



UPPOSE that we call this the story of a dimple on the face of nature

THE BLUEBERRY LADY

By H. W. COLLINGWOOD

Photographs by U. S. DEPARTMENT OF AGRICULTURE

ture which was brought back into a dimple by the application of wild roots and herbs. When the southern half of New Jersey rose up out of the water, many of these sour spots were formed. The soil was not quite ready for polite society when the forces underneath jumped it into the limelight and left out the lime. Thus ever since then the fine, sweet farming land on the higher ridges has suffered somewhat in reputation from the thin, sandy plains and low, sour spots through which nature still expresses a little of her disappointment in New Jersey. Now these spots are coming back into dimples, a credit to the state rather than a discredit and a joke.

Nature abhors a vacuum and never knew a waste. What men call wastes are only hard puzzles, which, when pulled apart by bright, orderly minds, are found to cover a pot of gold. Joseph J. White's great cranberry bog near New Lisbon illustrates this. It is about half way between the Delaware and the ocean. At night one may often see the glare of Philadelphia and Trenton on the sky.

Here was a sour spot of well nigh useless land, worth perhaps \$10 an acre. Mr. White learned how to make it a suitable home for cranberries, and the sour spot became a dimple. It is the largest cranberry bog in the world—more than 100 acres, a princely domain of bogs and lakes and canals and dikes. As a sour spot at \$10 per acre it produced a few cranberries, a few blueberries, and a good supply of bullfrogs and mosquitoes. As a dimple, the land is worth at least \$400 per acre, since it produces 50,000 bushels of cranberries annually. Nature smiles and shows her dimples only to those who learn the habits of her wild things so well that they will eat out of the hand, come upon the farm, forget their freedom, and join the labor union of orderly culture.

This great feat of spreading cranberry sauce over the sour spot as though it were roast turkey is another story. We are more concerned with a new chapter in history which is now being worked out by Mr. White's daughter. If we call Mr. White the cranberry prince, we must call Miss Elizabeth C. White the blueberry lady, for she is now doing an important pioneer work with the wild blueberry. This plant, when civilized and induced to work in harness, will make these sour spots and thin soils into the most profitable fruit gardens of America. Here at New Lisbon is the foundation of a great industry, based on that surest road to wealth in all the world, the ability to make nature smile. Nature has little or no sense of humor, but she has a great number of unappreciated children, plants or animals which have never been introduced into society. Nature, like other fond parents, wants them there, and will pay for their introduction. Some of them are shy or cranky, or positively mean, but nature has given each one a vast fortune for spending money, and she intended that they should pass it all on to humanity when some one comes who is wise enough to understand them. Why should she not smile and heap favors upon a human being who gets into the confidence of the shy and cranky children? You would feel that way toward those who did the same thing to your own backward youngsters.

That is just what Miss White has done with nature's favorite wild daughter, the blueberry. Most of us who have any part of a farm in our

ured, and treated as for onions, yet the plant slowly and steadily pined away and died. You may say, and

truly, that it died of a broken heart, a wild gypsy longing for her old home.

I know a homesick boy who was raised in the Cape Cod district, where each year the trailing arbutus springs out of the thin, sour land, a rare joy after the cold, hard winter. This boy moved away and carried several plants of arbutus with him. They were planted in the garden and cared for lovingly, but with all the petting and care they faded away to death. As with the blueberry, prosperity only broke their heart, and man could not mend it.

My children caught a robin, and put her in a cage. Just like the blueberry in the garden, she drooped and disdained the comforts of civilization. Suppose some one learned how to bribe her, so that she would gladly exchange her freedom for the chance of civilized development! She would increase her size as she became domestic, her half dozen eggs per year would increase to a hundred or more, until she became more useful than

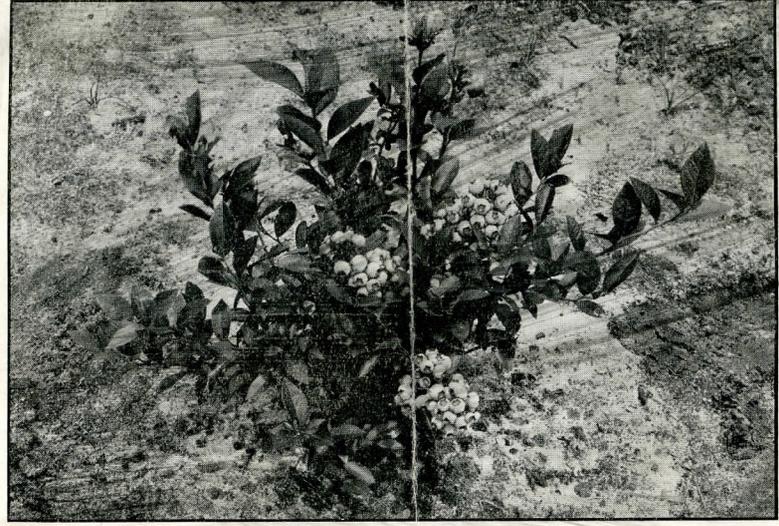
some of our present breeds of poultry. It would not be a miracle, only an understanding of her nature, the trick of making her appreciate all the comforts of her new home. And this is just what Miss White has done with the blueberry. She has learned how to make it drop the stripes of captivity for the stars which have led so many other wild things out of the forest into orderly industry. It is the most interesting and the most promising taming of a plant gypsy that has yet been attempted.

Professor F. V. Coville learned by long experiment what was the matter with this plant gypsy, when you took her from the wagon and the camp fire and put her in a palace. The most natural thing was to assume that if the blueberry was tough enough to make a living in a swamp, or in poor, sour soil, she would immediately respond to a much better living in a finer soil. That might be true of potatoes. Some farmers prefer to grow their seed on thin, poor land, believing that such seed when planted on rich soil will produce a superior crop. As we have seen, the blueberry sickened of prosperity and refused to accept one of the most polished precepts of society.

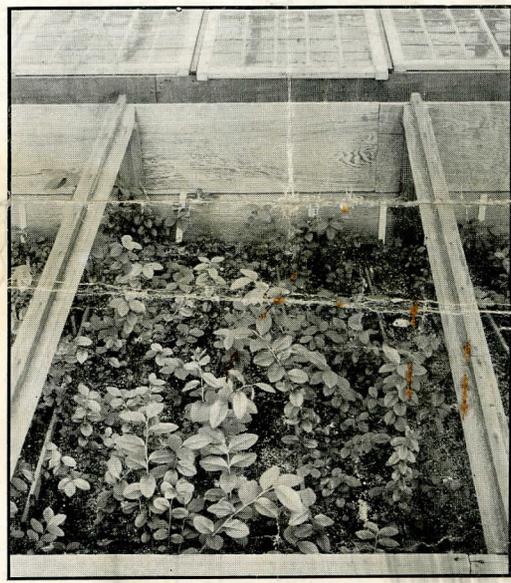
Then it occurred to Professor Coville that the blueberry was an acid loving plant, and from its very nature as unhappy in a sweet, rich soil as alfalfa would be in a sour swamp. "Every man to his taste," and evidently nature has given this plant a special set of machinery for running an acid factory. Most agricultural plants which feed and grow along the lines of polite agricultural society have their roots covered with root hairs. These absorb moisture and plant food. They are waiters, conveying food and drink to the parent plant. The blueberry plant has none of these root hairs. Like all savages, it waits on itself. In the place of these root hairs is found a peculiar fungus, which appears to have the power of making the unavailable nitrogen in the sour swamp into a form which the blueberry can use.

See what nature has done here with an acid machine. If man would feed his cultivated plants on muck or peat soil, he must haul it out to dry, mix it with lime and manure, then induce a hot fermentation to shake up the muck and put its nitrogen at work. This mycorrhizal fungus on the blueberry root plays the very part of the compost heap, and forces the sour swamp to give soluble food to Miss Blueberry. In its way this is as wonderful as the work of bacteria on the roots of alfalfa.

Professor Coville also found that while the



A blueberry plant two years and four months from the time the cutting was placed in the propagating frames at Whitesbog



Section of one of the frames in the shelter, showing root cuttings from a selected wild blueberry bush

pedigree have wandered off into the swamps and wild places after blueberries. The huckleberry cake at the old time Sunday school picnic beat the preacher as an inducement to attend the services. The child who would not stain his face from ear to ear with the juice of blueberry pie would hardly be worth raising.

This is all true, and yet while blackberry, raspberry, strawberry, and currant have climbed out of the jungle into the garden, and taken up the fat, satisfied life of civilization, the best child of all, Miss Blueberry, has remained a gypsy, camping in swamps or sour plains, a wild thing preferring death to man's well meant nursing and care.

Some years ago a famous nurseryman took me out into a corner of his garden where stood a blueberry bush. A great scientist had found it in a New England pasture, where it grew tall and strong, with berries half an inch in diameter. The scientist expected to propagate it as he would a currant. The nursery man was to distribute it so that it would be found in a million gardens. Finally they were to cut up a fine, juicy, financial pie between them. That bush had the pick of the garden. The soil had been limed and man-

blueberry wears rubber boots, it does not like to wade in the brook. Most of us would say that the berry bushes we find in the swamp are usually submerged in water. If we examine them closely, however, during the fruiting season, we shall find that they stand up on little mounds or hummocks, so that the air can reach their roots. Under cultivation the blueberry is not to be treated like a duck. It may safely pass the winter in a bath tub, but during its growth the roots must have air. Thus we see that in former years the inability to civilize the blueberry was due to the fact that we did not understand her nature or natural habits of life.

Professor Coville, the scientist, worked out the life habits of this gypsy among fruits. Miss White has done the practical work of gaining the confidence of this wild thing, and making it feel at home. This is the way such things are generally worked out, for science is often a giant in thought, yet as frequently a baby in practice. Miss White knows the soil and the people of the great piney region, for as she says—"I am a 'piney' myself." She knew the needs of the country and its possibilities. Many of the inhabitants make a good share of their living picking wild blueberries. They know the plant and its habits. If it could be made into a cultivated crop, as the cranberry has been developed, the entire section and its people would be helped. So Miss White started her remarkable work of taming the blueberry.

It was like a man starting an apple orchard, without knowing one variety from another. Out in the woods or in old fence corners there might be red, green, yellow, or striped apples, seedlings unnamed and untested. What should he plant in the orchard? In like manner there are hundreds of varieties or seedlings of blueberries. They vary in their habit of growth, size, color, and ability to stand frost or drought, even more widely than the apple varieties. Miss White illustrates this by relating how shortly after a heavy frost she found two blueberry bushes so close together that the branches mingled. The fruit buds and most of the leaves on one had been completely killed by the frost, while the others were unhurt. She has one gives a flower as delicate in color

In order to start with the finest wild varieties, Miss White among other ingenious devices arranged with some of her piney friends to mark the bushes carrying the finest specimens they could find. These pickers were provided with a small aluminum plate, with a hole nearly five eighths of an inch in diameter, and bottles for holding specimens. When they found bushes carrying berries so large that they could not pass through this hole, the bush was marked and report was made. In this way a few superior varieties were found for propagation. In 1911 Professor Coville sent sixty plants for test and propagation. These were seedlings from wild plants. All other seedling plants on the place were produced by artificial crossing very carefully done by Professor Coville at Washington. Crosses were made between the best wild stocks available, the work being done with the most patient and painstaking care.

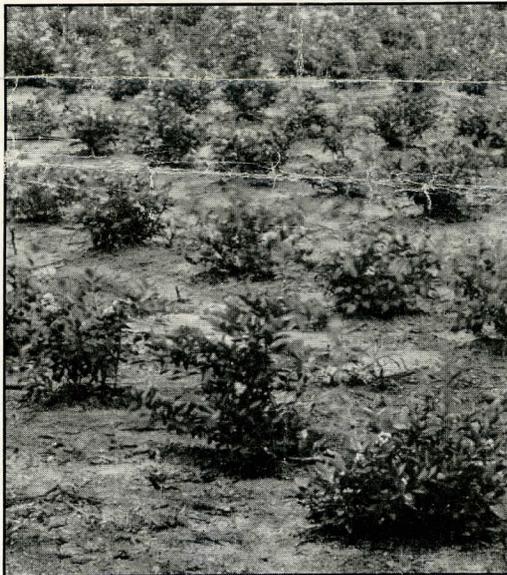
There are thousands of varieties to be tested before the most suitable ones can be recommended, and already several kinds are named and known to be superior. Thus far it has been largely pioneer work, a task requiring the most glorious faith in the final outcome, for taking the wilderness out of man or beast or plant is a thankless job until the results become evident.

The most difficult part of blueberry culture is the propagation. You may if you like handle the plant just as you would apple trees. The nurseryman will plant seeds of Northern Spy and thus produce little trees. Then he will bud or graft into them wood of the desired variety. This may be done with the blueberry, but it would be too slow for commercial work, and the

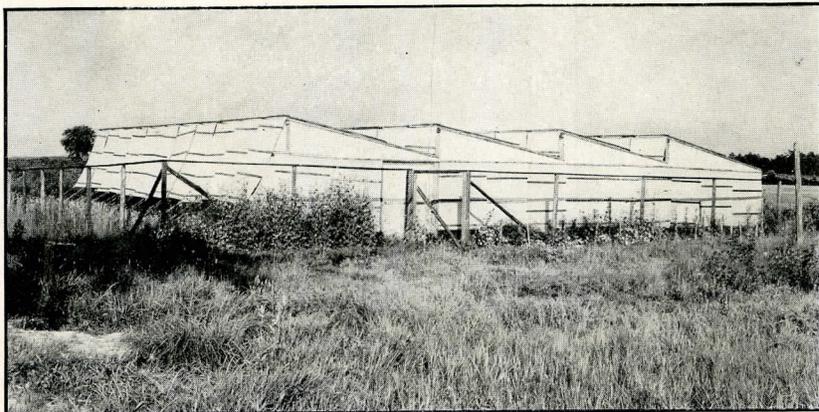
plant would become jealous and send up new shoots of her own below the superior wood. Wild plants may be dug up and planted in an acid soil, but for commercial purposes more rapid propagation must be worked out.

The most interesting thing about Miss White's work is the nursery in which the little baby plants receive their start. It is ever true that if you want to study nature—human or other—at its best, you should go to the cradle. In this blueberry nursery you see little cuttings three or four inches long, and not more than half the diameter of a lead pencil, stuck into a mixture of sand and peat. These must be protected and shaded like feeble human babies in an incubator, until finally they strike out their roots and thus obtain a firm hold upon life. It seems absurd to put these little pinches of wild life out in the field eight feet apart each way, yet in time they will grow into great bushes meeting across the rows, and yielding a peck or more of beautiful berries nearly three fourths of an inch in diameter. Men say it requires faith to plant an apple tree and wait patiently for returns, yet that faith has been justified thousands of times. What would they say of the faith required by one who would put these little pencils into the soil and wait for nature to open her purse and pay the price?

The easiest way of propagation is to let the bush remain at home in its native haunts and give a fair imitation in half an hour of what nature might do in half a century. In late fall or winter the plant is cut off close to the surface. A rough box or frame is built on the ground around this stump and filled in two or three inches deep with a mixture of three parts of sand and one part of peat. This is what nature might be expected to do by blowing sand, leaves, and trash over the stump. With this covering over of the root a strange thing happens. Left without covering the new growth would consist of stems which would come up, depending on the old roots for their support. Working up through the sand, however, these stems are transformed into root



Trial field of blueberries at Whitesbog grown from seed produced by hand pollination of selected wild stocks by Professor F. V. Coville of the U. S. Department of Agriculture



An outside view of the blueberry propagating shelter at Whitesbog

into leafy shoots, each one thus becoming a true plant with power of self support. We might compare the original bush to some substantial citizen, well-to-do and with a large family of boys. If these boys grow up without effort, or without being forced to face obstacles, they will never be anything but stems, looking to the family for support. If they are forced to work and fight through obstacles, they will form roots of their own, and become independent.

These rooted stems are cut away from the stump and set in pots containing a mixture of two parts rotted peat, and one of sand. That is their nursery, and they go on drawing the bread and milk of life out of this sour soil until they are large enough to be transplanted. The credit for suggesting this method belongs to Professor Coville. It would be in most cases impractical since the best wild plants are off in inaccessible places. The method is described merely to show the nature and habits of the plant.

Miss White has developed a more rapid method of propagation, based upon much the same principle. Small cuttings are made from outdoor plants, and these are put in boxes covered with a thin layer of mixed sand and peat. They are kept moist, and in time these cuttings throw up shoots in much the same way that the seed piece of potato sends up sprouts from its eyes. Just as is the case with the big parent stump, these shoots form root stocks in the sand and leafy shoots above. Thus we have a tiny rooted plant from each shoot. As with the potato seed, the cutting finally dies, but the little plants root and live. When the Early Rose potato was first introduced at a very high price, a number of nurserymen bought a few pounds of the seed and propagated very much as Miss White does these plants of the blueberry.

Miss White has thousands of the plants growing, and a good acreage more under field cultivation. The soil around the cranberry bogs is admirably suited to blueberry culture, and there seems no reason to doubt but that within a few years the industry will grow into large proportions. It will be what may be called a limited industry, because of the skill required in propagation and starting the plants, and the fact that the blueberry will thrive only on certain sour soils. It may in time shake off some of its wild tastes and habits, as asparagus or celery have done, but for years it will prove a fair companion for the cranberry and the laurel, and it will bring the poor piney district of central New Jersey right on the map in blue ink, as bright as the red of New England orchards, or the yellow of California orange groves, or the green of the Kansas alfalfa.

Nature will always pay the price when her wild children are introduced to polite society and trimmed and trained to meet its requirements. Suppose the world were still forced to depend on the seedy wild raspberries and strawberries as it was before these fruits got into society! That will give you an idea of what is coming from the taming of this plant.

There is one other cultivated blueberry plantation in existence. That is in Indiana, where a bog was drained and planted with unselected wild bushes. There are some misses, but in 1915 the plantation averaged 2,214 quarts per acre. They sold at 14½ cents a quart, which

meant \$321 income per acre. This was wild fruit of small size, while Miss White has varieties which give fruit nearly or quite three fourths of an inch in diameter. She will make no figures of probable income, but we may safely do our own figuring. Planted eight feet each way, there will be about 680 plants to the acre. At full size they may well average one peck each, or 5,440 quarts per acre. Plenty of vigorous wild plants can be found which will do better than that, and keep up for fifty years or more. Take the price at which these Indiana berries were sold, and you may see the possibilities of this ten-dollar land when it comes back as a workshop for the wild, shy sisters of the swamp.