3	5
30s. +	-	-	-	-	1
				100%	100%

Factors Influencing the Cost of Production

Feedingstuffs

Feedingstuffs is the most important item of cost for it accounts for 65 per cent of the net cost of production. The relationship which it bears to the egg returns is therefore of the utmost importance to profitable egg production.

Since the 1954 Price Review, the guaranteed price of eggs during any one year has been linked to the cost of a standard ration of feedingstuffs. Any movement of the latter is accompanied by an adjustment to egg prices so as

to leave the ratio more or less constant. But this does not mean that the ratio will be the same for all farms, for the average price of eggs will differ between farm and farm depending upon seasonality of production, the distribution within the weight grades, and the proportion of eggs sold retail and to the packing stations. The results of this study also reveal considerable differences in the cost of feed per cwt., depending upon the components and the form in which it is purchased.

The average cost of feed varied from £1.7s.10d (Deep Litter) to £1.15s.7d (Battery) per cwt. There was also a wide range in the amount fed per bird, from 94 lbs. (Battery) to 152 lbs. (Battery) and in the total cost per bird £1.5s.6d (Battery) to £1.19s.11d (Battery). Clearly there is considerable scope for improvement on farms showing a high cost of feed per bird when this is not accompanied by a high egg return.

Some comparative standards relating feed intake and costs to egg output and returns are shown in Table IV. The feed cost per cwt. for battery flocks is usually higher than the cost for deep litter and free range flocks, because owners of these flocks tend to purchase pellets which are more expensive than mashes and they incorporate less home grown or purchased corn in the ration.* Battery flocks cannot make up deficiencies in the ration by foraging which helps owners of free range flocks to keep down the cost of feed per bird. Battery flocks therefore need to, and usually do, yield a few more eggs per cwt. in order to cover the extra unit cost of feed.

Efficiency in the use of feed is one of the most important determinants of the over-all relative efficiency of production between farms and between systems of housing. The feed conversion rate is probably the best measure of efficiency in this respect. Clearly the battery system is the best system, on average, as far as feed conversion is concerned for 1.2 fewer pounds of feed are needed to produce one dozen eggs than are needed by the deep litter system. (It is likely that there is more waste of food on the deep litter system since the food can easily become mixed with the litter, whereas any waste in the battery system is very soon detected). Although the unit cost of food is the

* Home grown feed has been charged at the market price, but even so its use in the ration tends to reduce the cost per cwt.

TABLE IV

Standards of Feeding and Performance

System of Housing	Battery	Deep Litter	Free Range
Purchased feedingstuffs as percentage of total feedingstuffs	99.5%	94.9%	92.6%
Home grown feedingstuffs as percentage of total feedingstuffs	0.5%	5.1%	7.4%
Feed intake per bird (lbs)	118	123	112
Egg yield per bird	213	190	154
Feedingstuffs conversion rate(lbs) (lbs. feed to produce 1 dozen eggs)	6.6	7.8	8.7
Average cost feedingstuffs per cwt.	£1.12.6	£1.11.3	£1.10.4
Number of eggs to cover cost of feed per bird (at the average price of eggs sold by each system)	117	115	101
" " " (at 3/6 per dozen for each system)	117	117	104
Number Eggs to cover cost 1 cwt feedingstuff	112	105	101
" " " (at 3/6 per dozen for each system)	111	107	104
Egg return/feedingstuff cost margin per bird	£1. 7.2	£1.2.0	£0.14.11
Egg returns per £100 feedingstuffs	£180	£164	£149

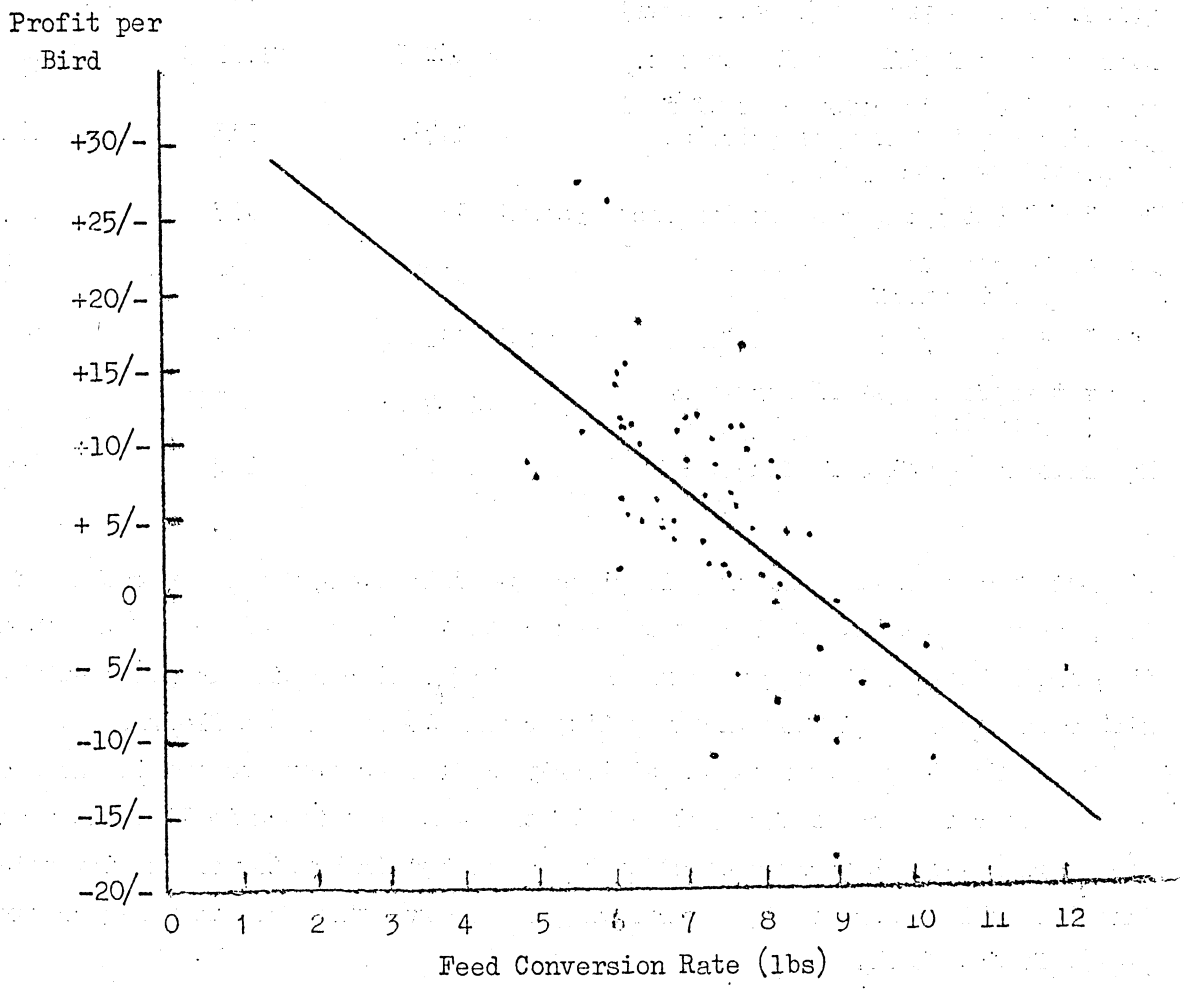
highest for the battery flocks, it gives the highest egg returns per £100 of food consumed because of the better feed conversion rate. Even more important the margin between the egg returns and the feed cost per bird is substantially higher than the margin for the deep litter and the free range flocks.

The deep litter system similarly shows a greater economy in the use of food over the free range system. If the size of a flock is limited by one cause or another there is a considerable advantage in housing on the intensive lines for this leads to higher profits per bird and therefore to a higher total profit from a flock.

The Relationship between Feed Intake Yield and Profit per Bird.

Since eggs constitute practically the total output of a commercial laying flock (the value of the culled birds being set off against the cost of replacements), and feed amounts to about 65% of the net costs, it is obvious that the level of the egg yield and efficiency in the use of feed are the main determinants of profit per bird. (Graph No. I).

Feed Conversion Rate and Profit per bird



$Y = 36.6 - 4.3X \quad r = -0.66 \quad r^2 = 0.44$

Significant at 99% level.

The results of the survey indicate that there is a wide range in the amount of food consumed, and in the level of the egg yields, and in the relationship between these two factors. The relationship is further complicated by the use of different breeds and strains of birds and in variations in the standard of management from farm to farm.

The composition of the food also plays an important role in determining the quantity of food consumed per bird. Specially manufactured high energy rations are available today which are tailored to the requirements of high yielding stock. High yields are usually associated with strains of the light breeds, and therefore this type of stock should not be fed bulky food which might limit the bird's egg laying capacity. Certainly the ad-lib method of feeding is recommended for all breeds which are housed intensively, for restricted feeding will reduce the potential egg yield per bird.* Morris and Jennings state "The implication of these results is that it is quite unrealistic to speak in terms of any fixed quantity of food as 'adequate' or 'inadequate'. The important question is how much of a particular food a flock will eat if given unlimited access to it. Restriction of food intake below this level is likely to lead to a reduction in egg yields unless the restriction applied is very mild. It may be that, with some of the high energy diets now available in this country, $4\frac{1}{2}$ ozs. of food per day is adequate for most flocks; but this is no justification for limiting the birds' access to food."

It is always difficult in a study of this kind, where conditions are not under the control of the research worker, to identify and measure all the factors which are responsible for a given relationship. For this particular study it is possible to measure feed input and egg output, both in physical and money terms, but it is impossible to value the capacity of the birds between farm and farm. This is particularly important in comparing hybrid and light breeds with heavy stock, since the feed conversion of the former is usually better than the latter.

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* Morris and Jennings, Agricultural Review. Vol.II No. III

But the indications are the producers who keep high yielding strains also pay close attention to feeding them accurately and housing them well, but it is impossible to discover how much of the higher yields which they attain can be attributed to the strain of bird or close attention to feeding, although there are indications that the hybrid flocks attain higher yields than the pures or first crosses. (None of the hybrid flocks yielded less than 180 eggs per bird, whereas 10 of the 36 "X"s flocks yielded less than this).

TABLE V

Feed Conversion Rates. Battery and Deep Litter Flocks Only

F/s Conversion	Feed Conversion* per Bird					
	Below 5 lbs.	5.1-6.0	6.1-7.0	7.1-8.0	8.1-9.0	9.1 & over
Battery Flocks	2	1	7	8	2	-
Deep Litter Flocks	-	2	2	7	7	2
Yield per bird	248	241	219	195	172	166
Feed Intake(lbs)per bird	102	115	118	123	121	135
	£ s d	£ s d	£ s d	£ s d	£ s d	£ s d
F/s cost per bird	1. 9. 3	1.11. 8	1.14. 4	1.14. 9	1.13. 4	2. 0. 1
Egg returns per bird	3. 4.11	3.11. 2	3. 2. 3	2.18. 3	2.11. 8	2. 8. 3
Egg returns @ 3/6d per dozen	3.12. 4	3.10. 4	3. 3.11	2.16.11	2.10. 2	2. 8. 5
Margin. Egg returns @ 3/6d per dozen/ F/s cost per bird.	2. 3. 1	1.18. 8	1. 9. 7	1. 2. 2	16.10	8. 4
Percentage Hybrid flocks	100%	66%	46%	36%	0%	0%

* Number lbs. to produce 1 dozen eggs.

The sample is not large enough to reach any more finite conclusions. All that one can assume from the data is that managers who kept high egg laying strains and who fed them appropriately obtained a higher margin of egg returns

over feed cost per bird. Table V shows that the largest economies are achieved by the best feed converting stock and that this is closely related to high yields and hybrid stock.

Feeding on the Free Range System

The sample of free range flocks is too small to yield more than tentative conclusions. But past surveys have indicated that the housing and management conditions are such as to prevent the higher yielding strains of birds from responding fully to an increased input of feed. Indeed, it might be said that to feed birds to capacity on free range, unless it is designed to alter the seasonality of egg production (which also requires artificial lighting) is to defeat the principles on which the system is based, namely that birds should supplement the ration by foraging over fields or stubble. This system requires an active strain of bird which will forage well and reduce the intake of hand fed foods.

Methods of Reducing the Cost of Feedingstuffs.

The relationship between the egg returns and the feed cost is obviously affected by the unit prices paid for feed. Provided that farmers can reduce the unit cost of feed without changing its quality, it is clearly to their advantage to do so.

There are four ways which they may seek to achieve this end.

(a) Bulk Buying

Purchase in bulk does not affect quality in any way at the time of purchase, but there are dangers of deterioration during storage. For this reason owners of small flocks quite rightly buy in small quantities, but they incur a penalty by doing so. Savings due to bulk buying can lead to a considerable reduction in the cost of feed per cwt. and it is one of the many arguments in favour of large scale production. Owners of the large flocks in the survey made a saving of 2s.5d. per cwt. over the owners of the small flocks. The farmers in the survey used a wide variety of types of feed. If they had

all used the same kind of feed the saving would probably have been higher than this.

(b) Mashes v. Pellets

Recent experiments* have shown that pellets have no advantage over a mash of the same composition, and that two groups of pullets from the same strain, one being fed pellets and the other mash, will average the same yield provided that the ad-lib method is practised. At the same time the pullets which consume pellets will average a higher feed intake per bird, admittedly with a greater gain in body weight, than the mash fed pullets. When either feed is suited to a particular system of housing, mash should be chosen rather than pellets because a saving of from 6d - 1s. can be made in the cost of feed per cwt.

If there is a limit to the feeding time, such as the automatic cafeteria battery system, pellets should be fed, for the laying bird can consume more pellets in a limited period of time than dry mash. Pellets are very convenient for the free range system particularly during windy weather when mash is liable to be wasted. Pellets, being more palatable, are also useful as a supplementary ration to dry mash to provide interest for the birds. Dry mash is particularly suited to the deep litter and wire floored system where the problem of vice prevention is an important aspect of management, and any lengthening of the time of feeding should be encouraged.

(c) Home Mixing

The evidence from past surveys supports the view that a considerable economy in the unit cost of feed is achieved by farmers who compound their own rations from straights. The number of farmers who mix their own rations, has diminished in the surveys during the past few years which is perhaps an indication of the recognition by many farmers that this is a skilled job which

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* Relative Merits of Pellets and Mashes for Laying Birds. Morris & Jennings Agricultural Review Vol.III, No.II

might well be left to the experts unless there is time and equipment to do the job properly. Certainly in the past there was a wide variety in the results achieved from home mixing.

TABLE VI

Home Mixed Feedingstuffs

	Flock A	Flock B	Flock C	Average
Feed Intake	116 lbs.	94 lbs.	114 lbs.	108 lbs.
Yield	225	203	170	199
F/s conversion	6.2 lbs.	5.6 lbs.	8.0 lbs.	6.5 lbs.
	£ s d	£ s d	£ s d	£ s d
F/s cost per cwt.	1. 9. 5	1.10. 6	1. 8.10	1. 9. 7
F/s cost per bird	1.10. 8	1. 5. 6	1. 9. 2	1. 8. 5
Egg returns per bird	3. 3. 3	2.16. 9	2. 8. 8	2.16. 3
Margin egg returns/ F/s cost per bird	1.12. 7	1.11. 3	19. 6	1.17.10
Margin egg returns @ 3/6 per dozen/ F/s cost per bird	1.15. 0	1.13. 9	1. 0. 5	1. 9. 7
Profit per bird	15. 0	10. 3	7	8. 7
Breed	Hybrids	Hybrids	"X"s	

Only three of the owners of the flocks in the survey mixed their own food. Two of them achieved extremely good results, but the third flock showed a poor feed conversion rate which may indicate that the ration was imperfectly balanced. It is of interest to compare the results achieved by the three flocks as shown in table VI.

(d) Incorporating Corn in the Ration

Earlier surveys made by this department showed that, provided producers who included corn in the ration fed slightly more per bird in quantity than those who did not, the resultant yield would be broadly similar. But Table VII which compares the results of hybrids and "X"s consuming varying

proportions of grain, shows that this no longer holds true for all flocks. This is not altogether unexpected because the modern hybrid bird has been bred for its high yielding and high feed converting capacity. But since it is a small bird with a limited capacity to ingest feed it requires to be fed on a high energy ration in order to attain its full laying capacity. A high

TABLE VII

Flocks fed Pellets and Mashes only, and Flocks Fed Varing Proportions of Corn

	Pellets + Mashes only	Pellets + Mashes & under 3% corn	Pellets + Mashes & 3-20% corn	Pellets + Mashes & over 20% corn
		"X"s		
Feed Intake per bird	121 lbs	120 lbs	129 lbs	123 lbs
Yield per bird	219	194	200	191
F/s conversion	6.6 lbs	7.4 lbs	7.7 lbs	7.7 lbs
Margin - Egg returns/ F/s cost per bird	£1.8.1	£1.1.6	£1.1.5	£1.2.2
Number Flocks	10	4	8	12
		Hybrids		
Feed Intake per bird	109 lbs	126 lbs	119 lbs	112 lbs
Yield per bird	220	237	188	183
F/s conversion	5.9 lbs	6.4 lbs	7.6 lbs	7.3 lbs
Margin - Egg returns/ F/s cost per bird	£1.12.7	£1.13.9	£1.1.10	£1.1.10
Number of Flocks	6	3	1	2

proportion of grain with a high fibre content will clearly limit its egg yielding potential. Certainly the hybrid flocks which were fed a high proportion of grain did not produce as high yields as the hybrids fed on mash and pellets alone. The "X"s which were fed on mashes and pellets also produced a higher yield. It is also interesting to observe that the flocks which were

fed a high proportion of grain averaged no worse a feed conversion rate than the 3 - 20% group. It may be that lower yielding stock responds as well to a low energy ration as to a high energy ration but it would certainly need more data than is available in this survey to support this theory. All that can be assumed from the data, at this stage, is that flocks which were fed on pellets and mash only, averaged a very much better yield and feed conversion rate, and averaged a higher margin between the egg returns and feed cost per bird than the flocks which were fed a high proportion of grain.

Labour

Labour accounts for about 13 per cent of the net cost of production and it is the third most important item of cost. By changing to the more labour saving systems of housing, increasing the size of their flocks, and improving on the layout of their houses and equipment, farmers have nearly succeeded in counteracting the continuous increase in the unit cost of labour each year. The cost of labour, therefore, on a per bird basis has not shown as marked an increase as it might have done if the systems of management had remained static. The average number of hours per bird, for example, was 3.2 hours in 1953/54 whereas it is 2.1 for this year.

Measures of the average productivity of labour in relation to type of housing are given in Table VIII. Although the battery and deep litter flocks show the same average number of hours per bird, it should be observed that the average size of the battery flocks is nearly double that of the deep litter flocks.

The productivity of labour in the two systems depends in part upon the size of the flock and upon the degree of mechanisation. For the smaller flocks in the survey (around the 500 bird size) the deep litter flocks showed a distinct advantage over the battery system, the number of man hours per bird being about 2.2 per annum compared with nearly 2.8 for similar sized battery flocks. This is a saving of about 300 man hours per annum or, more important,

it would enable the deep litter system to operate with roughly one-quarter more birds for the same total input of labour. Although profits per bird (excluding labour) were lower for deep litter than for the battery flocks the advantage of being able to keep more birds for a given amount of labour meant that total profits earned would be greater for the deep litter system. For this size of flock the relative advantage of the two systems from the viewpoint of labour use would be reversed only if the relative egg yields under the two systems departed considerably from the actual yields attained in the survey.

TABLE VIII

Labour Productivity

System of Housing	Battery	Deep Litter	Free Range	Surveys 1954,'55,'56
Cost of hired labour per bird	1s.2d	1s.7d	1s.4d	1s.7d
Cost of family labour per bird	6s.0d	5s.3d	8s.8d	5s.4d
Labour as % net cost	13.0%	13.4%	20.3%	12.9%
Number of hours per bird	2.0	2.0	2.8	2.7
Profit per bird (excluding labour cost)	+13s.11d	+12s.3d	+6s.1d	+18s.0d.
Egg returns per £100 labour	£855	£823	£453	£934

As flocks get larger the relative labour economy becomes less marked. The labour requirement of the battery flocks of about 1000 birds was 1.3 hours per bird, as against 1.4 for similarly sized deep litter flocks. In these conditions, and bearing in mind the profit advantage (when profits are calculated excluding labour) of the battery system, the higher total profit for a given input of labour is achieved under the battery system.

The free range system is very unsatisfactory from the labour standpoint, because more labour is required per bird than for the other systems, and at the same time it suffers from a disadvantageous egg yield, the egg returns per £100 labour being nearly half the returns of the battery system.

Intensive egg production is probably the most factory like operation of any farm enterprise. The labour involved consists of mostly such repetitive work as feeding, egg collecting, cleaning and watering. It therefore offers many opportunities for the application of work study* methods which will either reduce the amount of labour required for a certain size of flock, or increase the size of flock for the unit of labour which is available.

Opportunities for work study in egg production are probably most effective on specialist farms or large one man units. There is evidence in the survey that some specialist producers were not fully utilising the labour which was available, i.e. the flocks were not large enough in relation to the quantity of labour which was used. If full economy had been achieved in the use of the labour, the size of the flocks and therefore the total margin of profit could have been increased considerably on many of the farms. But it is possible that some of the farmers may have been prevented from expanding their flocks through lack of capital.

Family labour accounts for a very high proportion of the total labour in egg production, and it is often an important factor in determining a farmer's choice of poultry keeping as a sideline on a mixed farm. It is also doubtful if many small flocks would be kept if family labour was not available. Table IX, which shows the distribution of family income (i.e. profit plus family labour charge) emphasises the importance of family labour, for it shows that the number of flocks which made losses when all the labour was charged, has been appreciably reduced.

The relationship between the size of flock and the labour cost is important in determining the labour cost per bird. Very substantial economies are achieved by large flocks and Table X shows how the number of hours per bird decreases as the size of flock increases, the number of hours required by the 0 - 200 group being double that of the 1000+ group. The small flocks are mostly mixed farm flocks where labour often appears to be under employed.

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* C. Tetlaw. A Planned Approach to Capital Outlay. W.P.S.A., U.K. Branch April 1961.

Table IX

Distribution of Family Income per bird

System of Housing	Battery	Deep Litter	Free Range	Distribution as % Total Flocks'59/60	Distribution as % Total Flocks'54:55:56
Losses					
10/- - 5/-	-	1	1	2%	1%
5/- - 0/-	2	1	2	9%	3%
Profits					
0/- - 5/-	1	4	1	10%	9%
5/- - 10/-	6	5	2	22%	12%
10/- - 15/-	13	5	2	34%	18%
15/- - 20/-	5	2	1	14%	25%
20/- - 25/-	-	-	-	-	15%
25/- - 30/-	3	1	-	7%	10%
30/- - 353-	-	-	-	-	4%
35/- - 40/-	-	1	-	2%	2%
40/- +	-	-	-	-	1%
	30	20	9	100%	100%

Table X

Size of Flock and Labour Hours and Costs per Bird

Battery and Deep Litter Flocks only

Size of Flock	0 - 200	200 - 300	300 - 500	500 - 1000	1000+
Hours per Bird	2.7	2.7	2.1	1.8	1.3
Labour Cost per Bird	*8/6	8/10	7/7	6/7	4/9

* High proportion Women's labour.

Capital Invested in Poultry and Equipment and the Rate of Return on Capital

Poultry farming in company with any other agricultural activity normally operates with some degree of capital rationing. There are cases where the limit to the size of the flock or the type of system operated is imposed by labour availability. But in many ways, capital and labour are substitutes for each other in that the investment of capital will affect labour productivity and hence the size of flock which can be operated by a given labour force. Capital, like any other resource has its cost and poultry men may have difficulty in acquiring it. It is therefore important that the rate of return on capital in the different systems be calculated as an aid to decision making.

In the early post-war tendency towards the intensive systems of poultry keeping, the deep litter system gained a great deal in popularity precisely because of its relatively low demand for capital for housing and equipment in comparison with the battery system. This was particularly true of the change over of small flocks from the free range system to housing on deep litter in existing farm buildings which would otherwise be unused or for which the alternative use was of low value. This system also had the added advantage, for small flocks, of being very economical in the use of labour thus allowing of a high rate of return on labour and capital combined.

A comparison of the capital investment in the three systems covered by this survey is contained in Table XI. It demonstrates the relatively low investment required in the deep litter system compared with batteries under the average conditions obtaining on these farms. It also shows the relatively higher rate of return on capital with deep litter.

For several reasons, however, these comparisons can only be tentative. Since they are based upon the written down value of capital in housing and equipment, the age of the investment has an important effect upon the current valuation of capital and, hence, upon the rate of return. It is also true that some of the deep litter housing and a smaller proportion of the battery

Table XI

Capital Invested in Houses, Equipment and Livestock per Bird

System of Housing	Battery	Deep Litter	Free Range
	£ s d	£ s d	£ s d
Laying houses & equipment	12. 9	11.10	10. 6
Cages	13. 8	-	-
Rearing houses & equipment	4.10	4. 4	3. 7
Livestock	15. 5	14. 1	13. 7
Total	£2. 6. 8	£1.10. 3	£1. 7. 8
Range in capital invested in laying houses & equipment	10/3 to 66/3	1/10 to 32/3	6/5 to 15/5
Return on capital invested (inc.livestock)	+14%	+18%	-14%
Range in return on capital invested	-16% to +47%	-32% to +126%	-45% to + 18%
Return on capital invested in laying houses & equipment	+26%	+46%	-28%
Return on capital invested in laying and rearing houses & equipment	+22%	+34%	-37%
Return on capital invested (Labour cost excluded)	+30%	+40%	+22%

housing was in the form of existing farm buildings, otherwise unused and for which an objective valuation was, in any case, difficult. However, subject to these reservations, they do indicate the relative possibilities for those farmers who are still operating the unremunerative free-range system to change over to one or other of the intensive systems.

The importance of correct housing cannot be over-emphasised. It is likely that the wide range in the capital values of the flocks in the survey partly accounts for the wide variation in the margins of profit which is reflected in the wide range in the returns on the capital invested in the flocks. If a flock is not well housed then the maximum returns cannot be obtained from the

birds. The control of ventilation and insulation in old farm buildings can be very difficult. This aspect of management is particularly important for some lighter breeds which tend to be more subject to stress and strain than heavier breeds.

The wide range in capital values is also an indication that some of the houses were not being fully used. In some cases the houses were only half full. This may have been due to a high mortality rate in the pullet flocks being reared as replacements, or a high mortality rate in the laying flocks, or poor planning on the part of some of the farmers. Under-utilisation of housing places a heavy burden on the fixed costs of production and reduces the potential returns from a flock at the same time.

TABLE XII

[1]Estimated Amount of Capital Required to Purchase New Houses and Equipment

	500 birds		1500 birds		3000 birds	
	Deep Litter	Batteries[2] Hand operated	Deep Litter	Batteries[2] Automatic	Deep Litter	Batteries[2] Automatic
Capital Invested						
Housing Equip. (inc. Batteries)	23/-	28/-	20/-	26/6	18/-	23/6
Rearing Equip.[3]	9/-	9/-	8/3	8/3	7/6	7/6
Livestock	15/-	15/-	15/-	15/-	15/-	15/-
Total Inv. at Current Cost	47/-	52/-	43/3	49/9	40/6	46/-
Profits[4]	2/7	5/1	5/1	7/8	7/3	10/-
Return on Capital Invested in L'st. & Equip. %	5.5%	9.8%	11.8%	15.4%	17.9%	21.7%

1. The cost varies considerably between different manufacturers of houses and equipment.
2. Three birds per cage.
3. Two batches of pullets reared per annum.
4. Labour adjusted for reduction in cost of production due to economies of scale of production.

Where completely new housing and equipment has to be purchased for the battery or deep litter system of production, the return on the capital invested tends to favour the battery system regardless of scale of production. It should also be remembered that for large flocks in the region of 2000 birds or over the deep litter system also loses some of its labour economy, in that difficulties of handling with unskilled labour become progressively greater with the result that yield and returns suffer or greater expenditure has to be incurred on more skilled labour.

As a guide to the relative economy of the two systems under conditions of complete replacement of both housing and equipment Table XII has been compiled.

Livestock Depreciation

The livestock depreciation cost is gradually assuming more importance over the years. In 1953/54 it accounted for 13% of the net cost of production and it was less important than the labour cost, but it now accounts for 18% of the net cost of production.

The relationship between the livestock depreciation cost and profit is not as clearly defined as, for example egg yield and profit, because the livestock depreciation cost itself is the result of the relationship between a number of factors. These are:-

1. The cost of rearing replacement pullets, or the price of point of lay pullets, if purchased.
2. The mortality rate.
3. The price of culls.
4. The proportion of first and second year birds in the laying flock
5. The culling rate.

The Cost of the Pullet

In order to achieve a major saving in the cost of replacing the laying flock each year, most farmers rear their own pullets instead of purchasing them at point of lay.

The home reared pullets for all the flocks in this survey have been valued at 16s.0d. each in order to reduce variation in the individual flock results, which arose partly out of differences in the efficiency of rearing the pullet flocks. If the actual cost of rearing had been entered for each flock, the importance of the saving achieved by the low cost rearers would have been patently obvious. Conversely it would have shown that the high cost rearers would have increased their livestock depreciation costs proportionately.

Pullets purchased at more than 21s.0d. each are unlikely to yield a margin of profit, unless they are very high yielding birds. Recently, some farmers have specialised in the sale of point of lay pullets at prices which are more in line with the cost of rearing. Where farmers are limited either by capital or more particularly by labour, the purchase of pullets may be considered to be worthwhile provided that they are reasonably priced and that the grower has a sound reputation for his stock.

Mortality Rate

It is rather surprising to find that despite the improvement in systems of housing and management, the mortality rate of laying flocks shows no signs of diminishing over the years.

Free range flocks generally have very much higher mortality rates than flocks which are housed intensively (Table XIII). Battery flocks usually achieve a lower rate than deep litter flocks, because it is easier to cull birds in cages than on litter. Although Table XIII shows that the value of free range flocks on a per bird basis is lower than the value of intensively housed flocks (because the latter contain a higher proportion of first year birds), the higher mortality rate associated with free range flocks militates against this

initial advantage and causes the loss from mortality to be the highest for free range flocks.

TABLE XIII

Mortality Rate and Losses

System of Housing	Battery	Deep Litter	Free Range
Value initial flock per bird	15s.5d	14s.4d	13s.7d
Mortality Rate %	13.3%	14.6%	19.9%
Value of initial flock lost through mortality (per bird)	2s.0d	2s.1d	2s.8d
Estimated loss per bird for a full year (including potential egg returns less cost of feed if bird died at beginning of laying season)	£2.3s.3d	£1.16s.7d	£1.8s.6d

The greatest loss incurred by a high mortality rate is the bird's potential egg production less the cost of feed. The earlier a bird dies the higher this loss will be. Table XIII indicates the loss which would have occurred if a bird had died at the start of the laying season. The higher the potential egg yield the higher the loss will be, and since the intensive systems tend to average the highest egg yields the loss is usually greatest for these systems.

The Price of Culls

The livestock depreciation cost is generally higher than it was in earlier years because of the fall in the price of culled birds. This has been caused by the rapid growth of broiler production, which has resulted in strong competition for the market in poultry meat.

The price of culls for individual flocks depends upon a complex of factors, namely - local demand, seasonal demand, the weight and the variety of the birds, first and second year birds, and whether they are sold retail or

wholesale. Owners of large flocks tend to be penalised as far as retail sales are concerned unless the flocks are evenly culled throughout the year. But owners of small flocks can often arrange to sell their birds to local customers at the retail price. Battery birds usually obtain a premium over the price of deep litter or free range birds.

TABLE XIV

Average Price of Culls

System of Housing	Battery	Deep Litter	Free Range	Surveys 1954,'55,'56.
	£ s. d	£ s. d	£ s. d	£ s. d
October	8. 8	8. 4	8. 4	9. 9
November	7. 9	8. 0	7.11	9. 7
December	10. 0	8.11	9. 1	10. 8
January	8. 4	7.10	9. 0	9.10
February	8.10	8.11	8. 0	9. 1
March	8.11	8. 5	7.10	9. 0
April	9. 2	8. 7	8. 6	9. 8
May	9. 0	8. 8	8. 4	9. 3
June	9. 8	8. 7	7. 4	9. 3
July	9. 4	8. 5	8. 7	9. 7
August	9. 1	9. 1	8. 7	9. 4
September	9. 5	7. 7	7. 6	9. 1
Average Price of culls	8.10	8. 3	8. 5	9. 1
Highest average price for an individual flock	14. 1	11. 5	10. 0	1. 4. 2
Lowest average price for an individual flock	6. 7	5. 9	7. 2	3. 0

The combination of a low mortality rate and the sale of culls at the farm gate at the retail price can make a considerable saving in the cost of livestock depreciation and consequently upon the margin of profit.

The Proportion of First and Second Year Birds in a Laying Flock

The higher the proportion of second year birds, the lower will be the value of the capital invested in a laying flock, and therefore this will tend

to reduce the cost of livestock depreciation. But the retention of a flock for a second laying season is not considered to be worthwhile for the intensive systems of poultry keeping, because the saving in the cost of livestock depreciation is more than compensated by the much higher egg yields associated with first year birds.* In any case, second year birds are usually graded as second quality birds and they therefore obtain a lower price when they are culled. This aspect of management is also related to the price of eggs which is dealt with more fully in the egg returns section of this report.

The Culling Rate

The effect of the culling rate is masked by the price of culls, the proportion of first and second year birds, and the mortality rate. A low culling rate, for example, may not necessarily reduce the livestock depreciation cost for it may be the result of a high mortality rate. A high culling rate, on the other hand, may be associated with a high price for culls which would reduce the livestock depreciation cost.

In general, the culling rate depends upon the replacement policy. The intensive systems usually have a high culling rate, whilst the free range system, which tends to retain a high proportion of second year birds, tends to maintain a low culling rate.

The decision to cull depends upon a number of factors, the most important being the estimated future egg production of a flock (or bird), less the cost of feedingstuffs, plus any further depreciation of the price of culls (assuming that all the other costs are fixed). If a flock (or bird) is covering these costs then it will contribute to the total margin of profit of the flock.

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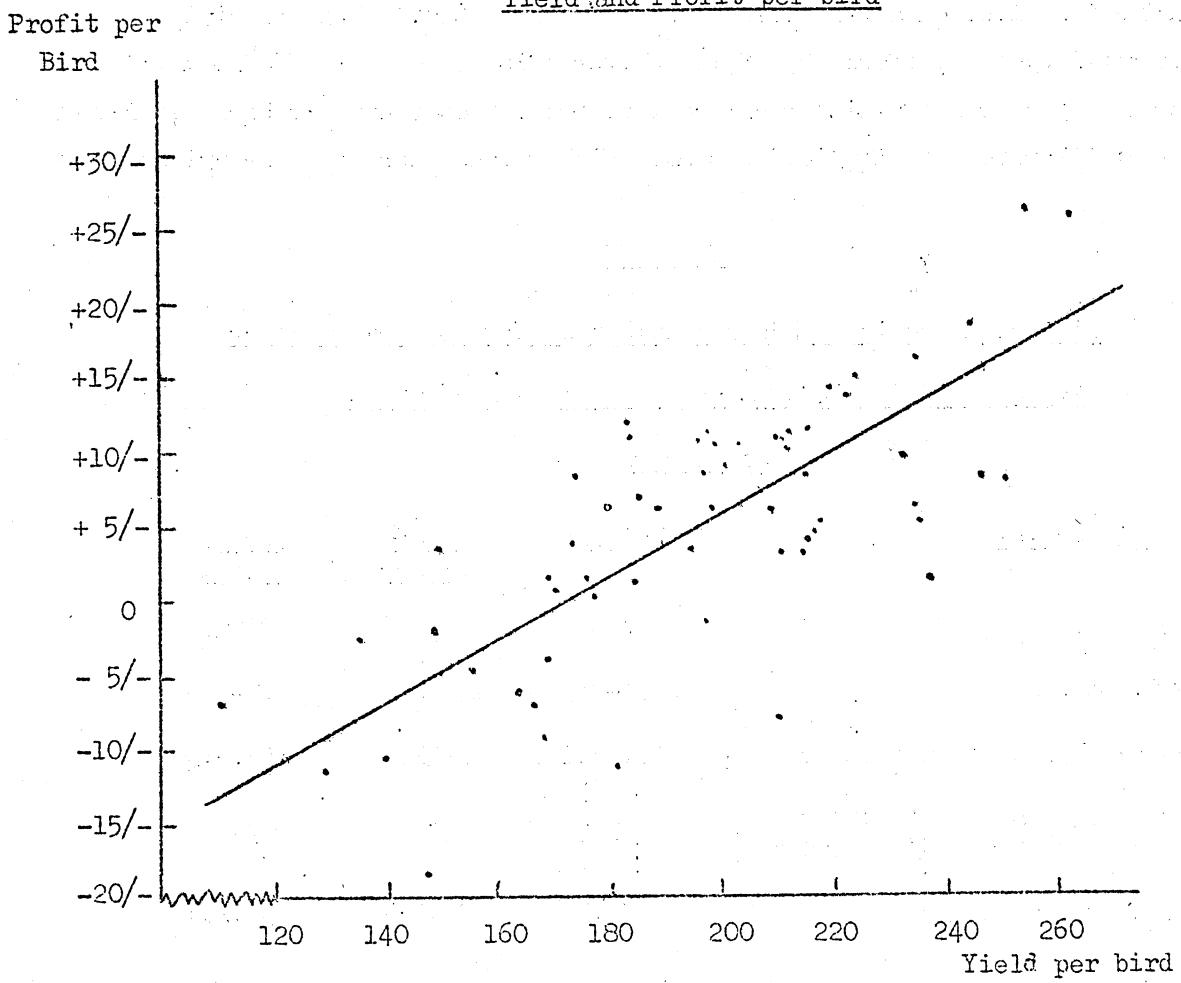
* D.I.S. Richardson. - The Relative Merits of Replacing a Laying Flock at the end of the First Year rather than the end of the second year of Production. W.P.S.A., U.K. Branch April, 1961.

Factors Influencing the Returns from Egg Production

Yield

Yield is the most important factor which determines the extent of the profit to be made from egg production. The relationship between yield and profit is seen in Graph No. II. Despite differences in breed, systems of housing and standards of management it is clear that high profits are associated with high yields.

Yield and Profit per bird



$Y = -35.66 + 0.21X \quad r = 0.79 \quad r^2 = 0.62$

Significant at 99% level.

The lower yields, and hence the lower profits tend to be associated with the free range system. The higher yields are associated with the battery system, but some deep litter flocks also achieve very high yields. Greater control over a flock is exercised by the battery system, but it is evident that a high standard of management of deep litter flocks can result in equally high profit margins.

The relationship between yield and the net cost of production is also very important, for the higher the yield the lower will be the unit cost of production (i.e. on a per dozen eggs produced basis). This point is demonstrated by the performance of the battery flocks. Table XV shows that although they averaged a higher net cost of production (on a per bird basis) than the deep litter flocks, the yield was much higher, and therefore the unit cost of

TABLE XV

Yields, Range in Yields and Number of Eggs needed to cover Net Cost of Production, and cost of producing a dozen eggs

System of Housing	Battery	Deep Litter	Free Range
Average yield	213	190	154
Range in yield	151-249	149-264	113-186
Net cost of production per bird	£2.15.2	£2.11.1	£2.9.3
Number of eggs needed to cover net cost per bird (@3/6 per dozen)	189	175	169
Net cost per dozen eggs	3s.1d	3s.2½d	3s.10d

production of eggs was lower for the battery system. The same test can be applied to the production of eggs by individual flocks.

The Price of Eggs and the Seasonal Pattern of Egg Production

Although the annual producer price of eggs is determined at the February Price Review and producers are paid for their eggs at prices fixed by the B.E.M.B. through the packing stations, individual farmers can obtain a higher than the average annual price of eggs by the following means:-

a) Maximum production during the high price season.
b) Sales to packing stations supplemented by retail sales at the farm gate.
c) Retail sales in conjuntion with existing milk round, or independent egg round. Sales to shops (this involves payment of a levy to the B.E.M.B.).
d) Egg bonuses from packing stations. Group production.

Although, over a period of years there has been a tendency for egg prices to start rising earlier in the year, the seasonal pattern of egg prices does not vary a great deal from year to year. Farmers are fairly secure in the knowledge that they can expect the price of eggs to begin to rise in April/May, to reach a peak in November, and to fall rapidly after December to its lowest point in February/March.

To achieve a high average price for the year as a whole requires that a high proportion of eggs are laid at the high priced periods. A number of the farmers who owned intensively housed flocks achieved a close coincidence of high production with high monthly prices but a number failed to get their flocks into lay early enough to take full advantage of the high price season. Free range flocks cannot attain maximum egg production during the high price season because the houses are not generally lit up during the winter months. Peak egg production takes place during the spring and summer months. Even though the price of eggs is low during this time of year, the free range flocks

should not be culled during the spring and summer months, since, despite the low egg price, the returns are at their highest during this period.

The other factor which affects the average price of eggs for the full year for individual flock owners, is the relationship between the price of eggs in the four weight grades at varying times of the year, and the pattern of egg production within the weight grades of a flock from point of lay to the end of the laying season. The margin between the price of large and small eggs is usually narrowest during February/March, when the price of large eggs is very high.

Egg production of a laying flock usually follows a prescribed pattern, for small eggs predominate at the start of the laying season, whilst large eggs predominate until the end of the laying season. Consequently, if a flock is to obtain the highest possible average price for all the eggs which will be produced during the year, the best time to bring pullets to point of lay for a twelve month laying season is during the March/April/May period, because advantage can then be taken of the relatively favourable price of small eggs in relation to the price of large eggs during the peak period of small egg production, and at the same time peak production of large eggs will take place during the season of the year when the price of large eggs is at its highest, and when the margin between the price of large eggs and small eggs is at its widest point.*

The size of the eggs laid at the beginning of the laying season may be improved by the decreasing light pattern system of pullet rearing.*1 Pullets reared by this system lay a higher percentage of large eggs early in the year, and of the total eggs produced. At the same time a lower mortality

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* This theory has been more fully developed in "The Relative Merits of Replacing a Laying Flock at the end of the First Year rather than at the end of the Second Year." D.I.S. Richardson. W.P.S.A. 1961. The grading of eggs laid by pullet flocks was related to the monthly price of eggs for flocks starting the laying season at monthly intervals throughout the year. The highest egg returns (and therefore the highest average price for eggs) was achieved by flocks starting to lay in March/April. The lowest price was made by flocks starting to lay in November.

*1 Morris and Fox. The Use of Lights to delay Sexual Maturity in Pullets. Poultry Science Vol I No.I.

rate tends to be associated with this system of rearing. The restricted method of feeding* pullets to point of lay also increases the percentage of large eggs laid and reduces the mortality rate. Both these systems, by delaying artificial sexual maturity, prevent precocity in pullets which is associated with the laying of small eggs at the start of the laying season.

Heavier birds lay a higher proportion of large eggs, but they do not generally lay as many eggs, and they consume more feed in the process. (see section Hybrids and First Crosses).

There are various means available to individual farmers, therefore, to improve upon the average price of all eggs sold within the U.K. during any given year.

Retail Sales

Some farmers sell at the farm gate at the retail price either all, or a proportion, of the eggs which are produced by their flocks, in order to achieve a higher income than would be possible if all the eggs were sold to the packing stations. Since the price of eggs has fallen heavily during recent years this practice has increased, particularly on farms which are situated near to a busy road.

Owners of small flocks are in an advantageous position in this respect, for it is easier to sell all the eggs retail if they are produced on a small scale, than it is if they are produced on a large scale, because clearly this market is limited. If all the eggs produced by a flock were sold at the retail price, then the average price per dozen would amount to about 4s.0d, whereas if only a quarter of the total production were sold retail then the average price would be about 3s.7½d per dozen. The extra returns, if all the eggs were sold retail would therefore amount to 6s.4½d per bird (at a yield of 17 dozen eggs per bird). Selling eggs at the door increases the amount of labour which is needed to deal with customers, and it is only usually possible where willing family labour is available. It is also an advantageous way of

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* Gowe et alia. Restricted versus full feeding for egg production stock. Poultry Science Vol. I, No. I.

selling cracked and small eggs instead of sending them to the packing station.

Table XVI shows that owners of free range flocks sold a much higher proportion of the eggs at the retail price, which resulted in a higher average price for all eggs sold. Owners of free range flocks are able to take advantage of the public image that free range eggs are "superior" to battery or deep litter eggs. (Table XVI indicates that the battery eggs sold retail made a lower price than the free range eggs.) Various methods were used for fixing the retail price. Usually they were sold from 6d to 9d above the packing station price, or the price in the shops. Other farmers preferred to sell them at an even price throughout the year. Others sold only small, medium and cracked eggs at the door, and sent standard and large eggs to the packing station.

TABLE XVI

Packing Station and Retail Price of Eggs.
% Eggs sold Retail and to Packing Station

System of Housing		Battery	Deep Litter	Free Range
Eggs sold Retail	as % Total	14%	16%	29%
Eggs sold P. Station	Eggs sold	86%	84%	71%
Av. Price Retail Eggs per dozen		3s.11d	4s.0½d	4s.0¼d
Av. Price Eggs sold to P. Station		3s.4¾d	3s.5¾d	3s.4¼d
Av. Price All Eggs sold		3s.6d	3s.7d	3s.7¼d

Owners of large flocks usually obtain a higher bonus from the egg packing stations than owners of small flocks. They are given this benefit because of the saving in the cost of "pickups" and the general overheads of packing stations.

Further savings were made by some farmers by maintaining a high standard of management through the production of clean eggs.

First and Second Year Flocks*. Egg Returns and Replacement Policy.

Some farmers retain their flocks for a second laying season in the belief that this will yield a higher income because second year birds lay a higher proportion of large eggs than first year birds, and because of the saving in the livestock depreciation cost.

Whilst it is true that a bird will lay a higher proportion of large eggs in its second year of production, it will not lay a greater number of large eggs and will certainly lay fewer eggs in total. Although the average price of eggs per dozen laid by first year flocks will be lower, the higher egg yield of these flocks will more than compensate for this disadvantage, so that the total egg returns of a flock in its first year of production will usually be higher than the returns of a second year flock. (If a second year flock moults during the high price season, in fact, there may not be a great deal of difference in the price). It should also be remembered that the quality of eggs laid deteriorates as a bird ages, which will further tend to militate against the retention of a flock for a second year.*1

There is certainly a saving in the cost of livestock depreciation, but this is often exagerated, because against the saving in the cost of rearing has to be set a lower price for the culled bird.

One argument which is put forward in favour of keeping a flock for a second laying season is the contention that replacing completely each year reduces the size of the laying flock because of the demands of labour and accommodation for rearing which would otherwise have been employed in a larger flock, and that there is a loss in the total profit by having fewer birds than would otherwise be possible. This increase in the size of flock which a reduced rearing programme makes possible is often over emphasised. Even if on the extreme assumption that every additional pullet reared requires a reduction

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* The argument in favour of replacing by the annual system is more fully developed in:- D.I.S. Richardson. The Relative Merits of Replacing a Laying Flock at the end of the first year rather than at the end of the second year. W.P.S.A. 1961

*1 Mueller, Maw & Buss. The influence of season, and the age of layers on egg weight, shape index, albumen quality and shell thickness. Poultry Science Vol. XXXIX No.4 July 1960.

of one mature bird in the laying flock, the increase in the size of the latter which would be possible by biennial rather than an annual replacement is only $\frac{1}{3}$ i.e. for every 100 birds replaced annually it becomes possible to keep 133 birds replaced on a two year basis. Since it is unprofitable in any case to retain birds for a second laying season, there is little point in keeping a larger flock if half the flock is unprofitable.

TABLE XVII

Comparison of Performance of 1st Year Flocks and 1st + 2nd Year Flocks

	Pullet Flocks Only	Pullet + Hen Flocks
Number of Flocks	17	42
Average Number of birds	620	674
% Hens (Initial Flock)	0	31%
Average yield	227	184
Feed Intake	124 lbs.	117 lbs.
Av. price all eggs sold	3s.5¾d doz.	3s.6¾d doz.
" " packing station eggs	3s.4½ doz.	3s.5¼d doz.
" " retail eggs	4s.2¼ doz.	3s.11¼d doz.
% sold retail (number)	11%	19%
% sold packing station	89%	81%
Mortality rate	15%	15%
Returns from eggs	66s.1½d	53s.0½d
Price of culls	9s.2d.	7s.9d
Profit per bird	8s.9d	3s.1d

Earlier surveys have shown that flocks which contained either second year birds entirely, or a proportion of second year birds were less profitable than pullet flocks. Table XVII, which compares the performance of pullet flocks, and flocks which contained both hens and pullets (or hens only) confirms this trend, for it shows that the pullet flocks were more

profitable because of the much higher yield. They also averaged a higher price for the culls. The average price of all the eggs sold was only one penny less than the price of eggs sold by the pullet + hen flocks. The price of packing station eggs sold was only ¾d lower. It is noticeable that the owners of pullet + hen flocks sold a higher percentage of eggs retail. They possibly intended to sell a high proportion of large eggs because of consumer preference for large eggs, and they retained their flocks for a second year in the mistaken view that this would return a higher income. The solution to this problem would appear to be the purchase of heavier birds which lay large eggs, and to replace them annually.

"Hybrids" and "Non-hybrids"

An increasing number of farmers are purchasing "hybrid" birds instead of the more conventional pures and first crosses, and Table XVIII is included to show the performance of hybrid and non-hybrid stock in the flocks in the Survey. (It should be noted that only three of the flocks in the deep litter sample contained hybrid stock.)

The hybrid flocks were more profitable, on average, because of the higher yields and better feed conversion rates, which also resulted in a lower net cost of production both on a per bird and per dozen eggs produced basis. The slightly lower price of eggs produced by the hybrids and the lower price for culls was compensated by these factors. Indeed the difference in the price of eggs was not as high as is commonly supposed.

None of the hybrid flocks made losses whereas three of the battery and five of the deep litter non-hybrids made losses.

Both types of flocks showed a rather wide variation in the results, but the non-hybrid flocks showed a rather wider range, particularly in the yields and the feed conversion rates. Some of the flocks achieved very high yields, in some cases as high as the best hybrid yields. In fact the most profitable flock in the battery sample contained non-hybrid stock. (16s.2d per bird, 246 yield.)

TABLE XVIII

Hybrids and Non-hybrids.

	Battery				Deep Litter			
	Hybrid		Non-Hybrid		Hybrid		Non-Hybrid	
Number of Flocks	11		19		3		17	
	£ s. d		£ s. d		£ s. d		£ s. d	
F/S Cost per Bird	1 11 7		1 15 6		1 13 6		1 14 4	
L. Depreciation	10 8		9 10		6 1		8 10	
Labour	5 7		8 0		5 2		7 2	
Miscellaneous and D.D.	3 6		3 10		9		1 9	
Net Cost	2 11 4		2 17 2		2 5 6		2 12 1	
Market Eggs	3 0 3		3 0 9		3 0 3		2 14 3	
Eggs-house	5		9		1 5		1 1	
Miscellaneous	9		7		-		3	
Returns	3 1 5		3 2 1		3 1 8		2 15 7	
Profit per Bird	+ 10 1		+ 4 11		+ 16 2		+ 3 6	
Average Size Flock	1204		677		505		486	
Yield	217		211		210		186	
Range in Yield	188-249		151-246		183-264		149-255	
F/S Intake (lbs)	112		122		118		124	
F/S Converstion	6.2		6.9		6.7		8.0	
Range F/S Conversion	4.9-7.6		6.1-8.3		6.0-7.6		5.6-10.2	
Net Cost per doz.	2/10		3/3		2/7¼		3/4¼	
F/S Cost per doz.	1/9		2/0¼		1/11		2/2½	
% Eggs Sold Retail	16%		13%		24%		14%	
Average Price All Eggs Sold	3/4¾		3/6¾		3/6½		3/7	
Average Price P.S. Eggs	3/3¾		3/5½		3/4½		3/6	
Average Price Retail Eggs	3/10¼		3/11¾		3/10		4/1	
Average Price Culls	7/8		9/5		8/6		8/3	
% Hens (I.F.)	10%		10%		30%		32%	
Mortality Rate (I.F.)	13.6%		13.1%		13.7%		14.8%	
Number Losses	0		3		0		5	

The wide range in the results of the non-hybrid flocks indicates that there is plenty of first class non-hybrid stock available, but that farmers have to exercise care in choosing the best source for their replacement stock. It also indicates the need for an independent commercial random sample test for commercial stock, so that the owners of commercial flocks can judge for themselves which is the best stock available.

The merits of hybrid stock, apart from high yields and good feed conversion rates, appear to be uniformity and reliability from year to year and within each consignment of stock. A further saving is found in the cost of rearing since hybrid pullets generally require less food to point of lay than non-hybrid stock.

Advantages of Large Scale Production

One of the main advantages of large scale production is that farmers can purchase goods in bulk. By these means they can achieve a saving in the unit costs of production since they are allowed a substantial discount on purchases. The greatest saving is made in the unit cost of food, and since it accounts for 65% of the net cost of production, this can make a considerable saving on the cost side of production.

Secondly a substantial saving can be made in the labour cost, since economy in the use of labour is achieved by large flocks. Thirdly there is the saving in the cost of rearing, which is related to these two factors, and which results in a reduction in the cost of livestock depreciation. Manufacturers of poultry houses and equipment also generally give a special rate of discount to farmers who buy large units.

There is generally no relationship between the size of flock and egg yields, therefore there is no advantage in the egg returns. But owners of large flocks are usually paid a higher egg bonus by the packing stations because of the saving in transport and overhead costs of collection.

Owners of large flocks, therefore achieve a considerable saving in the costs of production.

Owners of small flocks housed in an existing farm building achieve a saving in the cost of housing. They can also sell a high proportion of the eggs which are produced at the farm gate and thus increase the egg returns. Many small flocks are kept by unpaid family labour, therefore the labour cost may be discounted for these flocks. The labour for large flocks is usually paid labour and is an inescapable cost of egg production on a large scale.

Table XIX shows that the large flocks in the survey were generally more profitable than the small flocks, but that a useful margin of profit can be made by small flocks provided that the yield is high.

TABLE XIX

	Small Flocks		Large Flocks	
Size of Flock	0 - 200	201-500	1001-1500	1500 +
Number of flocks:-				
Battery flocks	2	9	9	3
D.L. flocks	1	12	-	1
Hybrid flocks	0	5	4	3
Non-hybrid flocks	3	16	5	1
Av. cost F/s per cwt.	£1.12.7	£1.11.7	£1.12. 4	£1.10.5
Av. cost labour per bird	8s.6d	8s.5d	4s.6d	5s.2d
Av. price culls	9s.5d	8s.8d	8s.10d	7s.4d
Av. yield per bird	* 225	202	208	198
Net cost per doz.	* 3s.0d	3s.2¾d	2s.11¾d	3s.0d
F/s cost per doz.	* 2s.0d	2s.0¾d	2s.0d	1s.10¾d
Av. price eggs sold	3s.7¾d	3s.6¾d	3s.6d	3s.5¾d
Pullet rearing cost	16s.7d	16s.4d	14s.10d	14s.5d
Profit per bird adjusted for Pullet rearing cost	* 9s.5d	5s.11d	9s.10d	10s.1d

* High yielding flocks.

Characteristics of High Profit Flocks and Flocks which made Losses

Table XX is included to indicate the characteristics of the more profitable flocks and the flocks which incurred losses. The reasons for the wide margin in the results of the well managed and badly managed flocks are clearly shown in the table.

TABLE XX

Comparison of Performance of High Profit Flocks and Flocks which incurred Losses.

System of Housing	Battery				Deep Litter			
	Profits over 10/- per bird		Flocks with Losses		Profits over 10/- per bird		Flocks with Losses	
Average Size of Flock	981		395		450		459	
Costs per Bird	£ s. d		£ s. d		£ s. d		£ s. d	
Food Stuffs	1 12 5		1 16 5		1 13 4		1 16 2	
Labour	6 2		9 3		6 3		7 7	
L. Depreciation	8 5		13 0		8 0		8 5	
Miscellaneous and D.D.	3 8		5 3		1 1		1 11	
Net Cost	2 10 8		3 3 11		2 8 8		2 14 1	
Returns								
Market Eggs	3 2 5		2 13 10		3 4 5		2 7 1	
House Eggs	10		9		1 4		1 0	
Miscellaneous	5		6		2		1	
Returns	3 3 8		2 15 1		3 5 11		2 8 2	
Profit or loss	+ 13 0		- 8 10		+ 17 3		- 5 11	
Yield	216		185		217		166	
F/S Conversion	6.4		7.8		6.7		9.1	
Average Price Eggs Sold	3/6¼		3/7		3/8		3/6	
Average Price P.S. Eggs	3/4¼		3/5¾		3/6		3/5¼	
Net. Cost per dozen	2/10		4/1¾		2/8¼		3/11¾	
F/S Cost per dozen	1/9½		2/4½		1/10		2/7	
Retail Sales %	26%		14%		18%		6%	
% Hens (I.F.)	9%		20%		23%		54%	
Mortality Rate (I.F.)	10.9%		15.0%		18.5%		14.2%	
Number Hybrid Flocks	6		0		3		0	
Number Non Hybrid Flocks	5		3		2		5	

Definition of Terms and Standard Charges used in Compilation of Costs

1. Feed. Purchased feed was charged at actual cost paid by farmers. Home grown feed was charged at estimated market value.
2. Labour. Hired and unpaid family labour was charged at the hourly statutory rate, with an allowance for overtime earning, holidays with pay, and employers share of National Insurance. (Male workers 3s.11d per hour. Female workers 3s.0d).
3. Home Reared Pullets. Transferred into laying flock at 16s.0d each. Purchased pullets entered at purchase price.
4. Deadstock Depreciation. Houses depreciated at 5%. Equipment at 10%.
5. Eggs consumed in farmhouse. Valued at 3s.0d per dozen.
6. Average size of flock. Average of the monthly average number of birds in the flock each month.
7. Average yield per bird. Total eggs laid divided by average flock.

Standard appendix

Year ending September 30th 1960

Laying flocks

Average costs and returns per bird and per dozen eggs

Per bird								
Costs			lbs	£	s.	d	£	s. d
(A) Foods	(a) Purchased		114¾	1	12	6		
	(b) Home Grown		4¼		1	0		
	Total Foods		119				1	13 6
			hrs					
(B) Labour	(a) Hired		0.4		1	4		
	(b) Family		1.7		6	2		
	Total Labour		2.1					7 6
(C) Livestock depreciation								9 2
(D) Deadstock depreciation								1 6
(E) Miscellaneous (net)								8
Total Costs							2	12 4
Returns - Eggs	(a) Market		eggs 192	2	16	0		
	(b) Used in farmhouse		4		1	1		
Total returns			196				2	17 1
Margin							+	4 9

Per dozen eggs	s.	d.
Total Returns	3	6
Total Costs	3	2½
Margin	+	3½

Number of flocks	59	
Average size of flock	658	birds
Average length of flock season	52	weeks
Average yield per bird	196	eggs