the Station records go, it has not been established that the progeny of great layers will inherit the laying propensity in equal degree. Such, at least, is the inference from a recently-compiled paper by Drs. Raymond Pearl and F. M. Surface, Biologists of the Station, who set out last year to analyze the egg-record statistics. We quote their conclusions as follows :

CONCLUSIONS REACHED FROM THE ANNUAL RECORDS.

The detailed study of the annual records, using adequate mathematical methods of analysis, leads to the following conclusions :

1. There is a large amount of variation among individual birds in respect to annual egg production. The range of variation extends from zero to approximately 250 eggs in the records of the Station. The amount of variation in regard to egg production is substantially the same at the end of the selection experiment as it was at the beginning. That is to say, after nine years of selection with respect to egg production, the birds breed no truer to a definite type of egg production than they did at the beginning. It will be recognized by every stock breeder that this is an important fact, to be taken into consideration in passing opinion on the value of the method of breeding poultry which was tried in the experiment.

2. The general trend of average annual egg production has been slightly downward throughout the course of the experiment. This is shown in the accompanying table, which gives the annual egg production for the years 1899 to 1907.

Year and pen.	Birds completed the year.	Eggs laid.	Actual average production.
1899—1900	70	9,545	136.36
1900—1901	85	12,192	143.44
1901—1902	48	7,468	155.58
1902—1903	147	19,906	135.42
1903—1404	254	29,947	117.90
1904—1905	283	37,943	134.07
1905—1906	178	24,827	140.14
1906—1907	187	21,175	113.24

It will be seen from the last column of this table that the annual average production increased during the first three years of the experiment. A second maximum was reached in 1905—1906.

It should be said that in the latter years of the experiment (from 1902 on) there occurs in all but one year some accident, which may be held to have diminished the egg production below what it should normally have been. In the detailed discussion of these figures in the complete report, the most liberal allowance possible is made for these accidents, and it is there shown that, even after making these allowances, the general trend of the line of annual averages is only horizontal. That is to say, there is no evidence of any increase in the average production of the flock.

It will be noted by those who have followed the previous reports of the Station, with reference to its poultry-breeding work, that the averages set forth in the above table do not agree with those which have previously been published. It is an unfortunate fact that the averages published in the earlier reports of this Station were in several cases in error. So far as can be learned from the records themselves, the causes of these errors fall into two categories, namely (a) faulty methods of handling the statistical material ; and (b) arithmetical mistakes. As soon as the detailed paper, of which the present discussion is an abstract, appears, it will be possible for any interested person to verify for himself the averages which are given in the above table, since in the complete paper there will be published the annual egg production of every single bird during the whole eight years for which complete records exist.

3. Another point which throws light on the value of the method of breeding for increased egg production lies in the consideration of the relative number of "drones" and of high producers in each successive year of the experiment. Defining a very poor laying hen as one which produces less than 45 eggs in its first laying year, and as an exceptionally good laying hen one which lays more than 195 eggs in its first laying year, it is found that there has been no substantial change during the course of the breeding experiment in the relative proportions of either very high layers or very poor layers in the flocks of the successive years. At the beginning of the experiment there were relatively few "drones" in the flock. The relative proportion of such has not practically changed.

4. during the last three years of the breeding experiment there was carried on in connection with it an experiment on the effect of the amount of floor space per bird and the size of the flock on annual egg production. Without going into the details of this experiment, which were entirely consistent in the whole of the three years, it may be said that it clearly appears that these factors of flock-size and floor-space have a definite and measurable effect on the average annual production. This effect is quite considerable in amount. The bearing of the results of this floor-space experiment on the breeding experiment with which we are chiefly concerned here, lies in the fact that the figures which will be given in detail in the complete paper show beyond any doubt that these environmental factors can, even after the close selection for more than five years, still cause very marked changes in the character (egg production) which it was hoped to fix in the strain by breeding. There is a considerable amount of detailed evidence, which is presented in the complete paper, all of which tends to show that the quality of high productiveness cannot be regarded as any more a fixed characteristic of the Station's strain of Barred Plymouth Rocks now than it was at the beginning of the experiment.

The general conclusion regarding the results of the breeding experiment may be quoted from the complete paper : "The practical conclusion to be drawn from the results of this breeding experiment seems to the authors to be clear. It is that the improvement of a strain of hens in egg-producing ability by selective breeding is not so simple a matter as it has been supposed to be. Nothing could be simpler than breeding from high producers to get high producers. But if this method of breeding totally fails to get high producers—in other words, if the daughters prove not to be like the mothers in egg production—it cannot fail to excite wonder as to whether the simplicity of the method is not its chief (possibly its only) recommendation. Anyone who makes a thorough, first-hand study of an extensive selection experiment, carried out, as was this one, by the so-called German method, without testing of the centgener power of the individual organisms, cannot fail to be impressed, we believe, with the fact that the improvement of a race by selective breeding is a vastly more complicated matter than it is assumed to be by those who maintain that one need only to breed from the best to insure improvement. The supposed 'facts' of heredity on which the practical stock-breeder (working for utility points) operates are, in very large part, inferences, rather than facts. What is needed more than anything else for the advancement of the stock-breeding industry in all its phases is an accumulation of definite knowledge of the fundamental principles of the hereditary process. All breeding operations must be based on the laws of inheritance in organisms. The practical stock-breeder is able to work out the applications of these laws for himself. What he most needs is broader and deeper knowledge of the laws themselves. This knowledge must come from the thoroughgoing, purely scientific investigations."

THE EXPERIMENT A SUCCESS AS AN EXPERIMENT.

It must not be concluded from what has been set forth above that the experiment in breeding for egg production is to be regarded as having failed. To draw such a conclusion is to misunderstand completely the purpose with which the work was begun. The purpose of the experiment was to find out whether high egg productiveness could be bred into a strain of fowls by the method of breeding practiced. The experiment has answered this question in the negative. There could be but one of two answers to the question. It is no more to be counted as a failure of the experiment if the answer turns out to be "no" than if it had turned out to be "yes." To have the question answered so clearly and definitely is a great gain. It clears the ground to start a new experiment to see whether another method of breeding will make it possible to breed high egg production into a strain.

Furthermore, it must not be concluded that the strain of Barred Plymouth Rocks carried by the Station is at the present time anything other than an excellent strain in respect to egg production. In spite of the fact that there is no evidence of any gain in respect to egg production during the course of the breeding experiment, the strain itself is, without doubt, an unusually good one in respect to this character. When the number of birds carried and the length of time over which trap-nest records exist are taken into consideration, it is doubtful if there is anywhere a strain of Barred Plymouth Rocks which surpasses the stock of the Station in record egg production. The stock of the Experiment Station poultry plant is unusually healthy and vigorous. None of the infectious diseases which so commonly cause serious difficulty in the operation of large commercial poultry plants has ever appeared in the Station's flocks. The small annual death rate which has existed throughout the poultry experience of the Station can only be regarded as a normal mortality for hens fed and managed for high egg production. The inherent value of the strain of Barred Plymouth Rocks with which this work has been done is attested by the almost uniform satisfaction which has been expressed by those who have bought either eggs or cockerels from the Station for the purpose of infusing new blood into their own flocks.

TEACHING CHICKS TO ROOST.

Chicks of Leghorn and other light-weight breeds will begin roosting of their own accord when six or eight weeks old. Chicks of the heavier breeds often do not roost until taught to do so by the keeper. The general practice is to keep chicks of medium-sized breeds on the floor until about three months old, and chicks of the largest breeds a month or two longer. Unless the floor is kept clean and the chicks well bedded, it is better to teach all to roost early. If suitable wide roosts are used, there is no more danger of crooked breasts than on the floor, and many poultrymen think the general advantages of getting the youngsters on the roost, where they cannot crowd and huddle in corners, and are not soiled by their own and each other's droppings, more than compensate for what keel bones are twisted.

Often chicks can be taught to roost by putting in low roosts and placing with them one or two old hens or chicks that are in the habit of roosting. If this plan cannot be tried, or does not work, a wide board should be placed close to the wall, about a foot from the ground, and the chicks placed on it after dark, night after night, until they will go to it of their own accord. After that, a wide roost, the regulation distance from the wall, may be substituted for the board.

POULTRY MITES.

Editor "The Farmer's Advocate" :

One great source of trouble to fowl, especially at this time of year, is the little blood-sucking mite. They rob the hens of their sleep and blood, and, consequently, they rob the owner of a large part of the profits hoped for. If once they become established in a coop it is a hard fight to get rid of them. Better not to let them start if possible.

Upon looking through my house at different times, and failing to find a single mite, it gives me a great deal of pleasure and satisfaction. It also prompts me to wonder why so fortunate. Of course the houses now in use are not very old (the oldest three years), yet there is no doubt that their newness is not the cause of the absence of the pest in question.

I always keep sifted coal ashes in the dust boxes all winter, and occasionally throughout the year paint the roosts with coal oil. Recently I read some poultry notes in an American farm journal. Among them was the following : "Always keep coal ashes in the hen pen and you will never be troubled with lice."

Of course the coal ashes are hard on the plumage, and the hens never have a nice red comb while they have access to them—always white and bleached looking. Nevertheless, while rolling in the ashes they raise a terrible dust, which settles into every crack and crevice. It must be the dust that prevents the vermin from lodging in the cracks.

From what I have been told by others, who have had experience along this line, I would use coal oil in an infected house. Simply spray every part thoroughly and repeat every couple of days until the pest is gone. They certainly cannot live if the oil touches them, and if coal oil is applied copiously it will touch everything near by. Besides, it is very cheap in price, in comparison with many of the prepared solutions which are less effectual.

J. R. HENRY.

Wentworth Co.

BUMBLE FOOT.

Fowls roosting on high perches sometimes injure their feet in jumping down from the roost to the floor. An abscess forms on the sole, which becomes hard and calloused, and a condition known as bumble foot, results. The disease, if neglected, may extend upward in the leg, affecting the joints, and ultimately causing death. A fowl that has once had bumble foot is of little more use. The lameness is liable to return at any time, and birds suffering once from this disorder very rarely become profitable producers again. The best way is to prevent trouble by making the roosting perches low, and all on the same level. The old-fashioned way of putting the roosts up, one above the other, like the rungs of a ladder, is the easiest way of laying things out for trouble of this kind. The hens crowd up to the top perches on going to roost, and when they come down in the morning jump from one perch to another. Hens of light-weight breeds, such as Leghorns, can make the descent every day of their lives without injury to the feet, but heavy-weights, like Plymouth Rocks, Wyandottes or Cochins, are liable to put their feet out of business by the performance; and the Scotchman's adage about the horse holds equally true with the hen, No foot, no hen.

Frequent applications of crude petroleum is a good remedy for bumble foot in the early stages of the disease. If the trouble is neglected, it becomes necessary to open the abscess by making two cuts across each other, in the form of an X. The matter is then washed out with warm water containing a little carbolic acid, and carbolated vaseline applied daily to the wound until a cure is effected. The hatchet treatment is used by poultrymen of experience, with rather more satisfactory results than any kind of doctoring.

GARDEN & ORCHARD.

TWIG BLIGHT ON APPLE TREES.

Why do small branches on my apple trees wither and die, and what should I do to prevent it ?

SUBSCRIBER.

Having no specimen from which to identify the disease, we judge the trees are affected with twig-blight, a bacterial affection, particularly destructive to the pear, but also troublesome on apple trees, and, unlike most other ailments, working its greatest injury in the best-cared-for orchards. The bacteria enter through the blossoms, and perhaps through wounds and insect punctures. Usually the terminal flowers, leaves and twigs are first killed, the plants appearing as if scorched by fire. The bark becomes black or brown, and the inner bark or cambium are destroyed. The disease progresses backward into