

pens 18 feet wide, are used for the laying stock, and colony houses are scattered over the farm to accommodate breeding stock in the spring and growing chicks throughout the summer. One pen is 145 feet long by 20 feet deep, but the other two are only 16 feet deep. Experience has shown that unless the front of the pen is high the sun will not shine to the back of a 20-foot pen. Without the sun it is difficult to keep the birds healthy. With the front 7 feet high the sun will shine to the back of a 16-foot pen. The pens are all 5 feet high at the back or north side, and are double boarded and tarpapered, giving a four-inch air space. The ends are also double boarded. The front is 7 feet high, and in each pen are two windows with sash 33 by 50 inches, and a space for cotton 3 by 5 feet, which is closed only at nights and on very windy days. These pens are 18 by 16 feet and accommodate 80 hens. Partitions between pens are solid out as far as the roosts extend, and the rest is cotton. This prevents a draft over the birds when on the roost. The dropping board is three feet from the ground, to allow sunlight to penetrate to every corner. An earth floor is used, but it is raised 18 inches above the ground outside the pen to keep it reasonably dry. Mr. Clark makes it a point to construct all the pens and equipment during slack time. There are no frills or furbelows to add to the cost of the equipment. The nests, feeding troughs and grit boxes are such as any handy man could make and so reduce the amount of money invested. The floor of the pen is covered with a good layer of straw. This is cleaned out and replaced with fresh straw occasionally, but dropping boards are cleaned 365 times a year.

Selecting Birds for Breeding Purposes.

In order to bring a flock up to a high standard a good deal of careful selecting is necessary. The system followed by Mr. Clark is to trap-nest the pullets, as this is the only accurate way to pick out the highest producers. It is a rule on Oldham Poultry Farm that no bird will be used for breeding purposes unless it has produced 115 eggs or over from October 1 to February 28, of its pullet year. Trap-nesting is only done for this period, Mr. Clark believing that winter laying determines the capacity of the bird for producing eggs. It requires a lot of time releasing the birds from the trap-nests and recording their numbers, but under the system in vogue this work is done when there is the least rush. All birds which lay a deformed egg, or a very small one, or that are in any way deformed themselves, or have an attack of sickness during their pullet year, are not put in the breeding pen. By exercising care and good judgment the egg production on this farm has been doubled in seven years, without in any way decreasing the size or weakening the constitution of the birds. New blood is introduced through the males every two years, the cockerels being secured from the highest producing birds possible. Every other year the cockerels from the home flock are used, care being taken that they are not mated with near relatives. This system is very satisfactory for the commercial poultryman, but on the average farm there is no time at any season of the year to watch the trap-nests. Consequently, some other system of selecting the layers should be practiced. Mr. Clark claims that the heavy winter layers of the white-ear-lobed birds can be picked out at this time of year. His theory is that the color of the ear-lobe decreases with egg production, and that a heavy layer will not be so heavy in January as one which has not commenced to lay or has only produced a few eggs. To follow this theory out in practice a number of birds in Mr. Clark's flock were noted and their leg-band number found on the egg-record sheet. In every case the birds with a big record were considerably lighter in weight than their sisters which had a poor record and their ear-lobes were a blue-white instead of that rich, creamy white seen on the birds which had a low egg yield to their credit. When picking out birds to place in the breeding pen this spring, the owners of breeds with white ear-lobes may fairly accurately select the birds that have been paying their way by the color of their ear-lobes. This system cannot be followed with the heavier breeds. However, the color of shanks and time of molt are guides for selecting birds in the fall to keep for breeders the following season. The shanks of a yellow-shanked bird which has laid heavily all season have a pale color by August, while the shank of the poor layer has a bright color. The theory is that the pigment is laid out of the shanks as well as out of the ear-lobes. The heavy layer has no time to molt until late in the fall, consequently the bird with a new dress in early October tells as plainly as words that she was looking after her own comfort rather than paying for her feed in the way of eggs. The trap-nest has exploded the theory that the finest-looking birds in early fall are the most profitable. The reverse is more generally the case.

Pullets prove much better winter layers than yearling hens, and will almost double the records of their older sisters in yearly production, but when it comes to eggs for hatching Mr. Clark wants them from yearling hens exclusively. His reasons are logical and it may be that the stamina of the average flock is but slowly improved, due to pullets being used for breeding. Pullets which lay heavily all winter and are, at the same time, completing their development will not produce eggs that will give as strong a chick as will a yearling hen. As a rule the yearling rests from November to January; her system is built up and she lays a stronger and larger egg than a pullet does in the spring. A cockerel is mated with the yearling hens for the reason that a young male bird usually has more vigor than an older one. With Rocks, one cockerel is mated with 12 hens, but with the Leghorns one cockerel is used to a pen of 20 hens.

The present pens of yearling hens were selected by trap-nesting last winter; they had stood the test of 115 eggs or more in 151 days, and were the only birds

carried over. They appear to be in the pink of condition and give promise of heavy egg production through the breeding season. They are the only birds on the farm which are mated, consequently no chicks are hatched from poor winter layers. Pullets are depended upon to supply the demands of Mr. Clark's ever increasing number of customers. Cockerels are disposed of at the close of the breeding season, and hens are marketed as they cease laying during the summer.

Feeding the Laying Flock.

No matter how well bred and selected, the birds cannot lay unless they are properly fed with the right kinds of feed. Lack of one variety of feed may be the limiting factor in production. The system of feeding which has given satisfactory results on Oldham Farm is to keep a dry mash, consisting of a mixture of 200 lbs. bran, 100 lbs. cornmeal, 100 lbs. feed flour, 100 lbs. beef meal and 100 lbs. gluten meal, before the birds at all times. A hot, wet mash from the same material is fed at noon. This mash is mixed with a soup made from boiling beef heads. The grain ration fed night and morning in the litter consists of equal parts wheat, oats, corn and buckwheat. No hard and fast rule regarding quantity to feed each day is followed, as it is regulated largely by the appetites of the birds and the number of eggs laid by the pens. However, it has been found that it averages about 10 quarts of grain to 100 birds. Sprouted oats are highly prized for green feed. Cabbages are also used. Meat feed is included in the mash and soup. The birds always have access to grit, oyster shell and charcoal. Potassium permanganate is always used in the drinking water. It is a disinfectant and tends to prevent spread of common ailments. Sufficient is used to color the water. The system of feeding and housing produces healthy, vigorous birds.

In seven years the present Oldham Poultry Plant has been built up and paid for from the profits largely on the sale of eggs. It is a commercial plant which is a financial success. Mr. Clark attributes his success to keeping only heavy producers. Whether a hen lays or not she must be fed, and overhead expenses are the same. It takes practically all the eggs are worth to feed the hen which only lays six dozen during an entire year, but where the average of an entire flock is 176 eggs per pullet it only costs 14 cents, or a little over one cent per egg for all expenses. The value of all the eggs laid over a certain number is clear profit. Whether a large or small flock is kept the aim should be to raise the average production by securing a laying strain of whatever breed is kept, and then endeavor to further increase the egg yield by selection and breeding. It has been done, and it becomes easier each year to improve the farm flock, owing to the increased number of breeding stock available.

Mr. Clark employs two men to help with the work on this poultry plant. They are kept busy the year round. A three-year rotation is followed on this small farm. Corn, wheat and clover are the crops grown. But a large amount of grain must be purchased. The small farm doesn't begin to supply the grain part of the ration. Millfeeds are high in price this year but eggs are correspondingly high, and it does not pay to curtail in any of the necessary feeds because they are high in price. More attention should be paid to breeding in the ordinary farm flock in order to increase the egg yield and incidentally the profits. The system of feeding, breeding and management on a commercial plant is largely applicable in a small flock.

FARM BULLETIN.

Secure Vigorous Potato Seed Stock.

Experiments conducted at the Dominion Experimental Station, Kentville, N. S., with eight lots of Garnet Chili potatoes, secured from different growers in 1915 show a variation in yield of from 36 bushels to 240 bushels per acre or a difference of 204 bushels per acre in yield when grown under uniform conditions. Seed from these eight lots planted in 1916 yielded from 68 bushels to 212 bushels per acre, a difference of 144 bushels per acre. The respective positions of the different lots were changed very little in the second year, but the lowest yielding ones increased somewhat and the highest yield was not so great.

Seed from fifteen others of this variety was planted in 1916 and the lowest yield obtained was 158 bushels and the highest 278 bushels per acre, a difference in favor of the best over the poorest of 120 bushels per acre.

Ten lots of pure stock of Green Mountain from different growers ranged from 180½ bushels to 313 bushels per acre, a difference of 132½ bushels. Seventeen lots of Irish Cobbler ranged from 93 bushels per acre as the poorest to 235 bushels at the best, a difference in favor of the best yielding strain of 142 bushels. This would show that there may be as great a difference between potatoes of the same variety as there is between potatoes of different varieties, and that it is wise to secure stock from farms which have had high yielding crops. Because the Green Mountain has failed in giving a crop on a certain farm is not proof that this variety will not yield well there; it may have been due to low vitality in the seed stock. Such reversion in yield may have been due to disease, or adverse soil or climate conditions which affected the crop at some time, and it may be better to discard the stock entirely than to try to bring it up to its former vitality by selection.

CENTRAL EXPERIMENTAL FARM, OTTAWA.

Flying Fish.

As seen by a Canadian Farmer.

It was on a little side trip from Los Angeles to Catalina Island that these odd fish were seen, and they were so interesting, and their general appearance and their flight differed so from ideas of them obtained from books that I would like to tell the readers of "The Farmer's Advocate" about them.

But first, a word or two about the places themselves. Los Angeles is not on the sea coast, being about ten miles inland from the nearest beach but it has electric and steam railway connection with many nearby coast resorts. And since it has become a great city of 550,000 it aspires to be also an ocean port, and has spent millions in improving the harbor of San Pedro, about twenty-five miles to the southwest, so that ocean steamers may safely land there. San Pedro itself is not much, but before reaching it the road runs through Long Beach which, a few years ago was but a resort for bathers and now is a town of 40,000 inhabitants.

A short sea voyage of twenty miles carries one from San Pedro to Santa Catalina Island. The voyage, though short, is reputed one of the worst possible for sea-sickness, owing to cross, choppy seas. The island itself appears to be the rough, towering top of a submerged mountain. There is no earth surface and scarcely any beach. Everything except for an occasional scrubby bush, seems to be rock. To go around the island involves a steamer sail of twenty-seven miles.

The chief attractions for tourists are sea fishing and the submarine gardens, as they are called. These latter are simply the vari-colored and luxuriant growth of seaweeds springing from the rocky bottom at one part of the coast, which are viewed through the glass bottoms of boats, made for the purpose.

We had met tourists who had made the trip, and who told about the submarine gardens and especially about the good chance to get seasick, but not a word about flying fish, so that the sight of them was the chief delight of the excursion, and had the added charm of being unexpected. We had not gone far beyond the outer breakwater of San Pedro harbor when a little girl called out "Oh, look at the flying fish!" and everybody looked of course. We caught but a glimpse of a bright, bird-like creature as it whisked out of sight, and thought possibly the little girl had mistaken a bird for a fish. But it was all eyes on the water then, and soon, within a few feet of the right hand, forward part of the ship out rose a fish, so suddenly as to make one gasp, spread its wings and sailed for 100 yards or more, skimming along a few feet from the water, and then dropped in with a chuck. Here was the first surprise. Not that the flying fish could fly, but that it could fly so far and on the level and without any diminution of speed to the very end. We had supposed that like a flying squirrel which can sail quite a distance but always on the down grade, that the fish shot out of the water a few feet then spread its wings and sailed on a gentle slope downwards until it struck the water again.

Not so. Neither that first fish nor any of the many dozen that followed by ones and twos and threes ever seemed to rise higher than about four or five feet from the water, and they kept at the same height and speed, some of them for 200 yards, until they suddenly plopped down. Not only so, but several, after flying for a great distance, would swoop down into the water and then out continuing their flight about as far again. Not one ever seemed to stop because it could fly no further, and none finished their flight with a gradual slowing up and lowering. The notion seemed to take them suddenly and down they would plop head-first. They acted as if they dare not let their wings get too dry.

Another surprise was in their manner of rising out of the water. They did not spring out as we read of salmon doing when they overleap a waterfall or as we have all seen common fish do when jumping at a fly. The flying fish burst forth with front wings spread but at a very slight upward incline. Before the tail was clear of the water they would have gone five or six feet from where they first appeared, the water below them being violently agitated as they continued to rise. It looked as if they must be using their back pair of wings (for they have two pairs), to get up speed. The agitation was probably caused by the motion of the tail, the lower lobe of which is much longer than the upper and is bent sharply downward. Whatever the cause of the agitated water, as soon as the fish rose clear of it all motion of wing or tail absolutely ceased. The front pair of wings had been spread out all the time, but now the hinder pair are also opened out to the widest, and all four being held rigid, tense and level the bird, or rather fish, sails away, its speed appearing actually to increase for a time. The rate of flight seemed to be about that of the barn swallow, somewhere near 30 miles an hour.

It is true that the most of the flying fish that were seen seemed to be started out of the water by the near approach of the ship and also that they struggled hard while rising, yet once clear they seemed to revel and rejoice in the exercise of their powers. Especially was this true of those that after a time dipped under and took a second flight. They seemed to be saying "isn't this dandy." If, like most creatures that have any pretensions to good looks, they knew how beautiful they were one need not wonder if they delighted to show themselves. They certainly did look dashing and bright and gay. They were all of nearly the same size, slightly smaller than a large herring. The body, seen from above of course, was dark, almost blue-black, in color. The wings were clearer than the wings of a fly and were not only transparent but glitteringly so. Dripping wet they flashed and sparkled in the