

around the farm. Also, the price of hens gradually descends from August to Thanksgiving so that there is a gain in market value of several cents per bird by selling in August rather than late fall.

The average percentage egg production for eight farm flocks during a part of the year is as follows:

Month	Average Per Cent Egg Production
June	37
July	34
August	34
September	21
October	13
November	9

This table shows a rather sudden drop in egg production from August to September indicating that the poorer layers have begun their molt and resting period and should be culled at this time.

Another important factor for Extension men to consider is the influence of feeding on the application of certain culling methods. In the Middle West it is a common practise for farmers to quit feeding their hens in May or June. Some continue to feed grain, usually corn, but many of them feed no mash or animal food from early summer to late fall. This "method" of feeding is based on the notion that hens will "pick up their living" on the farm during the summer months and the necessary protein is supplied by worms and bugs. While it is true that hens will "pick up their living" on these farms it is equally true that they must have something more than a mere living if they are expected to lay well. Records of such farm flocks show that, in practically every case, the flock production was around ten per cent in August. These same birds showed by their skin color and new plumage that they ceased laying soon after the feed was cut off. If farmers had culled them strictly on their characteristics seventy-five per cent would have been marketed. While there was a need for some culling in such a flock, by far the greatest need was good feeding. The culling of these flocks by Extension workers was largely governed by housing capacity and number of early hatched pullets available. Finding such a condition on many farms over the State, opportunity was never lost to urge proper feeding at culling demonstrations.

Occasionally flocks fed scantily during the summer would have access to a harvested wheat field where an abundance of shattered grain was available. This would temporarily bring the flock into normal productiveness. Such flocks showed bright yellow shanks and extremely early molting. It seems reasonable that those found in laying condition under such circumstances should be

retained.

Another problem which confronted field workers was the culling of breeds with white skin or flocks of mixed breeds where such breeds as Rhode Island Reds and Buff Orpingtons had been used in the cross. In such cases the application of color tests could not be considered. Although there were were fewer tests to go by, there was little difficulty in picking the culls. In one flock of Langshans it was noticed that the culls had a readily distinguishable yellow pigment at the base of the beak.

Broodiness was often to be reckoned with. A hen which had just weaned chickens and returned to productivity would show color characteristics of a poor layer, as would be expected. Such a bird could hardly be called a cull hen else she would not have come back into laying condition at that season. Her normal egg production had merely been suspended by broodiness. Then too there is the hen which is broody at the time of culling. We have no experimental data that fall broodiness indicates a good producer but it seems reasonable that such would be the case since a hen must lay before going broody and therefore late broodiness would indicate late laying which generally indicates a good producer.

The idea which the writer of this paper desires to leave is that Extension workers, in states where the farm poultry flock is the objective, should make clear to farmers the interpretations to be placed on the various tests under different seasonal, feeding and other exceptional conditions. The feeding factor should be emphasized along with culling.

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DAILY VARIATION IN FLOCK PRODUCTION.

In Relation to Certification of Egg Records.

Some satisfactory method of certified hen and flock records will no doubt be evolved in time. There are certified cow records, certified potatoes, certified oranges, certified this and that, and there should be certified egg records. Honest breeders are entitled to this protection, and the buying public demands it. The poultry industry needs it. We are all agreed, I think, as to this. The question is, how can it be accomplished?

The purpose, I would say of certifying egg records is a double one. First to encourage good breeders of high class laying stock, and second to protect the public as well as the industry against unscrupulous persons who make misleading claims as to the quality of their

stock. In no other agricultural industry, is there greater opportunity for fraud as in this matter of selling fowls with egg records. On the other hand, in no other agricultural industry probably, is there greater opportunity for getting results quickly and surely in breed improvement.

The poultry industry lags because of a lack of sufficient breeding stock of good laying qualities. There are two reasons for this. Breeders were not able until within the past dozen years to keep accurate trap-nest records, and many of them do not yet appreciate the importance of it. Second, the farmers and poultrymen who purchase stock to improve their flocks were not properly advised how to get it.

We have the laying contests. Their value can not be over-estimated. Their chief value, however, is not in certification of egg records.

The Experiment Stations are helping by sending out pedigreed males, and eggs for hatching from pedigreed, trap-nested stock. But the supply from this source is totally inadequate. If the state were to establish breeding farms in several sections of the state, this might solve the problem, but the cry would go up, that private breeders would be destroyed. This is one way, however and a fairly sure way of solving the riddle.

Another plan is for the state in some way to supervise the breeding farms so as to see that the breeding business is carried on legitimately. If this is to be the plan, what will be the requirements? Will it be certification of annual trap-nest records of individual hens, or will it be certification of flock records?

One way to have the trap-nest records certified would be for the Agricultural Colleges to turn out students who would do the work. A good breeder with a considerable flock could well afford to pay the usual wages for a young man who would work under the supervision of the poultry department of the College, following about the same system on which the cow testing associations are conducted, or if the poultry departments could provide a surplus of students, it might be required that students before graduating should spend a few months on a practical poultry farm, and do the trap-nesting. Breeders should be glad of some such arrangements.

I want to bring to your attention now a plan for certifying flock records by a weekly count of eggs. The method is

simply to count the number of eggs laid by the flock once a week throughout the year, and then multiply the total by seven. I have just finished tabulating a number of flock records for the purpose of noting variations in production from day to day of flocks of different sizes. The tabulation shows a remarkably close approximation to actual production records, as taken every day. A once-a-week count for the year, when multiplied by seven, and then divided by the number of hens in the flock comes within a few eggs of the actual annual production.

In one flock of 195 hens the difference between the estimate, and the actual production varied from about two less than the actual to three eggs above the actual. The actual production was 188.08 eggs per hen. The highest estimated production was 191.1, and the lowest estimated 186.01. When all the Sunday eggs were counted, and then multiplied by seven, and then divided by the number of hens in the flock, we got an average per hen of 187.9, just .18 egg less than the actual production. The Monday count shows a production only .32 egg more than the actual production. Tuesday 2.07 less than the actual, Wednesday .89 more than the actual. Thursday 3.02 eggs more than the actual, Friday 1.68 eggs less than the actual. Saturday .38 eggs less than the actual. This amounts to an accuracy in percentage ranging from 98.5 to 99.9. With smaller flocks the differences were greater. The larger the flock, of course, the more accurate. With flocks of about one thousand, the difference should be very small between the actual production, and the weekly count of eggs.

Estimating annual production of a flock by counting eggs once a week and multiplying by 7.

Actual Production 195 hens. 36676.
Average 188.08.

It seems to me that this opens up a way for getting certified flock records. The high flock record, after all, means more than a few high record hens in the flock. We may get a three-hundred-egg hen in a flock averaging 100 eggs, but a flock that averages 175 or 200 is well-bred. That is the place to go to buy good stock. A man with such a flock, if he uses high record, trap-nested males can keep up the production of the flock even though he never uses trap-nests. Of course in any scheme of

Sunday	x 7.....	36645	Average	187.90	- 0.18
Monday	x 7.....	36743	Average	188.40	+ 0.32
Tuesday	x 7.....	36274	Average	186.01	- 2.07
Wednesday	x 7.....	36848	Average	188.90	+ 0.89
Thursday	x 7.....	37268	Average	191.10	+ 3.02
Friday	x 7.....	36344	Average	186.40	- 1.68
Saturday	x 7.....	36610	Average	187.70	- 0.38

Editorial

An organization of individuals and institutions primarily engaged in instructional, investigation and extension in poultry husbandry.

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certification the man who trap-nests his flock and weeds out the poor layers that way should have preference over the man who depends upon the males only for breed improvement.

It should be a comparatively simple matter to certify flock records in this way. The farms could be divided into grades or classes, say Class A, B, C, and so on, each class representing an average production per hen within a range of a few eggs. The certificate would show for example that Smith's farm has a rank of Class A, representing a production of 190 to 200 eggs. Probably a range of five eggs in a class would be found sufficient.

The counting and certifying to the egg production might also be done by poultry students, or other representatives of the poultry department. A man could be sent out by the departments at week ends, and stay all day at the farm, so that he would be able to certify that all the eggs counted were laid on the same day. There may be other and better ways. A man could be employed by a community of poultry breeders under the supervision of the poultry department, and give his entire time to the work, visiting a different farm every day of the week, for six days.

The same man, if competent, would be able to certify that the flock was in good condition, and that the breeding hens were mated to certified, pedigreed males of certain records.

One result of this work would be to create a rivalry among the poultrymen to improve their flocks, and raise the rating of their farms. Smith for instance is rated in class D this year; he would likely hunt the country over for the best males he could buy to see if he could not raise a flock of pullets that would put his flock in class C, or better next year. When he got his flock into

Class A, or whatever designated the highest rank, he would feel that his fortune had been made. Class A farms would be able to charge a good price for their stock. If the farmer got a lower rating one year than the previous year, he would likely begin a serious examination of the methods both of breeding and management to find out where the trouble was. The results would be decided incentive to poultry breeders to improve their methods, both of feeding and general care as well as breeding.

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RELATION OF FALL MOULT OF LEGHORN PULLETS TO MONTH OF HATCH.

Part I.

On many farms, eggs are hatched in February in order to get pullets for early fall egg production. On other farms they are hatched in April and May in order to avoid a fall moult in pullets.

From the records kept for three years of Leghorn pullets at Purdue University the indications are that the month of hatch is not necessarily the limiting factor for fall moult of pullets.

Beginning October 1, 1916 for the first year and continuing every two weeks until all the pullets had finished their moult, observations were made of fifty-four pullets. Thirty-three, or 61 per cent went through a partial or complete moult. Twenty-seven of the thirty-three were March hatched. The balance, or six, were April hatched. Considering the twenty-one birds which did not moult, thirteen were March hatched and eight April hatched. On the basis of the total, fifty-four birds, 67½ per cent of March hatched birds moulted and 42.8 per cent of April hatched birds moulted.

Second Year

In 1917 thirty-seven birds were observed. Thirty-three or 89 per cent went through a complete or partial moult, taking an average of 7.9 weeks.

The February hatch birds moulted 9.77 weeks.

The March hatch birds moulted 8.18 weeks.

The April hatch birds moulted 6.28 weeks.

Nine of the thirty-three, or 27 + % were February hatched.

Fourteen of the thirty-three, or 40 + % were March hatched.

Ten of the thirty-three, or 30 + % were April hatched.

In considering the four birds which did not molt, one was hatched in February, one in March and two in April.

Third Year

In 1918, fifty-one birds were observed. Forty-six or 90 per cent moulted 8.4 weeks; twenty-eight, the March hatched birds moulted 8.4 weeks; seventeen, the