

the cross, the real work of breeding begins. The horticulturist must fix in his mind the ideal plant or fruit and work towards that end. When dealing with pomaceous fruits the process is naturally slower than with plants whose life cycles are covered in a year. For this reason the comparative amount of systematic work in plant breeding expended upon our tree fruits is insignificant. Good varieties have come to us,—but largely by chance. This is legitimate experiment station work. Thus far it has been largely carried on by individuals, and to them belongs great credit; but how much faster would the good work have progressed had it been supported by State appropriation, strengthened by horticultural society sentiment and guided by trained men?

If the horticulturist is at a disadvantage in crossing apples by reason of this slowness in producing fruit, he can at any rate offset this in a measure by making immediately available by grafting or budding any desirable form which may appear in the first generation. The type does not need to be fixed as in the case of those plants propagated from seeds, like cabbage or pansies. This fact encourages promiscuous crossing, but hybridists should remember that it is extremely important even in this somewhat uncertain process to select parents combining in as large a degree as possible the characters desired. In general, it is a mistake to make a violent cross—that is, between two very unlike forms—the offspring is rarely useful; e. g., currant and gooseberry. To summarize, then, (1) remember that a plant is a collection of individuals with great potential variability; (2) that the best results are usually obtained quickest by working with variable forms; (3) that it is wise to breed for one thing at a time; (4) that it is necessary to establish in the mind an ideal to work towards; (5) finally, that crossing is only a means to an end and should be supplemented by vigorous and persistent selection.

#### IN PROPAGATING A VARIETY SELECT SCIONS FROM THE BEST INDIVIDUALS OF THE TYPE.

How many nurserymen select scions with care, having due regard to the health and bearing habits of the individuals from which they come? How many orchardists notice the difference in bearing habits of a block of trees of the same variety? Yet there is infinite variation, and why should we not labor to perpetuate the best? Does the breeder of animals select animals at random, or does he choose with care those showing minor but to him important characteristics? Should the breeder and propagator of fruit trees be less careful? Should he not pay some attention to habit of tree and character of fruit of the tree from which he takes his scions? In root grafting, smooth, clean scions are desirable and workmen appreciate them, but it seems to me more important to cater to a bearing habit of tree, for instance, than to ease and comfort in growing scions and making grafts. Concluding, then, let me say that I have tried to show that varieties have comparatively narrow ranges of adaptation; therefore, each fruit-growing region should endeavor to work out its own salvation, which may be done by systematic plant breeding, assisted by fortuitous bud variation, as described in the ADVOCATE of January 2nd.

#### Grafting Apple on Hawthorn.

To the Editor FARMER'S ADVOCATE:

SIR,—I beg to reply to your correspondent as follows: If he desires to try grafting an apple scion on the hawthorn, I would advise him to do so, as if he did not succeed the only loss would be the scions. I fear, however, though it would be possible to successfully graft an apple on a thorn, it is not probable that the two would unite. The thorn is a very slow-growing tree, with comparatively little sap, and on this account it would hardly be likely that a strong-growing tree, such as the apple, would unite with it. I have never yet heard of anyone grafting an apple on a thorn successfully.

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#### Renovating Old Orchards.

In the case of a large number of farmers, especially in the older settled districts, it has become a question whether it would be of greater profit to root out the old orchard, root and branch, and to re-plant, or to undertake a renovating policy. Decisions to make way for a new plantation are being made by many, but to those who are more moderate in their undertakings and wish to help the old faith-

ful towards a new lease of life, a few suggestions may be acceptable. It is impossible to lay down any specific method of procedure, as the cause of the unproductiveness must guide the remedy. A long neglected orchard cannot be expected to arrive at the profitable condition of trees that have received the proper care and attention from the beginning. In many cases trees may have become so fixed in habit that no amount of good treatment can make them bear satisfactorily. In order to undertake this work aright a grower must arrive at a clear conception of the agencies which conduce to productiveness, in order that the work of renovation may take the proper form.

Perhaps foremost among the needs of an old orchard is that of tilling and fertilizing the land. Extensive execution with the saw, and perhaps the axe, may be necessary in order to make thorough horse cultivation possible. There are usually in such old plantations trees that are clearly not worth the room they occupy, either from a dying condition of the tree, or from the poor variety of the fruit produced. In the latter case, if the trees are sound, grafting with approved varieties may be resorted to. Otherwise, these are better removed to the wood pile as cumberers of the ground. If the orchard has been long in sod, the roots may be so near the surface that plowing near the trees is impossible, or at least unwise. The spade or disk harrow can in such cases be used to good effect in the spring, before the ground becomes hard, at least near the trunks. It has also been recommended to drop corn or other grain into holes made with a small crowbar around the trees, and allow the pigs to root up the ground in search of it. This stirring of the surface preserves moisture and makes it convenient to work in manure, which will not only feed the tree through the roots it now has, but it will also start new fibrous feeders, through which wood and fruit growth will be supported.

The work of cultivation must wait for some

viewed by Mr. K. Boyer in "Artificial Incubating and Brooding." The two lots of fowls used consisted each of 3 Barred Plymouth Rock hens, 8 Light Brahma hens, 6 Light Brahma pullets, and 2 Wyandotte-Light Brahma pullets. The hens were one and three-quarters years old when the experiment began. Each lot, of 19 fowls, occupied a detached house having two compartments, respectively 8x12 and 10x12 feet in size, and comfortably and healthfully fitted. The houses were practically the same in every particular. The two lots were fed as follows: In the morning they received a mash, which was mixed hot the previous evening; at noon, and again about sundown, whole grain was scattered in the straw of the scratching sheds. Artificial grit, oyster shells, and pure water were kept always before them.

The leading details and results are shown in the accompanying table:

| Began Feb. 9th,<br>ended April 28th;<br>79 days. | Food<br>consumed. | Cost of food<br>per fowl<br>per day. | Eggs<br>produced. | Dry matter<br>in food of food<br>per egg. | Cost<br>per egg. |
|--------------------------------------------------|-------------------|--------------------------------------|-------------------|-------------------------------------------|------------------|
|                                                  | Lbs.              | Cts.                                 |                   | Lbs.                                      | Cts.             |
| Cut bone lot.....                                | 283.5             | .22                                  | 289               | .940                                      | 1.2              |
| Animal meal lot....                              | 287               | .22                                  | 145               | 1.796                                     | 2.2              |

The food received by the lot having cut bone was as follows (in pounds): Whole wheat, 90.5; oats, 100; wheat bran, 18.5; wheat middlings, 18.5; gluten meal, 18.5; ground clover, 18.5; cut bone, 10. Total, 283.5 pounds; cost, \$3.25; nutritive ratio, 1:4.8.

The other lot received essentially the same foods, except that in place of bone it got 9.7 pounds of animal meal. Total food, 287 pounds; cost \$3.26; nutritive ratio, 1:4.9.

In the above estimate of cost the labor required to cut the bone is included. The results indicate a decided advantage in favor of the bone. There was no perceptible difference either in the condition of the fowls in the two lots or in the size or character of the eggs produced.

Mr. Boyer, after dealing with the above experiment, commenting upon the value of green bone for egg-production, says that it will double egg yield, but it must be fed fresh, the same day it is cut, and not too liberally. He feeds it as a separate meal twice a week to all ages of birds over a week old during the entire year, as a substitute for bugs, etc., because his premises will not allow of a range for his flocks.

#### Peterboro Poultry and Pet Stock Exhibition.

The Peterboro Poultry and Pet Stock Association held its annual exhibition in the Town Market Hall on the three days, January 17-19 inclusive. Most complete arrangements had been made in the way of a set of uniform galvanized-zinc coops, sufficient to accommodate all exhibits. The floor space is large, and the building was comfortably heated, so that both visitors and exhibitors had nothing to grumble at. The attendance was not as large as the character and variety of the exhibition deserved, perhaps on account of the Dog Show having been held only the week previous. As far as the exhibits were concerned, however, there was little room for improvement. The prize list included classes for cock and hen and for cockerels and pullets in thirty-five varieties, three classes for geese, four for ducks, and two for turkeys, besides five classes for breeding pens. There were also prizes for seventeen classes of pigeons for both cock and hen, and prizes for rabbits and canaries. There was a class for dressed geese, turkeys, ducks, and chickens. In addition to this comprehensive offering of prizes, there were thirty-three special prizes donated by the citizens of Peterboro.

The judging was in the hands of Mr. Daniels, and it was no light task. He declared the dressed poultry exhibit to be ahead of that in Toronto. There were Toronto winners in competition in some of the live classes, and local fanciers feel some pride in keeping many of the awards near home. Considerable interest has risen in this neighborhood lately in poultry. The energy of the local executive has secured the exhibition of the Western Association for Peterboro next year.

A perceptible relative increase in table fowl over the special laying classes might be called attention to. As far as numbers were concerned the Plymouth Rocks and Brahmas were most numerous, with Wyandottes, Leghorns, and Minorcas following in the order named. This may be explained by the stiff foreign demand that has lately been established for our fowl through the perfection of transportation facilities.

Considerable business was done with exhibitors in the selling classes. The number of birds exposed, however, was not very large.



EXHIBITORS AT THE GALT POULTRY SHOW, JANUARY, 1899.

weeks yet, but that of pruning can be gone on with at pleasure. In all probability this will have to be somewhat heavily done, more for the purpose of correcting the results of years of neglect than that of making the trees bear. The latter result will come as a matter of consequence after the trees will have overcome the severe shock. Where it is necessary to remove large limbs the wounds should be painted to prevent checking and bleeding. The effort must be in the direction of producing new and fresh wood for fruit bearing, and to trim the top sufficiently to admit the sunlight and air, and to allow the fruit to develop to something like perfection of size and quality. When the new wood is once formed and the tree has re-established its equilibrium, fruit-bearing may be looked for, if other conditions are right. Among these other conditions must be the absence of insect and fungous infestations, which can be overcome only by dislodging eggs, nests and insects, by removing the rough outer bark, and by thorough applications of insecticides and fungicides at the proper seasons. A liberal dressing of wood ashes to the trees and the land will have an excellent effect on both the trees and the fruit produced.

#### POULTRY.

##### Cut Bone vs. Animal Meal for Egg Production.

Animal meal and cut green bone each have their advocates for egg production, and to arrive at a conclusion that may be considered authoritative, Hatch Experiment Station, at Amherst, Mass., conducted a test with these two foods on two lots of fowls selected with utmost care with respect to similar characteristics in the two lots. The trial is re-