

THE  
CHILDREN'S LIBRARY  
OF  
WORK AND PLAY



OUTDOOR WORK

MARY ROGERS MILLER

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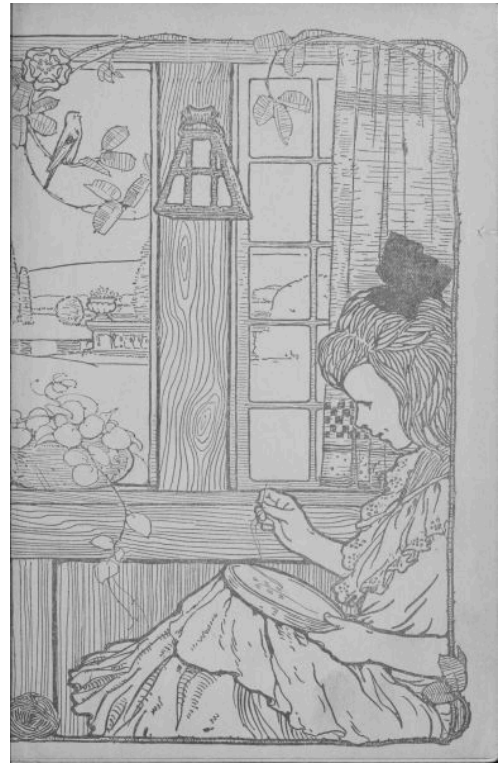
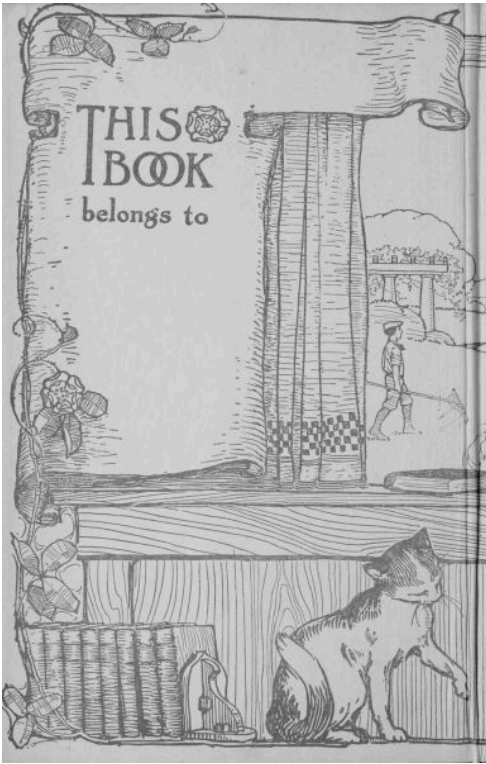
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# THE LIBRARY OF WORK AND PLAY

## Outdoor Work

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# THE LIBRARY OF WORK AND PLAY

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## Harvesting Nature's Crops

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*The Library of Work and Play*

**OUTDOOR WORK**

BY  
MARY ROGERS MILLER



LEON V. SOLOVY

GARDEN CITY NEW YORK  
DOUBLEDAY, PAGE & COMPANY  
1911

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THIS BOOK IS AFFECTIONATELY DEDICATED TO EIGHT  
BROTHERS AND SISTERS WHO SENT ONE ANOTHER TO  
COLLEGE

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## A WORD TO PARENTS

There are two sovereign cures for the ills of modern life: Work and outdoors. It is the purpose of this book on "Outdoor Work for Young People" to teach the gospel of these two remedies, not in lessons nor sermons, but in the form of confidential talks, which are intended to be both practical and inspiring.

The guiding principles in the preparation of this book are three: 1, to help young people to earn money; 2, to help them build character; 3, to help them make better citizens.

1. The most obvious reason why children wish to work is that they "want to earn money," to spend as they like. Here is a great opportunity and a considerable danger. The opportunities are to help support the family, to learn self-reliance, to gain in efficiency, to appreciate the sacrifices made by parents, to purchase innocent pleasures, and to save toward a college education. The dangers are that children may become too commercially minded, grasping, even dishonest, make dull playmates, and become stunted in character for lack of play and wholesome stimulus to the imagination. If you will analyze these dangers you will find that they are all the results of overdoing good things. The old rule of the Greeks, "Nothing too much" is the golden rule to measure perfect commercial relations between parents and children.

2. But far more important than money making is character making. And therefore one of the principles of this book is to suggest in a thousand ways that money making may go too far. For example, I would encourage boys to gather and sell nuts, but not to take nuts from a neighbour's trees without permission nor destroy young trees whose future crops belong to a future generation of boys. I encourage trapping but urge the use of humane traps to avoid cruelty. I encourage the gathering and selling certain wild flowers, if abundant, but warn against the danger of exterminating species, or of robbing the public of pleasure. I have gone over all of the things that children do out of doors and have tried to select the best occupations. I have studied the worst things they do and have suggested their opposites—

constructive work that earns money, develops character, or preserves public property. For example, instead of collecting birds' eggs I suggest methods of attracting birds, building houses for them, and providing food and protection from enemies.

3. The book is addressed to the citizens of nineteen hundred and twenty. Will not busy boys and girls make better citizens than idle ones? Practical patriotism becomes second nature to children who learn early to regard the rights of others, to respect the laws, and to protect public property. The boy who raises wild fowl and liberates them or refrains from mutilating for purely selfish ends a fine tree is doing his share in the great work of conservation.

But the young workers cannot do it all. You will be disappointed if you give this book to a child for a birthday or Christmas present and expect him to "do the rest," without further help. There is no substitute for affectionate parental interest. This book will surely fail you if you do not thoroughly believe in the dignity of manual labour and experience the uplift that rewards work with your own hands. Although in theory we may all believe in the dignity of labour (for other people), many of us make mental reservations to suit our own cases and persist in regarding certain forms of labour as distinctly beneath our dignity. Children see through that attitude every time. When I used to be acquainted with the citizens of the George Junior Republic, they had a saying that even the President and the Judge could not maintain standing with the others unless they took their turn now and then working in the ditch. And so I say, work with your children, with common tools, out in the dirt. The scratches will heal and the dirt will wash off, but the sense of kinship with workers will stay.

Have a "You and I" club, with you and the children for members. Meet once a week to discuss schemes for earning money to buy what the children want. It is easier to go out and earn the money and give it to them to spend, but where do they come in? Read parts of this book aloud when outside information or suggestion is needed. Make a list of your children's occupations; consider whether they are the best ones. If you know any better ones than I have put into this book please tell me, for I, too, have children and I wish them to have the very best works and plays that children in this world can have.



# CONTENTS

CHAPTER		PAGE
I.	The Best Ways of Earning Money	<a href="#">3</a>
II.	Harvesting Nature's Crops	<a href="#">9</a>
	Wild berries—Wild fruits—Nuts—Tree seeds—Christmas greens— Medicinal plants—Walking sticks—Wild flowers for city children—Corn husks—Fragrant herbs and grasses—Balsam leaves—Birch bark—Porcupine quills—Maple sugar—Wild rice—Spruce gum—Mushrooms.	
III.	Raising Domestic Animals	<a href="#">101</a>
	Colts—Sheep—Goats—Calves—Pigs—Chickens—Guinea fowls—Turkeys —Peacocks—Ducks—Squabs for market—Pheasants.	
IV.	Raising Animals for Pets	<a href="#">203</a>
	Shetland ponies—Rabbits, guinea pigs, and cavies—Fancy pigeons— Bantams—Fancy fowls—Dogs—Goldfish.	
V.	Work and Play with Trained Animals	<a href="#">241</a>
	Dairy cows—Training pet animals—Training young horses—Treadmills and cranks—Making animals happy—Taming wild animals.	
VI.	Making Brooks and Springs Useful	<a href="#">271</a>
	Reclaiming a trout stream—Reclaiming a Spring—Making a swimming pool.	
VII.	Keeping Bees	<a href="#">287</a>
VIII.	Raising Silkworms	<a href="#">338</a>
IX.	Making Collections	<a href="#">350</a>
	Plants—Shells—Insects.	
X.	Odd Jobs	<a href="#">405</a>
	Kindling-wood—Cleaning a carriage—Work in the orchard—Making rustic furniture—Selecting seed corn—Making cider vinegar—Making grape juice —Making leaf mould—Making lavender sticks—Drying corn—Making a tennis court—Shovelling snow—Mowing lawns—Utilizing wood ashes— Planting crocuses in the lawn—Making ice—Cutting seed potatoes—Pruning —Cleaning rugs.	
XI.	Making the Country a Better Place to Live In	<a href="#">450</a>
	Improving home grounds—Outdoor clubs—Attracting birds—Domesticating	

wild game—Protecting wild flowers—Preventing forest fires—Killing  
weeds—Getting rid of poison ivy—Lessening the plague of mosquitoes—  
Fighting flies—Trapping—Curing and tanning skins.

## Appendix

Free Printed Matter: How to Get It [514](#)

List of Books and Bulletins by Experts on Outdoor Work [518](#)

---

# ILLUSTRATIONS

Harvesting Nature's Crops	<i><a href="#">Frontispiece</a></i>
	FACING PAGE
Gathering Wild Flowers for City Children	<a href="#">62</a>
"Big Boy Blue" Looks After the Sheep	<a href="#">106</a>
Feeding the Goats	<a href="#">114</a>
The Shetland Pony is the Ideal Pet	<a href="#">204</a>
Holding a Conversation	<a href="#">242</a>
Gyp Has an Ax to Grind	<a href="#">250</a>
A Group of Happy Farm Animals	<a href="#">256</a>
The Skunk is an Amiable and Well-mannered Pet	<a href="#">266</a>
The Crow May be Tamed when Young	<a href="#">266</a>
A "Bottle Baby"	<a href="#">268</a>
Plenty of Trout in This Stream When Grandfather was a Boy	<a href="#">272</a>
An Odd Job that is Never Out of Date	<a href="#">404</a>
Is this Work or Play?	<a href="#">452</a>

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# **OUTDOOR WORK**

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# I

## THE BEST WAYS OF EARNING MONEY

**C**OULD'N'T you use more money if you had it? There are several million American boys and girls just like you. They want a lot of things, a lot of good things. Wouldn't you like a half dollar once a year for a circus ticket, a quarter now and then for a box of candy, or ten dollars for a new dress or some music lessons? You'd be glad to buy your own clothes, and select them too, if you had the cash. That would be a big help in thousands of families. Parents sometimes wish that their children could "leave out" in new clothes in spring, like the trees.

If you could begin to earn money at twelve you could save toward a college education, too. Lots of boys and girls are earning their way. You can. You can earn money between twelve and twenty years of age without interfering with your schooling.

What kind of stories do you like best? Isn't it inspiring to read about the boyhood of our great men. Do you remember young Abe Lincoln splitting rails? Garfield drove mules on a tow path. The men and women who are doing great things now started as boys and girls with work to do. They washed dishes and split kindlings and fed chickens and milked cows and dug potatoes. Now they are tunnelling mountains, building bridges, helping make the world better in all sorts of courageous ways.

Don't you like to hear engineers, miners, sailors, inventors, animal trainers, cowboys, foresters, and other workers talk about their work? The only really happy people are the ones who have found the work they love best. I have put some stories in this book. These are told by real boys and girls who were successful in earning money. Can you beat them at their own game? Will you try?

There are thousands of ways for young people in their teens to earn money. I believe the best are the outdoor ways. I have suggested a list of occupations, the best I can think of. Of course, no one person could try

them all. Circumstances must decide. You will succeed best with the work which you like best. You must not let outside work interfere with your studies. You must not undertake work that is too hard for your strength or unsuited to your disposition. Maybe this list will help you choose.

#### OCCUPATIONS SUITED TO THE FOUR SEASONS AND SOME THAT GO THROUGH THE YEAR

*Summer.*—Gathering berries, tree seeds, bulbs and roots, wild flowers and ferns, balsam leaves, medicinal plants, pine cones, making collections, mowing lawns, marking tennis courts, sawing wood, cleaning rugs, drying herbs, corn and fruits, raising queen bees, collecting bait, rearing butterflies for museum specimens, gathering clam shells for button factories, shocking grain, "toting" water.

*Fall.*—Gathering fruit, nuts, making corn husk mats and baskets, shelling corn, making leaf mould, clearing a field of stones, making stone fence, making grape juice and cider vinegar, collecting bayberries, painting barns and outbuildings, packing fruit, cleaning farm implements, gathering faggots, collecting cocoons, collecting insect homes for nature study.

*Winter.*—Gathering spruce gum, collecting Christmas greens, shovelling snow, pruning shrubs, vines and trees, trapping, tanning skins, making candles, selecting seed corn, pruning and tying grapevines, transplanting trees and shrubs, feeding birds.

*Spring.*—Cutting seed potatoes, budding, grafting, cutting dandelions from lawns, killing weeds, oiling ponds and ditches to kill mosquitoes, shelling corn, starting silkworms, trout, frog and toad culture, attracting birds, fighting flies.

*Year-Round Occupations.*—Keeping bees, raising goldfish, training animals, raising colts, sheep, pigs, goats, dogs, chickens and other poultry, rabbits and other pets, collecting wood for kindling, turning grindstone, milking, taming wild creatures, raising prize corn, potatoes, or cotton.

#### THINGS WORTH THINKING ABOUT

Don't think only of the money you can earn. There's no use talking, the work you do and the way you do it is going to have an influence on your character. Do a good job! If you slight your work you cheat your employer.

You know it, if he doesn't. You cheat yourself, too. And when you are working for yourself, you are the one who is doubly cheated by slack methods. That's plain.

Don't choose an occupation you are doubtful about. Most occupations are perfectly honourable. Dishonesty comes in methods. The grown-up grafters, ten to one, were cheaters at games, and sneaks about work.

When in doubt, ask advice. Don't you like to be asked for your opinion? Everybody does. Ask your parents' advice about the work you think of undertaking, and the methods of carrying on the business side. What will please them more than to know that you have a keen sense of honour?

This is my word of encouragement and inspiration to the boys and girls who read this book. There are a hundred perfectly good reasons why you should have more money of your own. And there are a thousand ways to earn it. Every one of you can earn a college education. Choose the best work *for you*, and do it with enthusiasm. If you want my advice about your work or any information I can get for you, nothing would please me more than to hear from you.

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## II

# HARVESTING NATURE'S CROPS

### PICKING BERRIES

**T**HE berry picking season begins "long about knee-deep in June" with the first wild strawberries. It does not end till the last cranberry is harvested on the eve of Thanksgiving Day at the end of the drowsy Indian summer. There is money to be earned at this occupation wherever there is ambition to overcome difficulties and force of character enough to step aside from the beaten paths. Fortunately berries are ripe in vacation time. For some people berry picking has almost if not quite the fascination of fishing. It lacks the objectionable features of hunting, fishing and trapping. Guns, tackle, and traps are unnecessary in this gentler sport. No costly tools are required. A light pail, flaring somewhat at the top, is a good receptacle. A wire bent into an S-shaped hook is handy to swing the pail over the forearm while the ambidextrous picker almost doubles the day's harvest if the fruit is extra plentiful.

There is hardly a state in the Union which has not plenty of wild fruits. The young citizens of each state should know these fruits and make the most of them. Some states or regions have fruits peculiar to themselves. Wouldn't it be worth while for the domestic science or cookery teacher in a country school to show her pupils how to utilize these home products? We hear talk about the cost of materials for use in classes in cookery. To let our wild fruits go to waste is poor economy whichever way we look at it. Wouldn't you, if you live in northern Michigan, like to exchange a pot of thimbleberry jam for one made in North Carolina from persimmons? Or if you live in Montana would you exchange buffalo berry marmalade with a Florida friend for guava jelly or preserved cumquats?

### WILD RASPBERRIES

Just the other day a girl from the shore of Lake Superior told me of a camping trip on a part of the lake shore inaccessible except by water. A storm on the lake kept them from going home when they had expected so they gathered raspberries and canned and jammed them till their sugar gave out, then until every available cooking utensil, even the coffee pot, was full and the supply of berries was as unlimited as ever. These great, luscious fruits, she said, were as big as the end of her thumb, and fairly falling off the bushes with the weight of juice.

Doesn't it make your mouth water? The pickers who live near the woods up there bring berries to town in milk pails. The fruit box may be more elegant, but there is a bountiful sound about the milk pail that takes my fancy. Of course, one gets scratched while berry-picking; but in what a good cause. Is there something wrong about boys and girls who prefer boxed berries and smooth hands to wild fruits and scratches? There are thousands of dollars wasted every year that might be working on some boy's or girl's schooling, just because nature's crop of raspberries isn't half harvested.

Wild raspberries should be canned, jellied, or jammed by the regulation methods. With a good oil stove all the work can be done in the open air.

#### **THIMBLEBERRY**

Do you know the thimbleberry? Some call it the flowering raspberry. You will know by its shape and general look that it is a cousin to the black raspberry although it is flatter, seedier, and more sharply acid. It grows on a bush or shrub somewhat like a raspberry, but its leaves are broad, like grape leaves. Instead of thorns its twigs are clothed with sticky hairs. The colour of the fruit is pinkish purple.

Thimbleberries grow often along woods margins, just back of the fringe of wild red raspberries. You are lucky if you get two cupfuls of the thimbleberries while your companion is picking two quarts of the raspberries. Yours pack more closely and the fruit is not so abundant.

The number of people who have tasted thimbleberry jam is small. I am told by one who has made it that you can get any price you ask for tiny glasses of it, even a dollar a glass, from people who "must have it." Made just as one does other jams, equal parts of fruit and sugar, there is nothing tastes quite like it.

## BLUEBERRIES

Blueberry pie was a staple and justly popular dessert in a certain college dining-room, where I first made its acquaintance. It was, of course, made of canned blueberries, and we used to wonder where they all came from. We certainly never saw them growing in the Mississippi Valley. The blueberry belt is a wide one and includes all the eastern and central states. I first saw them growing on Cape Ann, and later on the New Hampshire hills. The women and children used to bring them in small pails to sell at the doors of their less enterprising neighbours. But the price was always high and the berries not first class, unless we gathered them ourselves. It takes a lot of picking to get two quarts. One gets an entirely wrong impression of the blueberry business from these experiences.

The great canning factories do not depend on a haphazard crop. In New England and the eastern states there are thousands of acres of waste land, shorn of its forest, where blueberries grow in greatest abundance. It is not possible to estimate with any accuracy the value of this wild crop. Pickers get from one and one-half to three cents a quart, and the boxes sell in retail market at from twelve and one-half cents to eighteen cents a box. Northern Michigan shipped five thousand bushels one year. They ship better than softer fruits, but the price is always high and the supply small because the canning factories are near the fields, and shipping is expensive. One large factory uses seven hundred bushels a day. The total product of the Maine canneries ten years ago was worth over one hundred thousand dollars. That must be where our college cook got her supply.

Huckleberry and blueberry are the names used most commonly and you will meet people who know one from the other. But as both are blue and there are high bush and low bush huckleberries, as well as high and low bush blueberries, it is useless to discuss the names. Both are right and a huckleberry in Ohio may be a blueberry in Maine.

A sort of rake to gather blueberries is used for the low bushes. But hand picking is best. The rake tears the bushes so, and the berries have to be put through a fanning mill twice to free them from leaves and rubbish. This process fits them for the canners who are not as particular as we wish they were.

The blueberry bush is a kind of Indian. It does not take kindly to gardens and other civilized places. It thrives and yields abundantly if given a chance on its native hillsides, and comes up by the million wherever the cutting of the timber lets in the light. By burning over the blueberry land in very early spring while the ground is wet, those in charge can keep down the alder, poplars, birches, and other non-money-making growths, and this is taken by the blueberries as their chance. They come right up, and deliver a tremendous crop the first year after the burning.

#### WILD GRAPES

We used to gather wild grapes along the river bottoms in the middle West when we went nutting. Sometimes our nutting excursion turned out to be a grape harvest. These grapes were small, almost black under their thin coat of bloom, in clusters like miniature garden grapes. Oh, but they were puckery when green, but the frost sweetened them. The vines grew tremendously, way to the tops of the trees, their stems like great ropes, which we used for swings. The grapes were really mostly seed and skin, but there was juice enough to stain our aprons, and give the teeth and tongue an unmistakable telltale hue. There was juice enough for a kind of jelly which I believe had the peculiarity of never "jelling" properly. It is good, though, and they were well worth the sugar to make them edible.

I was surprised at their size when I first saw the big summer grapes of the eastern hedge-rows and banks. But their flavour is no great improvement over that of the frost grape. There is more pulp, though. My barberry gathering friend, who admits that she is "fond of all sorts of woodland flavours," gathers these grapes in August before they begin to change colour. She makes the only really green grape jelly I have seen. This is her receipt:

Wash the stemmed grapes very carefully to rid them of dust and possible taint from poison ivy, with which they often associate. Put them into a preserving kettle with a very little boiling water, cover and let them steam till tender. (No boiling here.) Strain to get rid of seeds and skins. (Work fast at this point, because delay may cause the change of colour we wish to avoid.) Weigh the juice and an equal amount of white sugar. Heat sugar and juice separately, without scorching. Stir the hot sugar into the boiling juice,

let boil up, skim, and put into dry, hot glasses. If it boils a long time it loses the green colour, and its flavour of the wild out-of-doors.

Green grape jelly that is really green is a triumph. It would bring a price.

#### **ELDERBERRIES**

Elderberries have almost gone out of fashion in these days of refrigerator cars and cold storage, when fruits from all parts of the world are brought to our doors. But I am antiquated enough to like the rather flat, seedy things, and the "runny" jelly is of a wonderful colour and flavour. Best of all is the fun of gathering the broad, flat clusters, always seeing a finer one just a few steps farther on or just over the fence. The golden-rod is brilliant in the September sunshine, the asters like star stuff sifted in every fence corner, while the fox grapes clambering over stray trees along the line fence fill the air with fragrance. Perhaps I could get on without the elderberries, but the New England conscience requires some practical excuse for traipsing off over the fields when there is useful work to be done indoors. Elderberries canned in a thin syrup, one cup of water, two of sugar, and all the berries the jar will hold, are excellent for steamed pudding. Drain off the juice, and stir the berries into the batter just as you would blueberries, mulberries, or any other fruit. The colour of the pudding will be awe-inspiring but with the juice for sauce it is good, really.

#### **BARBERRIES**

Our Westchester County hostess always took a basket on her arm when she went for a walk. She had an unusual taste for wild flavours of all sorts and her guests were always sure of some delightful surprise at her table. In September there is a choice of wild fruits, and everybody recognized the necessity for a basket. I wondered, though, when we passed, unnoticed, bushels of elderberries, and rods of browning grapes, and headed for a group of dogwood trees. But although the berries were thicker than I ever saw on the dogwood, they were only admired and left for the sun to burnish. High on a bare hilltop we sat where the view was panoramic. The lady with the basket betook herself to a fringe of tall, ruddy bushes on the brow of the hill, and I found her busily filling her basket with barberries. She did not wait to pick them singly but snipped off the laden twigs with scissors, avoiding thus the angry thorns.

"What are they good for?" I asked, as I tasted again the sharp, astringent flavour and felt that indescribable pucker on tongue and lips that goes with it. The barberry had long been a favourite with me; the bush for its wayward grace and its cunning flowers, the berries for their exquisite bloom and for tasting so unlike any cultivated thing. But I had never dreamed of making jelly of them.

"Jelly," said our hostess. "It's particularly good with game."

Of course it would be good with game, but can you imagine eating barberry jelly with corn-fed pork or with fat mutton?

The berries should be gathered before they are fully ripe and treated like currants, although the yield of juice is meagre. Add a little water and heat slowly. Strain and add "pound for pound" of sugar. Put in tiny glasses. Any one in search for a unique Christmas gift for an epicurean uncle would find barberry jelly fills the bill.

In Salem, Mass., I saw barberries for sale in the market. They looked mightily out of place along with pineapples, watermelons, grapes, peaches, Japanese plums, and other conventional market fruits.

#### **BAYBERRIES**

Two friends of mine, summering on Cape Ann, discovered there to their delight, a low shrub, growing in great profusion on the rocky hills. The foliage was of a rich green colour, of a leathery texture, and was possessed of an aromatic odour at once delightful and wholesome to their senses. They were seized with a great desire to take home with them a quantity of this plentiful foliage to make into pillows or to feed the fire on the hearth that they might inhale its fragrance, and be reminded of Cape Ann and the summer sea.

So they procured huge gunny sacks which they were at some pains to stuff to their utmost capacity. They have a snapshot of themselves, bent double under the weight of the great sacks. With the help of a friendly native they succeeded in transporting the burdens to the express office, and addressed them home. We cheerfully paid the expressman's charges at the home end, having been advised that the bags were coming, and carried them to the attic floor where they were to be spread to cure. But when the contents came tumbling out, its pent-up fragrance was familiar. Then was it possible

those blessed geese had been spending their precious vacation days gathering bay berry leaves? It was even so, and we had paid nearly two dollars express on the bags—and our woods were full of it! What a laugh we had at their expense when they came to reimburse us.

The bayberry shrub is also called wax myrtle and it is easy to see why, when you find the berries in October. They are gray, almost white, and you see that each one is covered with tiny drops of wax that has oozed out of the berry and dried on its surface.

Bayberry is called candleberry, too, because of the use our great-grandmothers made of the wax. Bayberry dips have come into fashion again and people who make them skilfully find a ready sale for their product.

#### **MAKING BAYBERRY DIPS**

To make bayberry candles you must first gather the wax-covered berries. Get them early, for, as cold weather comes on, the pellets of wax drop off. Two quarts make only a little ball of wax, so you must gather an enormous quantity of the berries. Put them into water and bring it to a boil, stirring well to be sure that all the wax is melting. Being lighter than water the wax will rise to the surface. When you think all the berries are bare, take them from the fire. As the water cools, the wax hardens on top. If the berries do not all go to the bottom you will have to melt the wax again over a slow fire or in a double boiler until the wax rises clean at the top; all dirt and refuse on its lower surface can be scraped off. Do not let the wax burn. Smoke is a sure sign that it is too hot. In a double boiler there is no danger.

To make the dips, take regular candle wicking, a soft, white, loosely twisted cord, cut it twice the desired length for the candle. Double it and twist enough to hold it together. The loop at one end is convenient to hold it by. Dip into the hot wax and then as it cools draw the wick down with finger and thumb so that it hangs straight and kinkless. A second dip adds a little to the diameter of the candle, the third another layer and so on till your first bayberry dip is finished. If the first effort is not a good shape and has to go back into the pot you needn't be discouraged. Didn't the first chocolate cream you ever made look like a chestnut gone wrong? But with patience it is possible for even a beginner to produce very shapely candles. They do not need to be absolutely regular. Paraffin or tallow candles, moulded just alike by the hundred thousand dozen, may be as round and perfect as

machinery can make them. Part of the charm of the bayberry dips is in these slight irregularities of shape and size.

#### WILD CRAB APPLES

Thickets of small trees, bearing little solid green apples are a feature of almost every farm in the prairie states. They are common also on the hilly pastures of Ohio, western Pennsylvania, and New York. The South, too, has its native crab apple. School children the country over loved in my day to fill their pockets with the hard, sour, little fruits and nibble at them surreptitiously under cover of a broad geography. But perhaps children's tastes have changed since that far time.

Modern geography must be different, anyhow. I saw one the other day shaped just like a fifth reader or history or any other. It just looked like any book, not one bit like a g'ography.

The little crabs were made into sauce or "butter," by pioneers of the prairie states. We washed, quartered, and cut out the wormy places, stewed them till soft with a little water, then put them through a coarse sieve to take out seeds, cores, and skin. The pulp was then sweetened with sorghum molasses and boiled; stirring is necessary to prevent burning. The appetites of those days did not demand dainty fare. Well do I remember a small visitor to whom our cookery was new whose demand for crab-apple-sauce-if-you-please was hard to satisfy. I believe crab apple jelly would be regarded a great delicacy by people of good taste, if once they had a try at it.

#### PERSIMMONS

The children of the persimmon belt, which includes a much larger part of the eastern half of the United States than many suppose, all know that the fruit of some trees is better than that of others. The 'possum knows, too, and lucky is he who finds both "fruits" on the same tree. There is a market for persimmons if they are gathered after frost, and a greater demand may be created. Seeing an unfamiliar fruit in the market is very likely to awaken the interest. Whether the buyer will want a second basket or not depends entirely upon the cleverness of the person that supplies the demand. The thoroughly ripe fruit is, according to an experienced traveller, "entirely without bitterness or astringency, sweet, rich, and juicy." What more can you say about watermelon or strawberries? But if you who gather the fruits

persist in hurrying them green into market you may expect that the prejudice against persimmons will grow stronger.

#### HAWS

Is there any good reason why some of the people who used to be boys should never have a chance to taste any thorn apples now that they are older? Perhaps these grown-up boys deserve to be punished for deserting the old haunts, but give them a taste of what the open road has to offer and maybe they will be tempted back to a simpler life.

The fruit of the May haw or apple haw of the far South is sold in the markets of some cities and is made into preserves and jelly. The Washington thorn which grows wild in Virginia and the other states not far from the capital city is also cultivated in many gardens farther north. It has run wild from these gardens and ranges over New York, Pennsylvania and neighbouring states. Though usually small, its berries are a beautifully shining scarlet and very numerous. It is worth risking a pound or so of sugar just to see what jelly they would make. The pear haw has a thick, juicy flesh, and some of the yellow ones are equally good.

#### WILD PLUMS

The wild plums of the East did not strike the early settlers as very much worth while. They were almost all seed and skin and the rest was "pucker." Quite naturally the plums of the mother country were preferred and sprouts were brought over and set in the gardens of our forefathers. These plum emigrants did so well in the new country that they escaped from the gardens into the pastures and roadsides, coming up wherever seeds were dropped. In such places they still flourish and are thought of as wild plums. They are gathered for market, but compare unfavourably, except with very old-fashioned people, with the garden-grown fruits of the same or similar varieties.

The pioneers of the middle West, however, found very fine plums growing wild in plentiful thickets. We used to gather these native plums in the Mississippi Valley, in great tubfuls. We not only appreciated the crop nature provided for us every year, but were far-sighted enough to realize that the time would come when the march of civilization would tramp out the plum thickets. So we planted them in orchards and gardens, taking those trees

that had given us the best crops of the biggest, finest fruit. In fact, the pioneers did just what we ought to be doing all over our country with other wild fruits and with nuts. The wild goose plum is a native which has founded a race of which there are many named varieties, much bigger and finer than the little, old, wild grandmother of the plum thicket, but they all have still that same tart tang, just under the skin, that gave to our wild plum "jell" its incomparable flavour.

Are the wild plums all forgotten? Must all fruit come out of boxes and have that stale taste of the town? Must it lose its characteristic aroma and give off only that general "markety" smell? Is "goin' plummin'" entirely out of fashion, even in the prairie states? I don't believe it is as bad as that. Do you believe that moving pictures or shoot the shoots or merry-go-rounds can begin to compare with such simple pleasures as plumming, graping, berrying, and nutting? I have tried both, and give me the old, homely pleasures every time.

The following extract from "The Tree Book" so well describes an annual outing of pioneer children that it is quoted in full:

"Do you calculate to go a-plummin' this fall?' The question was quietly put in father's judicial tones, but it sent an electric thrill from head to toes of every youngster. Mother's reply sent an answering current, and the enthusiasm of the moment burst all bounds. 'Well, you better go this afternoon. I can spare the team and wagon, and I guess John is big enough to drive. There's no use goin' at all if you don't go right off.'

"So mother and the children rode out of the yard, she sitting with her young driver on the spring seat, the rest on boards laid across the wagon box behind. What a jouncing they got when the wheels struck a stone in a rut! But who cared for a trifle like that? John's reckless driving but brought nearer the goal of their heart's desire.

"A lurid colour lightened the plum thicket as it came in sight. The yellow leaves were falling and the fruit glowed on the bending twigs. Close up the wagon is drawn; then all hands pile out, and the fun really begins. How large and sweet they are this year! Mother knows how to avoid the puckery, thick skin in eating plums. The youngsters try to chew two or three at once and their faces are drawn into knots. But they soon get used to that.

"Now the small folks with pails are sent to pick up ripe plums under the trees, and warned against eating too many. 'Remember last year,' says mother, and they do remember. The larger boys spread strips of burlap and rag carpet under the fullest trees, in turn, and give their branches a good beating that showers the plums down. With difficulty the boys and girls make their way into the thicket; but torn jackets and aprons and scratched hands can be mended—such accidents are overlooked in the excitement of filling the grain sacks with ripe fruit. How fine 'plum butter' will taste on the bread and butter of the noon lunch when winter comes and school begins. (The Pennsylvanian's love for 'spreads' on his bread leavened the West completely.)

"Other neighbours have come, and started in with a vim. It seems unreasonable to take any more. The bags are full, and there are some poured loose into the wagon box. Besides, everybody is tired, and John shouts that the hazel-nuts are ripe on the other side of the log road.

"A great grape vine, loaded with purple clusters, claims mother's attention. There will probably be no better chance for grapes this fall, and the sun is still an hour high. John chops down the little tree that supports it and the girls eagerly help to fill the pails with the fruit of the prostrate vine, while John goes back to command the hazel-nut brigade and sees that no eager youngster strays too far.

"Mother's voice gives the final summons, and the children gather at the wagon, tired but regretful for the filled husks that they must leave behind on the hazel bushes. A loaded branch of the grape vine is cut off bodily, and lifted into the wagon. The team is hitched on, and the happy passengers in the wagon turn their faces homeward."

Such was the poetry of pioneer life. Pleasures were simple, primitive, hearty—like the work—closely interlinked with the fight against starvation. There was nothing dull or uninteresting about either. The plums and grapes were sweetened with molasses made from sorghum cane. Each farmer grew a little strip, and one of them had a mill to which every one hauled his cane to be ground "on the shares."

Who will say that this "long sweetenin'" was poor stuff, that the quality of the spiced grapes suffered for lack of sugar, or that any modern preserves have a more excellent flavour than those of the old days made out of the

wild plums gathered in the woods? And this is also true: There is no more exhilarating holiday conceivable than those half days when mother took the children and "went a-plummin'."

#### NUTS

The wild nuts gathered in this country for sale or home use in the North are chestnuts, hickory nuts, black walnuts, butternut, hazel-nut, beechnut; in the South, the pecan and the chinquapin; in the far West, the pine nut. The least known of these in eastern markets are the pine nuts, which form a very staple article of food for many tribes of Indians in the Great Basin. John Muir says that there are tens of thousands of acres covered with nut pines. An industrious Indian family can gather fifty or sixty bushels in a month if the snow does not catch them. The little cones are beaten off with poles as the trees are not high, and are heated till they open and the nuts fall out from under the scales. I have eaten pine nuts in Turkish restaurants. They came as a surprise in a dish of eggplant stuffed with chopped meat, raisins, nuts, bread crumbs, and I know not what all else.

The native chestnut, though smaller, is far sweeter than the popular Spanish one. But it looks as if some foreigner must take the place of our native chestnuts in the woods as well as in the market. The chestnut disease which has driven the trees out of the parks and wood lots near New York City is baffling the scientists. Every year the deadline moves westward and southward and northward from its center. Perhaps a cure will be found before all the chestnuts are gone. If any region has a few trees which seem to withstand the disease while all the rest die, those trees should be preserved and used to propagate a race of chestnuts which would be immune. It may be that the Spanish and Japanese chestnuts will prove hardier than our own. These are being grown quite extensively in some Eastern states. They bear when remarkably young. Japanese chestnuts begin to bear, according to the nurserymen, "at three years of age, bear from three to seven nuts in a bur, each nut measuring from four to five inches in circumference." Trees five years old bear two or three quarts each and the yield increases rapidly from year to year. These bring fancy prices in city markets and are eaten either raw or cooked.

In growing chestnuts it is the practice first to cut down the old native trees. As in all likelihood these would be dead in a few years anyhow, this is

economical. Dead lumber is not as valuable as live lumber. The first year after a chestnut is cut, a crop of young suckers come up around the stump. These shoots are grafted with scions of a desired variety. There is a good story of a lad of twelve years of age who asked his father to graft a chestnut tree. Although the man was grafting apple trees at the time he laughed at the boy's idea. The lad did not forget and years after he put his idea into practice and now owns a chestnut grove which brings him an income of thousands of dollars. His chestnut groves are on waste land unfit for ordinary farm purposes. If one farm boy in every county would take an interest in growing the nuts that belong to his region, think how the value of the nut crop would increase. Every boy knows that the hickory nuts on one particular shell-bark are bigger and sweeter than on every other one he knows of. He and his friends try to get there first, before the "other gang" do, and make sure of their share. But does he ever plant any big sweet nuts along a fence row and take care of the young trees till they are big enough to take care of themselves? In the seventeenth century there was a law in certain European countries that every young man should plant a certain number of walnut trees. Unless he could prove that he had complied with the law, he couldn't marry. What a good idea! With such a law we might have more fine trees and fewer hasty marriages.

#### CHINQUAPINS

A coloured girl brought me a pint of chinquapins from her home in Ca'line County, Virginia; I sampled them eagerly, taking great pleasure in their diminutive prettiness, tidy shape, and rich, dark colouring. I kept a handful securely tied in the little salt bag in which they had made the journey and took them to my native state to show to the children, who had never seen a chestnut tree of any kind.

When I took the bag from the trunk, there was a dustiness about the feel of it that aroused my suspicions. I emptied the contents into a flat dish. There were my nuts, their glossy brown shells as smooth as ever, but empty. Rolling about amongst them were a lot of the plumpest little white grubs, fairly bent double with corpulency. There must have been one for each nut, for not a sound kernel was left.

I learn from chestnut-wise people that these weevils are another great enemy of chestnut culture, no remedy having been found.

The chinquapin is the Southern child's chestnut. It is sometimes a tree, but more often a low shrub. The bur is round and has only one nut in it. A good many are marketed, especially in Southern cities, and bring a good price when fresh. The weevils enter the nuts before they are mature and it is difficult to find the bad nuts till too late to prevent a disagreeable impression. This interferes with the popularity of the chinquapin as a dessert nut.

#### HAZEL-NUTS

The American hazel-nut flourishes over the eastern half of the United States. It is a sweet little nut, much more to my taste than the bigger filbert, which is so popular in our markets. We used to gather hazel-nuts in the edge of woods which fringe the little rivers of the Mississippi Valley. The bushes grew in thickets and while the big brothers and sisters gathered the nuts from among the closely interlaced branches that grew scarcely higher than their heads, the smaller fry crept in underneath and getting about on the floor of the woods searched for nuts that had ripened early and dropped from the browning husk.

There is no progress in simply going out in the fall and taking what nature furnishes. Unaided, the good mother goes on producing the same small nuts, caring just as patiently for the inferior ones and even encouraging the nut weevils to prey upon them. But I wonder if some boy or girl who thinks there isn't any interesting work to be done on the farm, could not make some experiments in hazel-nut culture.

The bushes grow readily from seed, but seedlings do not always produce as fine nuts as those that were planted. For this reason one can save time by selecting the bushes that bear the largest crop of fine nuts and propagating those. They grow in any well drained, fairly rich soil and I know of hundreds of miles of fence rows answering these requirements, which now produce poison ivy, cat brier and other harmful crops. Hazel bushes make a beautiful fence row, and yield a salable crop. Hazel bushes propagate naturally by suckers and layers. By manuring well in summer long shoots for layering will be forced. "These should be staked down in winter or spring and covered with earth. They may be removed to nursery rows or orchard at the end of the first season." So says W. A. Taylor in the "Cyclopædia of American Horticulture." The same writer gives directions

for pruning as follows: Strong shoots should be headed back to promote spur formation (the nuts are borne on short side shoots) and old wood that has borne fruit should be removed annually. Suckers should be kept down unless wanted for propagation. March or April is the best time to prune as they blossom very early and one must avoid cutting off either the young nuts or the pollen-bearing flowers. The nuts should be gathered when the husk begins to brown at the edges. If left longer, as is most often done, in the case of wild nuts, a large proportion of the crop falls to the ground and is lost. Beside, the dried hulled nuts do not bring as high a price as the fresh unhusked ones. If kept long in the husk they will mould, unless dried thoroughly. The nuts, however, will keep through the season in a cool place.

### WALNUTS

The fruit of the black walnut is enclosed in a globe-shaped husk. All country boys and girls know how that husk smells and how it stains the fingers. The nuts are very oily and must be treated carefully. They should be dried, preferably on the garret floor, hulled and stored in a cool, dry place. If for market, they should be sold immediately. They are very likely to grow rancid if kept. Billy, in the "Limberlost" story, had a piece of heavy plank with a hole in it, just big enough to let the husked nut through. He put an unhulled nut over the hole, then with a wooden mallet, he drove it through the hole. It came through clean.

The butternut or oilnut is from a tree closely related to the black walnut. It is called also white walnut. The husk is not so thick as that of the black walnut and adheres stubbornly to the nut if left to dry. The nuts get rancid if kept warm and should be marketed as soon as dry or kept stored in the cold and eaten before spring.

Pickled walnuts are a highly prized delicacy in households where "culturine" has not taken the place of old-fashioned household arts. The nuts are gathered when green, before the shell has hardened. If a knitting needle can be pushed clear through the nut, it is not too old for pickling. You will be fortunate if you can get a receipt from some housewife who has time for real culture as well as for making pickles.

*Receipt for Pickled Walnuts.*—(From my great aunt's cook-book.)  
Ingredients: One hundred walnuts, salt and water, one gallon of vinegar,

two ounces of whole black pepper, half an ounce of cloves, one ounce of allspice, one ounce of root ginger sliced, one ounce of mace.

Gather the nuts in July when they are full grown. They should be soft enough to be pierced all through with a needle. Prick them all well through. Let them remain nine days in brine (four pounds of salt to each gallon of water), changing the brine every third day. Drain them, and let them remain in the sun two or three days until they become black. Put them into jars, not quite filling them. Boil the vinegar and spices together ten minutes, and pour the liquid over the walnuts. They will be fit for use in a month, and will keep for years.

### BEECHNUTS

The boys of your neighbourhood may not know that the smooth, gray-barked trees with very long, slender, pointed buds are beeches. They may never have noticed the wonderful gray-green colour nor delicate texture of the newly opened leaves, nor the soft, silky flower head that bears the pollen. Too many boys think these preliminaries are of no importance. The chances are strong that when October ripens the nuts, nobody has any difficulty in locating beech trees, if there are any in the vicinity. Usually, in the wild woods, they grow in large groups of various sizes; the big trees sheltering the little ones until they are strong enough to live in the full sunlight. Do boys and girls find the beeches by instinct just as the mice, the blue jays, the squirrels, and the foraging hogs do?

Do you know why it takes so much longer to gather a pint of beechnuts than the same amount of hazel-nuts? They are pretty small; yes, but there's another reason. If you were to count your beechnuts, you would find it takes many more of them by count to make a pint than of the round nuts, because of their triangular shape. They fit so snugly that your pint measure of beechnuts is almost solid nuts. They are about the sweetest of the wild nuts. They are very rich in fat too, and in olden times an oil for table use was made from beechnuts. Olive oil takes its place now and costs less. There is a market for all the beechnuts you can gather. Dealers in tree seeds often have difficulty in filling orders. As the nuts do not germinate till April they may be gathered at any time during the winter, unless the wild folks have gathered them all. The chances are that to get any you would have to go early and search sharply. Once or so in a lifetime the burrow of a white-

footed mouse is discovered near beech woods. Are you hard hearted enough not only to break and enter, but also to burgle his hoard? Rather admire the little creature's industry and resolve to go and do likewise.

### HICKORY NUTS

America is the only country that has native hickory nuts. Of these the best nut producers are the shagbarks and the pecans. These two nuts are increasingly popular. People are planting these nuts and experimenting with new varieties, with grafting and cultivation, as never before. Pecan orchards are being planted in many regions and hickory nuts are being studied with a view to improving the kernel and reducing the hardness of the shell. The value of hickory wood in the making of tools and for fuel has made the lumber more profitable than the nuts. But with improved varieties this may not be true. The poor quality of the wood of the pecan has saved these native trees from destruction.

Hickory nuts have a husk as every country child knows; but the husk has a good-natured habit of splitting neatly into four equal parts which fall away from the nut when dry. There are several kinds of hickory which produce sweet, edible nuts, but the nuts of the true shagbark are the best. They grow on low hills near streams or swamps in good soil in the Eastern and Middle states as far south as Florida, and as far west as Kansas. The king nuts of the Mississippi are bigger, but not so good, although the price you get for them is good and the baskets fill faster than with the little shagbarks.

### PECANS

This nut tree grows in the South, and as the wood is too brittle to be very valuable nobody has cut it for lumber. Tremendous interest has been aroused during the past ten years in pecan growing. Pecan orchards are being planted in all sorts of soil, good, bad, and indifferent. The wisest planters have gone to nature to learn what kind of conditions the pecan requires. By cultivation and fertilizing and otherwise improving good natural conditions, many growers are succeeding. By planting nuts from trees that produce fine ones abundantly every year, and by budding these trees with scions from still finer specimen trees great improvement has been made. I have a picture of a pecan tree in Georgia, sixteen years old, which is nearly fifty feet high. It has borne already three hundred and fifty pounds of nuts and this year's crop will be over a hundred pounds. This tree has never

had to fight weeds, has always had plenty to eat and drink, was protected in winter while young, and now it is ready to foot all its own bills and give a fine profit. How many of us are ready to do that at sixteen years? The cultivation of pecans is only just begun. Very little of the annual crop of these nuts is harvested in orchards. In "The Tree Book" the author says that ninety-five per cent. of the crop is still gathered in the woods. The annual crop is tremendous, and the pickers get only three to ten cents a pound for the ungraded nuts. For the very best nuts, mainly sold for seed, the retail price is from fifty cents to a dollar a pound, which is from one to two cents per nut.

Who picks all these nuts in the woods? Surely, the boys and girls of the pecan belt do their share. Do they do it in a primitive way or are their methods worthy of the up-to-date American youngster? Professor Hume of the Florida Agriculture Experiment Station (Bulletin No. 85, 1906) gives suggestions for gathering the pecan crop in the orchard which ought to be useful to the "wild picker." The nuts ought to be gathered as soon as the most of the burs have opened. In orchards, the pickers use ladders for young trees and climb the big ones and gather the nuts by hand into sacks. Beating and shaking the trees is only resorted to for the nuts that are entirely out of reach. If allowed to fall on the ground so many of the nuts are lost that the profits are materially lessened. If practicable a large sheet should be placed under the tree to save this loss.

The nuts should be spread under some sort of roof to cure, which requires ten days or two weeks.

Have you ever tried the experiment of sorting and grading the nuts you gather? The fruits of wild trees vary greatly in their size and general appearance. The wholesale dealer who buys nuts undoubtedly grades them and gets a fancy price for the big ones. Why should you not benefit by this?

Pecans are graded by sifting them through screens, the mesh of which lets only those of small size through. You might build up a private trade in wild nuts by packing your best nuts in attractive pasteboard boxes and charging a good retail rate for them. The inferior nuts you could well afford to sell at the lowest wholesale price as your average would be higher than the wholesaler would pay for unsorted nuts.

Your fancy nuts would have to be polished in order to compete with the nuts sold in city markets. The polishing does not make the meat any sweeter, but it does make a more attractive dessert nut, especially now that folks are used to seeing them polished. This is done by putting some dry sand into a barrel with the nuts and rolling the barrel about till the nuts are polished. If you have a worn out barrel or box churn, as we once had, that would be just the thing. Fancy packages of five to ten pounds would be very much in demand at Christmas. The big cities are well supplied with this sort of thing, but in the smaller cities and larger towns there are always some people who know a good thing when they see it and to whom the local markets often fail to supply these little luxuries.

#### NUT GROWING

In Bulletin No. 125 of the Maryland Agricultural Experiment Station published in 1908 you may read: "The young and middle-aged should not only plant nut trees themselves, but should encourage the children to do likewise. Every farm boy ought to have a small nut nursery and be taught to plant and care for nut trees. Nothing more creditable could be done in the schools than to interest the boys and girls in the possibilities of nut production and to celebrate Arbor Day with the planting of nut trees."

Doesn't that read like sound advice? Think of the land on your father's farm to-day that is not working. Or if there isn't any idle land can you not persuade him to lend you an acre or so for experimental purposes? The chances are that he will encourage and help you because he wants you to be interested in the farm. But you may say to yourself: "Not much! I don't mean to stay on the farm. I'm going to work hard and get an education. I want to be a doctor, or a lawyer, or a banker." Nevertheless, you take the Maryland man's advice and set out some nut trees. Let us say you start your nut orchard at age fourteen when you have three years yet in the high school. Your trees will be set so far apart that some other crops will be grown between them; corn, potatoes, melons, or anything that requires good cultivation and fertilization. When you finish the high school your nut trees will not look very big, but promising. You go on to college and in four years you will see a big change. No crop is in sight yet but you are only twenty-one and ready to go to work. You may forget all about those nut trees for a few years but they are not forgetting their business. They will bear a few nuts some year, as if to try their hand at a new enterprise. Some day when

you are needing a sum of money to start in business for yourself, and you are wondering who will lend you that much, you will get word from the folks at home that they have harvested your first crop of pecans or English walnuts or Spanish chestnuts and have deposited a thousand dollars in the bank in your name as the net profits. Will you try it?

Before planting nut trees it is important to learn all you can by reading and by correspondence with your Experiment Station experts about the kinds that will do best in your region and on your soil. If more boys used a little forethought we should have fewer young college men struggling along on small salaries in work they dislike, just for lack of a tidy sum of ready money to set them on their feet at the critical time.

There are good reasons for this greater interest in nut growing in the United States. The use of nuts is more common than formerly but they are still a luxury. Wild nuts are scarcer, owing to the destruction of the trees for lumber. The food value of nuts is better understood than formerly, and many articles of food are manufactured now from nuts. Nuts as meat substitutes have come into prominence within a few years. This creates a demand which will increase. There is no danger of over-production. Now is the time to get into the nut business.

#### **TREE SEEDS**

In his book on "Forestry" Professor Gifford says: "Collection of tree seeds should yield good returns if properly conducted." That is good news, for if ever a crop was allowed to go to waste it is this crop of tree seeds. Any one who has seen a forest of young maples cut down by lawn mowers in the helplessness of their seed-leaf stage realizes that with any sort of forethought those seeds might have been made a source of income.

Professor Gifford says a little farther on that many of the seeds of our native trees can be more easily obtained in Europe than in America. We may learn many lessons in economy from our neighbours over there.

But who is going to harvest the tree seeds? A mechanic who earns a good wage cannot afford to gather tree seeds; neither can a bank clerk unless he does the work in his vacation. But our boys and girls are often at a loss to find ways of earning money. Here is a crop they can gather without danger of trespassing. There is a market for this harvest. Some tree seeds are

difficult to get and expensive; red pine for instance. Spruce trees produce seed only once in seven years. This keeps the supply short. In a spruce seed year every seed should be gathered. Pecks of hard maple seeds are swept up by street cleaners every year on our home street. They are worth a lot of money, yet the boys on the street never have all the cash they want to buy baseball gloves and circus tickets and bicycles. No enterprising reader of this book need ever lack for pocket money.

Remember, Professor Gifford said, "Collection of tree seeds should yield good returns *if properly conducted*." Every business to be successful must be conducted properly. There are some simple principles. You need not be an expert forester but the more you know about trees the better. If a dealer buys six quarts of *red* maple seeds of you he will be disappointed if you send him *silver* maple, discouraged if you send him *sugar* maple, and disgruntled if you send him *ash*. Furthermore, he will not send you the money nor any orders for more. If there is a maple tree with a peck of seed on it in your yard, in five minutes or less time you can find out what kind it is with "The Tree Book." Before the seeds are ripe write to a several seed men and tell them what you have; ask if they want any, at what price, and on what date. Some trees ripen their seeds in the spring, shake them off, and let the wind scatter them. In the case of some kinds, the seeds sprout within a few days after they reach the ground. These should be gathered as soon as ripe, spread out to dry for a few days, and planted within a few weeks at latest. Seeds of other kinds do not grow till the following spring. None of these should be allowed to dry too thoroughly. Nuts and acorns for seed should not be allowed to get dry over winter. These should be packed in moist sand and kept cool but not frozen. Cherry, plum and peach pits are better for being frozen.

The supply of white pine seed is never equal to the demand. The market price is said to vary from two dollars fifty cents to four dollars fifty cents per pound. You get a little over a pound of seeds from a bushel of unopened cones. White pine trees require two years to mature their cones and they set seed only once in every four or five years. But every year there will be some trees bearing seed. Nineteen hundred and four was a big "on" year in the New York white pine forests. You can tell when the tiny cones first appear that a crop is coming. The cones should be watched as August wanes and gathered before they open. September is the month as a general thing.

Boys can earn thirty cents or so a bushel gathering the full cones. But I should not be satisfied to let the other fellow get all the profits just because he knows how to cure and market the seed. That is easy. Spread the cones out in the barn to dry. Slat trays are best to get free circulation of air. You can make these at odd times before the crop is ready. A fanning mill comes in handy to thrash and free them from rubbish and imperfect seed. Market them immediately to avoid loss. If you are to keep the seed for home consumption, mix with dry sand and store in a cool but not too dry place. If allowed to dry or freeze and thaw they lose their vitality. Tree seeds need pretty careful handling.

Any one interested in gathering tree seeds should get information from books and bulletins on forestry. He should write to firms who make a specialty of selling tree seeds and they will help him by giving directions about the treatment of seeds.

Did you ever wonder where the nursery men get the thousands of apple trees they sell every year? Go a step back of the budding or grafting that is done in the nursery. Where did the little tree come from whose top was cut off after the first bud was set? It came from a seed; just any apple seed. And where do apple seeds come from? From apples? Yes, just any apples. Did you ever make cider on your farm? You put in whole apples, skin, core, stem, seeds, and all; shovelled them into the hopper. The pulp was squeezed dry and thrown away, wasn't it, at your cider mill? That is proof of the wastefulness of some good farmers. If the pulp were washed in tubs, the seeds would find the bottom (or the top) and they would bring a good price per pound.

#### COLLECTING CHRISTMAS GREENS

Once upon a time everybody who wanted Christmas greens had the fun of gathering his own. That was in the generation when all the grandmothers lived in the country and only the plain fathers and mothers and children lived in the cities. But now we children have grown up and our children want to go to grandmother's house for Christmas just as we did. Can't you imagine how surprised and disappointed they are to find their grandmothers living in city houses, even in flats? Didn't we tell them about going out to gather holly and mistletoe and ground pine and hemlock and even how we used to cut the Christmas tree itself in grandpa's woods? In the middle West

where Christmas trees do not grow in the woods we used to choose a shapely young oak. To make it look like an evergreen we used to get grandpa to go out with his big jack-knife and cut off the largest branches he could spare from the evergreens in the door yard. With good, strong twine we tied these to the branches of the oak. When all the decorations were on and the oranges and the apples and the popcorn strings and the candles *and* the presents, we children who had never seen a real live Christmas tree couldn't have told the difference. We didn't even mind the fact that some of the oak's outer branches were pine, some were spruce, some were cedar. It was all evergreen to us and all Christmassy. We were easy to please.

But now—alas! The gathering of Christmas greens has been commercialized. It has ceased to be fun, and has become a business. The boys and girls may share in the profits and perhaps get some fun out of it if they go about it right.

Holly, which of all the Christmas greens is the most popular, is a hardy and beautiful tree, which grows wild in great numbers in the Southern states and in the Chesapeake region. Many country boys and girls make easy Christmas money from the holly trees in their own woods. To these boys and girls I want to say "Don't kill the goose that lays the golden egg." A tree with fine berries on it this year will, if treated right, produce a good crop again in a few years. Pruning is good for a tree, but brutally hacking its head out destroys the tree's future, and the boy who does it is not a good citizen.

Holly wood is close grained, light, and tough and is valuable in some forms of cabinet work. Here is an industry that might be developed as a side issue in the holly trade.

The best market calls for holly wreaths. I have a picture of a girl of fourteen who can make sixty wreaths in a day and she gets six and a half cents for each. That is good wages for a girl of her age, but she must get pretty tired making wreaths every minute all day long. If she could help her brothers gather the holly for part of the time, it would be easier on her back. The wreaths are made on frames of twigs, twisted into circles, and tied. Young twigs of any flexible shrub are used. Somebody has to gather these. It is a wonder that more holly trees are not planted in door yards. And wouldn't it be a good idea for some boys to begin a plantation of holly now so they can

reap the harvest later? Holly will not go out of fashion in a great many years. But at the present rate the supply cannot last. The amount used every year is past belief. From one small railway station 150,000 wreaths! One year, several carloads were burned because the market was overstocked.

The time has come already when raising Christmas trees is necessary. They still come up like weeds in the woods where enough mature ones are left to seed the bared hillsides. The harvest begins in November and the trees are cut and sorted, roped to preserve their branches, in bundles of eight or less or singly, and stacked along the roads to await shipment. Hundreds of thousands are harvested every year. "No-Christmas-tree" clubs are being formed now to try to stop this wastefulness. We go too much to extremes. One Christmas tree used to be enough for all the grandchildren; but nowadays every one must have his own. If our children's children are to have real Christmas trees the boys of to-day must plant the seeds of the beloved balsam fir.

The man who discovers and makes popular a new kind of Christmas greens does everybody a good turn. One of the most remarkable "ten-strikes" ever made along this line was a sort of accident. A man who calls himself "Caldwell, the woodsman," describes his experience as follows: "It was several weeks before I found the evergreen that was to make the town of Evergreen, Ala., famous throughout the decorative world. Wandering through the woods one day, my attention was attracted to a beautiful green vine hanging from the topmost limb of a small dead oak. I caught hold of the vine and pulled it down, and was much astonished at the ease with which it came out of the tree, and the fact that it seemed in no way injured by my rough treatment. On carrying it to my new home, I arranged it around the mirror in my room, and, after leaving it there for about a week or ten days, found that it was as fresh and green as ever."

Mr. Caldwell saw that in wild Southern smilax he had found a plant that possessed all the good points required for wholesale decorations. It is used everywhere now. City florists cannot get enough of it. The plant is a perennial, renewing itself every year, and grows in greatest profusion in its wild habitat. He had an uphill job, though, convincing the fashionable florists of the value of this plant. But he persevered and now he ships five thousand cases of it a year at an average profit of one dollar per case.

Young long-leaf pines grow in the South and are now used extensively for Christmas decoration in the North. It seems a pity to kill a pine tree every time one of these is cut, but in places where the seedlings come up too thick for good forest growth cutting out some is a benefit. If only the gatherers would be conservers as well!

The collecting of ferns in the woods is a business suited to the country boys and girls. This has grown to a really great enterprise since the rage for country things has struck city people. There is some sham about every fad of this kind, but the fern gatherers are not shamming. They do the real work. To succeed in this, one must not work haphazard. He must know just what his customer wants, and the buyer must know just what the collector can supply. *Ferns* is a big group of plants, and some of them you couldn't sell. If Christmas ferns grow plentifully in your woods, you can gather them by the thousand fronds. But will the florist buy those leaves which have the brown spots (or spores) on the under side? Find out before you waste your time. Those spores are more valuable in the woods than on the garbage heap. The boys who pull the plants up by the roots are killing their own goose. The fern can spare all the perfect leaves you find on it in the fall without much if any damage. A new crop will be forthcoming next year if the roots are undisturbed. Scissors and care used in gathering only good leaves will pay now, as well as in the future.

There are a number of wild things that deserve more popularity. Bittersweet is lovely and lasts forever, nearly. You seldom see it in the market, though. Sumach too, has great decorative value, yet whoever saw it in a florist's window? Cattails, pussy willows, spice bush, dogwood flowers and berries, Solomon's seal, and a score of other wild flowers are already in use. But there are others you may be able to introduce to city people. It is surprising what they will buy and admire if it comes from the country. I rode on a suburban car one day behind an armful of poison ivy. It was brilliantly beautiful and I suspect the gatherer wished I had kept still when I told her what it was. If she hadn't had a child with her, I should have let her risk it. Maybe she was immune. Most people are. The funniest thing I ever saw for sale was a basket of skunk-cabbage flowers on Broadway. The shrewd old farmer who had them for sale got a quarter for two. He called them Japanese lilies.

I wonder that the winter berry has not found more favour for decoration. Two kinds of shrubs with this name are common in our Northern woods. They are both hollies, but, unlike the Southern holly, lose their leaves. One has bright orange-coloured berries, the other is covered with a great profusion of bright scarlet fruits. Nothing could be more effective in a large vase in a dark corner. They light up handsomely at night or in the sunlight.

#### MEDICINAL PLANTS

There are a good many kinds of aromatic roots and medicinal plants which are kept in stock at drug stores. Some of them are rare and bring a good price; like golden seal at a dollar or over per pound. Digitalis in the drug store is foxglove in the garden; but who ever thinks of gathering its leaves and finding a market for them? Somebody must or the supply would run out. The leaves of the second year's growth are dried for medicinal uses.

Wild ginger root is used in preserves and for confectionery. I have seen it in market and wondered who gathered it. Preserved calamus root, too; who buys that unless it is Br'er Rabbit? There is a Bulletin of the Department of Agriculture on "Weeds Used in Medicine" that you ought to have. The list of weeds used in medicine will certainly surprise the unenlightened. How do you know that your doctor isn't dosing you with burdock, dandelion, dock, pokeweed, foxglove, mullein, tansy, boneset, catnip, horehound, fleabane, yarrow, or jimson weed? All these and many more common weeds are collected by somebody, dried, and used in medicine.

#### POKEWEED

Pokeweed roots are poisonous. The berries are not. They are used to make a syrup with which to colour frosting for cakes and the like. Receipts for this are to be found in many cook books. But the best part of pokeweed is not the fruit. In early spring, when asparagus is expensive and scarce, the pokeweed shoots grow rank and as thick as your thumb in fence corners. They will take entire possession of a large garden in two years if given the least encouragement. I cut the stems when about a foot in height. They are covered with short leaves which are best removed except at the end of the shoot. Cook exactly like asparagus, and dress with butter or cream. They resemble asparagus somewhat, but are more delicate in flavour and less woody in texture.

## WALKING STICKS

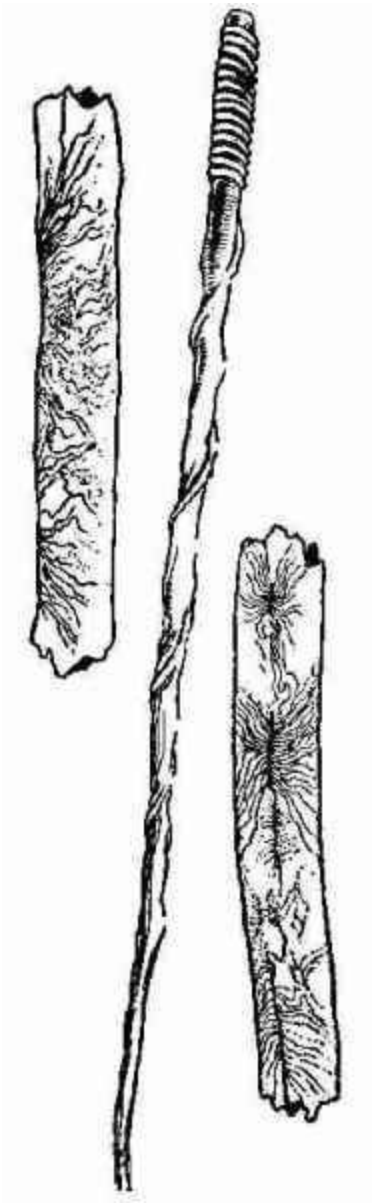
I once knew a stubborn man who was convinced that an unproductive orchard full of old gnarled trees on his place was good for nothing but firewood. He had the trunks cut into stove lengths and then burned the brush in ten huge piles. As the last pile was about to be fired, a manufacturer of umbrella handles offered him ten dollars for what was left. Imagine his feelings! Thousands of handsome walking sticks and umbrella handles are made of apple, cherry, and such woods. The makers cannot get enough of it and yet every year how much salable wood must be burned in the form of prunings. There is a true story of a young man in Florida who paid his way through college by collecting orange wood suitable for walking sticks. This wood is still popular for the same purpose, and the idea is worth passing along.

Roots of quaint or grotesque shape are often found in the woods and may be used as handles of umbrellas or walking sticks. I have a stick made of a small sapling upon which a branch of bitter-sweet had entwined. As the sapling grew in circumference, the coils of the climber had not been loosened but had become imbedded in the wood of the little tree. The long vine was not cut off, but trimmed and wound round and round at the head of the stick to make it large enough to grasp comfortably. Such a stick is an interesting gift for a friend.

Another pretty bit of nature's handiwork is a walking stick engraved by the engraver beetle. These little insects make their burrows just under the bark and they often work on small branches of a great variety of forest trees. Remove a bit of loose bark and ten to one you will find it carved with a more or less intricate design by the engraver beetle. Could you do as neat a piece of work? A thorough brushing and oiling are all that such a stick needs to make it an ornament to the hat-rack.

Sticks intended for handles or canes cannot be bent when dry. They should be steamed until flexible or buried in hot, wet sand till you can shape them. Boiling for a half-hour will sometimes make a piece supple. Fasten in the desired shape with stout cords and dry thoroughly before releasing. Sticks that are slightly crooked may be straightened by putting them into a bundle with perfectly straight pieces and winding with strong rope; let them dry in

this bundle. Sticks which are to be peeled should be partially dried first but not by artificial heat. Rapid drying is likely to split the stick.



**Walking sticks  
decorated by nature**

#### **WILD FLOWERS FOR CITY CHILDREN**

Children who live in the country part or all of the year do not know how much pleasure they might give if they would gather wild flowers and send them to city children. There is a society which distributes flowers thus collected in New York but maybe there is none in the city near you. The commonest flowers, even the weeds like daisies and dandelions and black-

eyed Susans, are eagerly taken home by children who are so poor that they never even saw a park, much less a meadow. In one city school over two hundred children had never seen a dandelion. A lady once started with a bunch of daisies to give to a city friend. She was met at the ferry with, "Please give me a flower." She went on up the street. "Won't chu gimme one o'yer flowers?" Children seemed to appear from every direction; maybe they were always there and she had not noticed them before. The grown-up friend did not get any flowers but she got a good story instead. Mr. Jacob Riis founded a flower mission on a similar experience. It is fun to gather flowers anyhow, and if you can make some other child happy even for a few minutes it would be even more fun. This is only a hint.

#### **SHELF FUNGI**

Have you seen those outgrowths on dying and dead trees which stand out like a shelf? They are called bracket or shelf fungi. If you have an artist friend who can make beautiful things on these by carving them with little engraving tools, gather all you see for her.



Photograph by Verne Morton

## **Gathering Wild Flowers for City Children**

### **DANDELION GREENS**

Do your folks cook dandelion greens? Mine never did but since seeing them for sale at so much per half-peck I have come to think that they must be eatable and have wished we had gathered and sold the bushels that grew in our lawn.

### **CORN HUSKS**

Corn husks is a crop that used to be more eagerly harvested than now. In the corn belt, where the husking is done in the field, the husk is left on the stalk and would therefore be hard to get. But where corn is snapped, husk and all, and left to be husked at leisure in field or barn, the husks can be saved with profit. For summer beds they are cheaper and softer than hay. For porch cushions they are far superior to excelsior. For braiding into mats they are really valuable, and well-made ones bring a good price.

Cornstalks yield another crop that is little known. Collectors of insects use thin sheets of cornstalk pith to line their insect boxes. It is peculiarly adapted to this purpose. They cannot get a large supply of it, yet what boy in any great corn state could not get a ton of it if he had the gumption. Ask the entomology man in your state Experiment Station, if he needs cornstalk pith. If you live in a cactus country, ask him if he could use thin slices of the pith from the flower stalk of the giant cacti.

#### FRAGRANT HERBS AND GRASSES

Of the fragrant herbs, grasses, and shrubs which nature provides, nothing is more in demand than sweet grass. In the parts of the country where it is abundant, people still gather and cure it and make useful baskets and mats of it. Sometimes it is combined with birch bark or porcupine quills or both by skilful Indian women who learned how from their grandmothers. The good market for such things will keep the art of basket making from becoming a lost one.

Indian maidens are not the only ones who have learned basket weaving. Indeed this has almost taken the place of patchwork, for girls, except in very old-fashioned families. Clever girls will not be content to use only such conventional materials as raffia and reeds. Often the colours of those you buy are so crude that you cannot make really artistic things of them. Some of the native grasses, flower stalks, strips of palmetto, rushes, soft inner corn husks, cat-tail leaves, and sedges are used. One basket maker has used the shiny brown stems of maidenhair ferns and the effect is very pretty. Another uses long pine needles in her weaving. Most of these materials are unfit for use when dry and brittle, but books on basketry tell just how they can be made pliable. Grasses are usually at their best just after flowering.

The dried leaves of sweet fern, sweet clover in blossom, balsam fir, and bayberry make sweet smelling cushions and bags for bureau drawers and

couches.

#### BALSAM LEAVES

In gathering what you hear called "pine needles" for pillows be sure you have the right kind of trees before you begin to gather the leaves. Pine needles are long and stiff and sharp. A pillow made of dried ones would not be a very fragrant nor a very comfortable thing. What you want is the short, soft leaves of balsam fir. These retain their wholesome odour after being dried. In five minutes you can learn to tell the balsam from spruce, hemlock, and cedar, the other common short-leaved native evergreens.

#### BIRCH BARK

Camping parties often leave a trail of devastation behind them which would shock the most hardened and wasteful one of the lot. This is largely if not entirely because they are ignorant, not because they are intentionally breakers of the laws of the woods. Indeed they are probably very ardent believers in the theory of conservation. Has it never occurred to them to practise it?

In the matter of collecting birch bark much damage has been done. Some people in whom you have confidence say: "Oh, no. It doesn't hurt the tree." So you strip off layer after layer; such a fascinating occupation, I do not wonder you hardly know when to stop. But read what Miss Rogers says in "The Tree Book:" "The feminine tourist in Northern woods loses no time in supplying herself with birch bark note-paper. The bark is usually removed in thick plates, from which the thin sheets may be stripped at leisure. These sheets are orange-coloured, with a faint purplish bloom upon them and darker purplish lines. Alas! for the zeal of these tourists. They usually cut too deep, and the strip that tears off so evenly girdles and kills the tree, because nothing is left to protect the living cambium. A black band (of mourning) soon marks the doomed tree, and it eventually snaps off in the wind."

I know a girl who killed thirty-seven beautiful birch trees before any one showed her how she could get plenty of bark and leave some for the tree beside. She was perfectly horrified when she realized what she had done. So few people know that the live part of the tree is not at the heart—that is

quite dead—but just under the skin. Cut off the bark in any large quantities and your tree falls an easy prey to disease.

Hiawatha was not the first Indian to use the canoe birch for practical purposes. His ancestors used this bark for all sorts of utensils, dishes, baskets, buckets, and for their canoes. They sewed the pieces together with fibrous roots and filled the cracks with wild gum or pitch. The Indians of nowadays have degenerated and the things they make have become less artistic. I lately saw a buckskin pouch, decorated with exquisitely woven bead work, in simple but charming design. It was a piece of real Indian handiwork, but the whole effect was spoiled by a lining of coarse red and blue and green gingham and the pouch flap was secured by a thong looped over a large white agate shirt button!

In trying to imitate the Indians at their game of making things out of birch bark, quills, sweet grass, and other natural materials, let us keep clear of the shops and use only what combines naturally and artistically.

#### PORCUPINE QUILLS

"Give me of your quills, O hedgehog!" Hiawatha was talking to a porcupine, for the chances are that he never saw a hedgehog. Poets ought to know better than to confuse their "critters."

A real Indian boy in the woods knows that porcupines give up their quills all too willingly. It is strange that the wild beasts of prey and the domestic dogs cannot learn this and let the porcupine alone. They have no quarrel with him. He eats the bark of trees, and goes about his own affairs. There isn't a word of truth in the story of his shooting his quills. No doubt he would if he could, if sore pressed, but he can't. He bristles them up when attacked and then woe be to the tender nose that touches the sharp points! The quills let go of their original owner very easily, but being barbed on their outer end they bury themselves in the soft parts of the attacking animal. With no thought of revenge in his rather witless head, the porcupine may pronounce the death sentence on his captor.

Porcupines are hunted for their quills and easily captured by men as they are slow and awkward. The quills take a pretty polish and their cream white and shaded brown colours blend softly with the tints of birch bark and wild grasses with which they are combined by basket and mat weavers.

## MAPLE SUGAR MAKING

Most of the fifty million or so pounds of maple sugar made in this country is made in six states, Vermont, New York, Ohio, Michigan, Pennsylvania, and New Hampshire. The boys and girls of these states have exceptional opportunities of studying the mysteries of tree life and of sharing the bounty the maples provide. I was not brought up in any one of the above-named states, yet I remember the maple sugar making in the woods along the river. One of my early recollections is of a party of Indian women, on piebald ponies, bringing fascinating heart-shaped cakes of maple sugar to exchange at the farm for fresh meat. Theirs were no pale, anæmic, delicate squares of creamy texture, but ruddy and hard. Less discriminating than now, we children ate with relish the coarse sugar almost black from the bits of bark, chips of leaves, and twigs which had undoubtedly been boiled with it. Nor did we innocents turn from it with loathing when told by a teasing uncle that its colour was due to the sirup having been strained by the Indians through their blankets. We didn't believe it then and I don't yet. How very bad for the blankets!

The Indians discovered the maple sugar industry long before they themselves were discovered by white people. They taught our New England ancestors how to tap the trees and boil down the sirup and how to "sugar off." They had little or no sugar except what the maples supplied. The Indians had very primitive ways of tapping the trees, collecting the sap, boiling, and sugaring. These ways have been improved in the last three hundred years. Although wooden buckets and home-made spiles made of sumach branches may still be used where only a few trees are tapped, the up-to-date sugar maker has modern, patent, covered buckets, spouts, and evaporators. He uses a thermometer and knows "for sure" when to shut off his fire if he wants to make sirup, and how high the temperature may go to make the best sugar. He knows, too, whether he can afford to make sugar which tests eighty per cent. or ninety per cent. pure and get the bounty, if his state pays one, or if it costs him less labour and expense to sell his entire product in the form of sirup.

But scientific methods can never take away the charm of maple sugar making. There is so much yet to be learned from the trees about the whys and wherefores of their behaviour during the harvest, that our interest in maple products increases as our interest in mere "sweets" decreases.

If you have a "sugar bush" planted by your great-grandfather, the chances are that you have had annual opportunities to help in making sugar, ever since you could drive a horse on frosty mornings to collect the sap. But I am going to suppose that during the winter you have been reading "Trees Every Child Should Know" and have been identifying the trees about your home. The maples are about the easiest trees to identify when leafless. Suppose you have found several maple trees, good big ones, right in your own door yard. The hard or sugar maple is the one most frequently used for sugar making, but experiments show that soft maples make good sugar too. It isn't worth while to tap trees in winter. The sugar is in them all right because the leaves were storing up the starch all summer. This starch has been changed to sugar in the living cells of the wood. But you couldn't get any of it until the sap begins to run. It does this with the first warm, sunny days of February.

After locating all the trees you expect to tap, you must make some preparations so that you will not lose any time at the critical moment. I knew one boy who got his bit and brace out the first thing, bored a hole in the tree trunk, and lost about a gallon of sap before he could get a spile and a pail ready to catch it. You want a spile or spout for every pail and a pail for every tree. The patent spouts have a hook upon which the bucket hangs. If you use sumach spiles you may have to set the bucket on the ground where it is likely to get dirt in it, tip over, and it is so far from the spile that the wind blows the sap away from the pail entirely. The pails should be generous in size unless you expect to collect the sap more than once a day. An average yield per day is five quarts per hole. The pails and spiles should be in readiness before "sugar weather" begins. Beside the pails and spouts you need a wooden mallet, and a bit and brace or small auger for the outdoor work; a kettle for boiling down, a large jar to put the fresh sap in, and a dipper to dip it out, a strainer and a skimmer for the indoor work. If you boil your sap outdoors using cheap fuel you will make more out of your enterprise than if you use coal or gas. A good sap-running day is a warm, sunny day after a frosty night. While the days and nights are about the same temperature the sap does not run much.

The best place to tap a tree is about four feet from the ground, and fortunately that is the easiest place to work with the auger or bit. The bit should be bright and sharp; a dull, rusty bit makes a shabby hole in the

wood with a lot of woody shreds which clog the flow of sap. Clean out the hole, as any chips left in stop the flow in the same way. The bit or auger used should be about one half inch in diameter. A bigger hole might give more sap but would injure the tree more. The tree fills up the smaller hole in a few years with new tissue. The hole should not be deeper than three inches. It is a mistake to think that the centre of the tree holds the sap. As a matter of fact there is less there than anywhere else and more as you near the surface. The living, active part of the tree is just under the bark. It is necessary to say this over and over again so that people will get it into their minds. The Indians used to tap the trees on the south side because they said more sap came from that side. Experiments show that on warm, sunny days, this is the case. On cloudy days, however, sap comes about equally from holes on all sides. If the trees have been tapped before, it is best to tap at some distance from the old places. The size of the auger and spile should be the same and the latter should be forced in tightly, and not fall out when the pail is full.

Pure sap makes the clearest sirup and the lightest-coloured sugar. Every bit of dust, leaves, twigs, or bark that gets into the pail leaves its mark on the sugar even though strained out. So covers on the pails are preferred if one can afford them. Most of the sap runs between nine o'clock in the morning and noon. It has been found by tests that this morning sap has more sugar in it than that which runs later in the day. It is the custom in some places to throw away the ice if the sap freezes. This is very wasteful, for this ice contains about thirty per cent. of the sugar. Of course, melting ice is expensive business so one must try not to let his sap freeze. The sap in the storage jar or tank must not be allowed to get warm, though, as it may sour. It should be boiled as soon after gathering as possible to ensure best results.

Maple sap contains other ingredients beside water and sugar. In boiling, the water passes off in steam and the sugar and other solids remain. The changes in colour from clear sap to dark brown sugar is caused by the action of the heat upon the sugar and other substances. All sugar makers know that the lightest coloured sirup and sugar can be made from the earliest run of sap. That is because, as the season advances, more of the lime, potash, magnesia, and other substances are present in the sap. You see the tree does not stop work just because you tap it; and the sap is changing

every day until, by the time the buds begin to open, the sap is so changed that it does not make good sugar at all.

Water boils when it reaches two hundred and twelve degrees, Fahrenheit, as any thermometer will tell you. In fact, you cannot heat water hotter than two hundred and twelve degrees, for at that temperature the water becomes steam. A mixture of sugar and water will not boil at two hundred and twelve degrees but requires a higher temperature. Therefore, as the water passes off the sap in boiling, and as the amount of sugar per gallon increases, it gets hotter and hotter. It is necessary to watch boiling sap carefully to avoid burning. In making sirup it is important to have it just thick enough to taste right and not so thick that it will granulate. Sirup that weighs eleven pounds to the gallon has long been considered as "just right," and it has been found by testing that if you take the sirup off the fire just as soon as the thermometer registers two hundred and nineteen degrees it will weigh eleven pounds to the gallon and will not granulate. If you take it off when the thermometer says two hundred and sixteen degrees your sirup will be a pretty fair article, but you cannot expect to get as good a price for it, because it has more water in it than there should be in a prime article.

When the sirup has boiled down to nearly two hundred and nineteen degrees, it is necessary to pour it off or strain it through thick cloths to take out the dark-coloured impurities. After this the sirup is heated again to boiling point and sealed in jars or cans.

A gallon of sirup will make between eight and ten pounds of sugar. Can you afford to make your sirup into sugar at this rate? It will depend upon the relative price of sugar and sirup, the cost of your fuel and the value of your time and whether your market wants sugar or sirup. There is a good and increasing demand for pure maple products, especially in the form of confectionery. If you can work up a market for fancy maple sugar in the form of bonbons it will bring a fancy price. This is not so hard as it sounds but it takes enterprise and gumption and perseverance and knack. Here is a job where brothers and sisters can work together to very great advantage and add to their store of college money by discovering and harvesting a crop right at home which in many cases has been neglected for decades. If you have city cousins they will help you sell your products among their mates. It will pay you to prepare small sample parcels, enough to whet the appetite but not enough to satisfy. I remember receiving a number of

packages of maple cream from a Vermont friend. The price per pound was equal to that of the finest candy and I wanted to share with all my friends. But I couldn't afford to give away pound packages to everybody. I might have created a large demand for this delicious confectionery, had I been able to get sample packages to give to friends. This year I am to have them.

It adds wonderfully to the attractiveness of maple sugar to have each cake or bonbon wrapped in its own piece of waxed paper. This is a kind of guarantee of dainty handling that is appreciated by the purchaser. A shoe box is hardly a dainty parcel, yet I know of one unimaginative maple sugar man who packs his cakes in just such boxes. There is a chance for some one to "make a hit" in this line.

#### WILD RICE

Wild rice sells for two or three times the price of ordinary rice and the supply never meets the demand.

"But who wants it and what for?"

Wild rice is not likely to become a popular breakfast food except among the Ojibways, yet a lot of time and effort have been spent on trying to find out how to grow crops of it. The reason for this is that nothing fattens wild ducks, geese, and other game birds quite so satisfactorily. Where the wild rice flourishes there is the hunter's paradise in September. This is reason enough for wanting to grow wild rice. When our true American sportsmen awoke to the fact that game was scarce and realized why, they set about protecting the wild fowl and studying their habits so as to better supply ideal conditions for the remnant to increase. This is conservation and boys that help in such enterprises are truly patriotic citizens.

Wild rice grows in swamps, shallow lakes, and sluggish rivers covering immense areas in the Mississippi Valley and the middle North-western states. Mud is a necessity to its growth. It grows taller than a man's height above the water and its seed comes in a loose spray at the very top of each stalk. The plants die every year and new ones come up from seed. The grain begins to ripen early in September and keeps on until heavy frosts. This is all right for ducks but it makes harvesting a very difficult task. The Indian women of the wild rice regions go out and shake the heads over their boats. They have to go again and again. If they left it till all the grain had ripened

they would get very little seed, because the wild rice falls as soon as it is ripe and lies in the mud till spring. The long-hid secret of the many failures to get wild rice to grow from seed was discovered by some scientist to be this habit of lying in the mud over winter. Thoroughly dried seed does not germinate.

Wild rice is queer looking stuff. The grains are black and very long and slender. Some of them are an inch long. It is said by some to be very good eating, especially as prepared by the Indians. They parch it usually, but sometimes it is made into a sort of porridge and eaten with maple sugar.

Practically, the best market for wild rice will always be amongst the wild fowl and it is a sportsman-like act to gather the seed and propagate it for their sake.

#### GATHERING SPRUCE GUM

If spruce gum were used only in the manufacture of "chewing-gum" we had much better let the crop go unharvested. It serves a useful purpose in the tree which produces it. When you have a cut or bruise you like to put something on it that excludes the air. The tree acts on the same principle. The live part of the tree is just underneath the bark. Trees are liable to many kinds of injuries. The winter winds strain them sometimes to the point of splitting, a heedless woodsman blazes the bark in passing, wild creatures gnaw or scratch the trunks, a woodpecker digs a hole through the bark. Any injury of the living layer is like a "hurry call" to the cells where the resin is stored. These cells are the health department. They send out to the injured part a covering of balm, a salve which seals the wound effectually from contact with the air. We cannot say that the tree knows that the air is full of the germs of decay and that to let them get a foothold means decay and sure death; but the tree has something that serves the same purpose as knowledge.

Physicians make use of the resinous gums in preparing medicines, and druggists always try to keep a stock of spruce gum on hand. Collectors find their best market for it in the drug trade. The best quality brings as high as one dollar and fifty cents a pound, while one dollar a pound is not too much to expect for the average collection.

All the spruces yield gum, but the best quality is said to come from the white spruce. The first thing to do then is to learn to recognize this tree on sight. It will take you and a tree book together about five minutes to distinguish between the three short-leaved evergreens which look so much alike to a novice, the firs, the hemlocks, and the spruces. When once you know the spruces by the looks or the feel, you will begin to know the white from the red and black spruce by the colour. Everything about the white spruce is paler than the others. The foliage is light, almost pea-green, and the bark is not ruddy but grayish-brown. There are thousands of acres of spruce woods in our northern Central and New England states. Boys and girls on camping trips can sometimes collect spruce gum enough to pay expenses and have fun doing it. The only equipment necessary is a heavy pocket knife, a gum spud, a canvas sack, a strong hand, and a pair of sharp eyes. The eyes will get sharper as the knife gets dull and the tree you found nothing on in the morning of your first day may yield a good harvest on the return trip. You will not be able to buy a gum spud, but a tinsmith can make one for you at small cost, according to these directions: Solder a piece of galvanized iron into a funnel six inches deep, three inches across the top, and one inch in diameter at the bottom. A ferrule two or three inches deep and an inch in diameter is fitted into the bottom of the funnel and soldered in tight. Fit a long handle into this affair and your spud is ready. You may count on a good majority of the gum you find being out of reach of the knife but the spud gets it down very successfully.

The best place to find spruce gum is undoubtedly in woods where no one has been "gummin'" before, at least not for five years or so. The most plentiful supply is said to be on slopes where the trees have a southern exposure, and the smaller trees yield more gum than the big ones. Your work is not done with collecting, for in order to get the best price you must present a fancy grade to the market. If your gum is all thrown in together, good, bad, and indifferent, your average price is pretty sure to be less than for a carefully cleaned and sorted lot.

Spruce gum can be collected in summer or winter. Which time is better for you depends on circumstances. There is a peculiar charm about gum hunting on snow-shoes. A young man suffering from too little fresh air and attendant ills might find his health among the spruce trees while the gum paid the bills.

## MUSHROOMS

"Are you sure these are good mushrooms?" I asked my seven-year-old daughter.

"Yes. I'm sure. Don't you know Aunt J—— says that all the *Coprinæ* are edible?"

This is a true story and it only goes to show that even a small child can learn that there are a small number of unmistakable mushrooms, which are edible and there is never any danger of being wrong about them. The puff-balls, for example, are all good to eat. When we found the neighbour's children kicking great white spongy puff-balls in the pasture we begged them to let us have them instead. "Pap says they're p'ison" was their reply, but we heeded them not for their "pap" was no oracle of ours. We were quite willing the children should go on thinking puff-balls were poison, if only they would not use them for foot-balls. Nobody in his senses would try to eat puff-balls after they have begun to turn black or brown. But when they are white and tender they are very good. Skin the ball, slice thin, add water and a little salt, and stew for twenty minutes or so. Drain and dress with cream sauce. No doubt puff-ball slices broiled over a camp fire with bacon would be good. I wish I had tried it, but I never have. We will agree that no puff-ball can compare with the pink-gilled meadow mushroom, but we make no such claims for it.

The best place to look for puff-balls is in old pastures in late summer and early fall. The giants are sometimes as big as a milk pail. The pear-shaped ones grow on tree stumps and are as big as your fist or smaller. There is an endless variety of tiny ones of all sorts which are either too tough or too small to bother with. But no puff-ball is "p'ison," not one.

Boys and girls who like to harvest nature's crops are missing a lot of fun besides many pecks of delicious food by neglecting the common edible mushrooms. If you know a few good ones you are perfectly safe. When you have seen them a few times and gathered them a few times and compared them with photographs you are ready to eat them. I should advise always to go mushroom hunting first with some experienced person. Personally I take no risks. For instance if my book tells me that "dangerous fungi resembling this species and sometimes found in company with it—etc.," that's enough. Say no more. I let that one alone. I do not like the company it keeps, and it

may be a sheep in wolf's clothing. In my list of edible fungi, common in New York and New Jersey, there are less than a dozen kinds. No one of these looks enough like any other fungus to be mistaken for it. A few good looks at them will fix them in the memory. These are morels, meadow mushrooms, shaggy-manes, inky-caps, oyster mushroom, puff-balls, coral fungi, and chanterelles. The open season for morels is in early spring, when arbutus is blossoming, and later. Coral fungi and chanterelles are at their finest in midsummer, puff-balls in September, inky-caps and shaggy-manes in October, and we ate oyster mushrooms on January first one year, though they appear earlier. The meadow mushroom with white flesh and pink gills is grown indoors and is seen in the market from fall till spring, but nature's crop must be harvested in fall before frost.

*Morels.*—Morels look like nothing else. When full sized they are six inches high. The hollow stalk is as large as your finger and about half the length of the whole. The top or cap is brownish and so covered with ridges and wrinkles that it would never be mistaken for anything else in the world. You ought to see a picture of it because it is difficult to describe so irregular an object. Look it up in some mushroom book or bulletin in your library.

You never know just where morels may appear. We found them in our garden once. They come up right among the weeds or dead leaves. I have often found them along forest by-paths, especially in wet weather in spring. They are delectable. Perhaps you have eaten delicately broiled slices of tenderloin of young pig. Morels do not taste like this—they look a little like it—they taste very much better. You taste them.

*Coral Fungi.*—The coral fungi that I eat look like chunks of pinkish or cream white organ pipe coral. They are fleshy, soft, yet firm enough to keep their shape, and the whole mass is made up of tiny thread-or rod-like parts of many branches. There is a fine one which looks like a cauliflower though more yellow. I have found the pink and creamy ones on fallen and decayed tree trunks in deep, cool woods in midsummer. Others equally good grow in thin woods or open places. They vary in size from chunks as big as a walnut to those as big or bigger than your fist. They need careful cleansing under a faucet.



Some cooks soak them first in cold water into which they put a little vinegar or lemon juice. They then fry in butter. Another way is to stew till tender in water with lemon juice in it. Then drain and dress with cream sauce.

*Puff-balls*.—What country child has not puffed the "smoke" from the hole in the top of the tough-skinned little brown balls they find in the fields in autumn? Children generally believe them to be deadly poison and call them "devil's snuff-boxes." Their life history is very like that of other fungi. The most of the year these flowerless and leafless plants spend underground. They spread in a tangle of fine threads all through the soil wherever they find decaying vegetable matter upon which to feed. When their time comes, little white balls push out and up from the threads. These come to the surface and we know them by their shapes and sizes as our different kinds of puff-balls, mushrooms, or other fungi.

The puff-balls are white and look like fine cream cheese when they first appear. Their business is to ripen their spores, scatter them, and disappear. The brown smoke or dust of the ripe puff-ball is blown about by the wind and finds its way into the earth in time; each tiny spore or grain of dust can start a new mat of threads down underground. When you puff the devil's snuff-box you are doing the plant just the kindness it was waiting for. When a cow steps on a ripe giant puff-ball a great smoke goes up, and the breeze catches the dust. Some of the spores may be carried on the wind or on the cow's foot to far distant pastures, there to settle down and start a new puff-ball colony. It is just so with all the fungi.

All the puff-balls are edible but one of the most eatable is *the giant*, which is found in August or September in pastures or other grassy places. When right to eat it is grayish on the outside and pure white clear through. In size this giant varies from six or eight inches through to two feet. Specimens of ten pounds' weight are not rare, and there is record of some twice that size. When yellow or brown inside, the giant is past eating.

The *pear-shaped* puff-ball is the commonest one. This is a sort of dirty brown colour outside, pure white inside. It is found on old wood or on the ground as early as July and as late as October. In size the balls vary from thimble size to that of a big pear. They grow in companies, sometimes scores together.

The *brain* puff-ball is larger than the pear-shaped. The top is wrinkled or corrugated, and grayish or reddish in colour.

*Chanterelles*.—Chanterelles are found in late summer in the woods amongst moss where it is damp and cool. They are red or yellow and look as if you had put your thumb in the middle of the top and pushed it down so that the network of gills appear on the outside. The name means a little goblet, and the perfect ones are goblet-shaped. If you go camping in the woods in summer you are almost sure to find chanterelles.

*Meadow Mushrooms*.—The wild meadow mushroom usually appears in large numbers after the autumn rains have renewed the pastures. They frequently come up alongside of an old dried patch of cow manure. To make myself familiar with this pink-gilled variety I visited a large market where they had them for sale in all stages, from the little round buttons to the big flat broilers which are turning brown. They are just right when the cap has spread so as to burst the delicate white veil which covers the gills. The flesh is white and the gills a delicate pink. The skin peels off easily like that of a ripe peach. Look them over with great care when preparing for the table. The early worm which is on hand to get a first bite of everything sometimes honeycombs the whole plant. The stems of young ones are tender at the top.

*Inky Caps*.—You never expect to gather your dinner from an ash heap? Neither did I; but in the edge of the woods nearest us the public used to be allowed to dump ashes. It is now overgrown with golden-rod, iron weed and various other coarse plants. A path leads through it. Last fall we discovered that the place was fairly swarming with *Coprinus comatus*, the shaggy mane mushroom. This does not look like anything else on land or sea and is delicious. Its relative, the inky cap is just as good to eat, but not so handsome. Both melt away into black ink as they grow old. They should be cooked as soon as possible after gathering. We kept some over night once. Such a sight! They looked like black corn smut.

The *Coprinæ* push up in such tight clumps sometimes that their heads are all out of shape. They rise literally over night. Sometimes one comes up singly and grows tall and perfect, a truly lovely object, pure white, six inches tall, its shaggy head held high, its silver-white gills delicate as tissue

paper. A few hours later you will see a ragged bit of pulp rapidly dissolving in a pool of black ink.

*Oyster Mushrooms.*—The oyster mushroom comes out like the shelf fungi on decaying tree stumps or logs. They are ashy colour or dull white, solid and rather tough, and vary in breadth from two to five inches. As to why they are called oyster mushrooms, opinions differ. The flavour is not oyster-like, though the flesh is about as tough as a boiled oyster. The shape does suggest an oyster shell; perhaps that is the best reason for the name. One edible relative of the oyster mushroom grows usually on decaying elm stumps as late in the year as November.

The first thing to do if you get interested in mushrooms is to get some good illustrated book on them. The chances are that your State Experiment Station has issued a bulletin on the subject. If not you can get those published by the United States Department of Agriculture or perhaps those issued by some neighbouring state. What you want is information on wild fungi, especially the edible ones, not directions about growing the market varieties. When you write for bulletins state just what you are looking for. Pictures, especially photographs, are of the greatest use in identifying specimens. Compare the descriptions and pictures with your mushrooms and do not use them if there is any question in your mind as to what they are. The books mentioned in the appendix of this book have been of help to me.

#### CONSERVING NATURE'S CROPS

The harvesting of nature's crops is a most fascinating occupation. As boys and girls we do not ask why; we only know what fun it is. If the time ever comes when you wish to forget that you are grown up, nothing will help you like going into the woods, the fields, or the hedge-rows to help the birds and the little fur-coated animals harvest the crops of nuts or berries or other fruit that grow in nature's orchards. With your sack of nuts or plums on your arm, or your pail full of berries, you can easily forget that you live in a flat or work in an office or a factory.

Some people think when they see how much over-ripe fruit is falling to the ground, and how much more there is than can ever be gathered by human hands, that nature is wasteful. Perhaps this is why these same people and others who did not think at all, have been so very wasteful of our country's

natural resources, and brought about such a really alarming state of things in our forests. Those who do stop to think will see that although she is lavish, nature is never wasteful. The berries must decay in order that the seeds may germinate, and in moulding they nourish the fungi which are just as important in nature's eyes, so to speak, as the berries are. Nothing is *wasted* in nature. On the contrary, everything is *saved* and is made over into some other form. Nothing stands still; transformation goes on continuously. What was soil yesterday is fruit to-day and is built into our muscles and nerves and brains to-morrow.

Every boy or girl that helps to harvest nature's crops can do a little to assist in our great national work of preserving the country's natural resources. Would you ruin a fine young tree just beginning a life of usefulness? By mutilating it past recognition, you may add a few nuts to your this year's store. But what an injustice you are doing to the next generation of boys and girls. You are robbing them. I have heard men say: "When I was a boy we used to bring home arbutus by the wagon load from Coy Glen. But it's hard to find any there now. It must have winter-killed or blighted." My tongue burned to tell them that they themselves were the blight that winter-killed the arbutus and robbed me of my right to gather a few sprays. They had torn it up by the roots in their greed to fill their wagons, and then they cut out all the trees, and the sunlight destroyed all the shade-loving things.

Boys and girls of a more enlightened generation know better ways and will not leave behind them a record of selfishness.

#### THE STORY OF THE CREATION OF A NEW INDUSTRY

I am glad to tell the methods by which I have developed a good business in collecting and growing California bulbs, as I believe my success can be duplicated in other parts of the country—in fact, one man already makes a good living by exploiting the wild flowers of the Rocky Mountains, several people are exporting the cacti of our desert, and there are several nurseries in the southern Appalachians for the interesting plants of North Carolina.

In 1870, when I was nine years old, my family moved to Ukiah Valley in north-western California, and there I have lived ever since. My early home was a farm, and my first work to raise hops and a mortgage. My education was such as the district school and an abundance of good reading could give me. At eighteen I began to teach school. I was always a lover of nature and

fond of wandering about the hills. In Mendocino County in 1870 the country was just emerging from the cowboy era, and little attention was paid to vegetable gardening, while flower gardens were all but unknown.

#### HOW THE LIFE WORK WAS DETERMINED

There was one notable exception to the indifference to flowers. Alexander MacNab, a Scotchman who had been forced by declining health to leave Glasgow, had found new vigour in California's mountains. The property which he had purchased for a stock range is one of the most picturesque in northern California, and there he built a modest but ideal home. He sent everywhere for flowers, and I know of no place in these later days where more flowers are well grown. He gave to his flowers not only money, but love and himself, and few gardeners were more successful. I often visited there in my boyhood days and the inspiration that I received from this place and from another source determined my life work.

I had a sister a few years older than myself who had been in the East for some years and whose failing health forced her to return to California. She was a flower-lover and soon called upon me to begin a garden on the bare hill where our very plain home stood. It was a work of love, for all of the new soil was carried in buckets, and the water which our hot climate made necessary was carried from a well, but it was a great success. My Scotch friend was most liberal with both plants and instruction, and between the two my bent was well fixed.

#### THE BEGINNING OF THE INDUSTRY

It was through Mr. MacNab that I got started in the collection of native plants. Woolson and Company, then of Passaic, N. J., were the first American firm to take up the culture of our native American plants as a specialty. They wrote to Mr. MacNab, asking him to secure the native plants and offering to pay for them in eastern grown plants. My love for flowers had interested me in botany, and it was quite natural that the letter should be turned over to me. In my first letter to Woolson I sent a pressed flower of *Colochortus pulchellus* and received in return an order for one hundred bulbs, which they said they would pay for in cash. This order was filled and it was the beginning of my bulb business.

My first idea was to earn money to buy plants with, but before long I saw that a small business might be built up.

My progress as a collector went hand in hand with my education in botany. My method was this: First to find something of sufficient beauty to make it probable that it would be wanted; next, to find its name, and then to offer it to some one of the very few firms then interested in such things.

Such was the first stage in the development of a new industry, but the latter was no less important, for it involved knowing the plant at every stage of its growth, finding when it could best be handled, and how best packed for shipment. Almost from the beginning I tried to grow the native plants, and botanical study, collection, and cultivation have gone hand in hand since.

#### METHODS OF COLLECTING

Every year I took longer trips. I went alone, with the lightest of camping outfits, slept on the ground, and penetrated the wildest regions, learning where the desirable flowers grew, and collecting those in demand, at the same time studying the general flora. When I had learned the flora of a region, I tried to train some resident as a permanent collector, for not all of these long trips could be made every year. My horizon fast widened, and through friends, by letters to others, and often by the migration of men whom I had trained, new fields were opened, and later I had men who had been trained under me to send to distant points.

Before I began to collect, others had been in the field, but they were principally wandering botanists who seldom collected over the same ground for two years in sequence. Their collections were of stuff of all grades, often made at the wrong season, and there was no demand except from a few special lists. At first I shared their faults, but after a few years I saw the necessity of making a reputation for reliability, for thoroughly learning the art of packing, and for such grading as would insure uniform quality.

#### ESTABLISHING A NURSERY BUSINESS

As time went on, collection became less important and culture the central feature of my work.

My first garden was at the farm home; later I spent much time and money in experiments in a reclaimed lake bed near Ukiah, still later at my Ukiah

home, and since 1897 in the mountains about eight miles east of Ukiah. Each experiment had its value. No one had grown Californian bulbs in California, and everything had to be learned experimentally. I now have two nurseries. One of them is at Lyons Valley, a lovely spot in the highest part of that branch of the Coast Range which I found six years ago was specially adapted to lily culture. About three quarters of a mile away, at "The Terraces," nature has provided endless variations of soil, climate, moisture, sun, and shade. Here I grow a great variety of bulbs.

In 1886 I sold about seven thousand plants of all sorts; in 1888, two hundred and fifty thousand, and the difference was on business principles.

CARL PURDY

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### III

## RAISING DOMESTIC ANIMALS

### RAISING COLTS

**E**VERY farm boy I ever knew was ambitious to own horses. Before my eldest brother was twelve he had traded pigs with our father for calves, then heifers for a horse, and his favourite air castles were great luxurious barns inhabited by blooded horses of his own raising.

If your colt's mother is dutiful, and they mostly are, the youngster will have plenty to eat for the first few weeks. Petting is a good thing for little colts; never a cuff nor a harsh word. Their confidence won, their education is begun. While still dependent on the mother for milk the young colt begins to nibble hay from the manger, and gets a taste of the oats in the feed box, too, and finds them good. Oats and clover hay, a little bran and shorts, a run in the pasture every fine day all winter, will usually keep the colt growing and healthy. A warm stable with plenty of dry bedding, preferably in a stall with another colt, is necessary at night.

Colts need a plentiful supply of cool, clean water in summer, but in winter, water should be heated just enough to take off the chill. It is bad for a colt to drink at meal-time. (That sounds like a rule for boys and girls.) A chunk of rock salt handy for colts to lick at helps keep the appetite normal.

An ordinary farm colt at three or four months old is worth only thirty or forty dollars. Two years later, with the right kind of care and teaching, the same colt will bring four times that price. What other farm crop will do as much?

The mother of a baby colt once died on our farm. My father felt very badly over it; losing the old mare was misfortune enough, but the colt was a noble-looking little fellow, highly bred. We girls had been foster-mothers to almost everything; cats, pups, and pigs were easy, and calves. But what of a colt? "Let's try if we can't raise him on the bottle," said our mother. The

experiments we tried with that colt were many. We gave him "half and half" at first—a cup full of milk to one of water. Our small cousin had once been fed on mare's milk, much to our disgust, but it gave us ideas for our colt. Mother read somewhere that cow's milk was not so sweet, but was richer than mare's milk. So we patched our bits of hearsay together and made up our colt's ration about like this:

First week: half sweet milk, half water, a teaspoonful of sugar to each pint, ten times a day—always warm—last feeding at ten P. M.—not very much at a time. Second and third weeks less water, six feedings a day, warm and sweet as before. Fourth to tenth week: increase quantity gradually, give warm—not very rich—milk three times a day. We gave him a bottle at first with a nipple made of a goose-quill wrapped each time with clean, soft rags. Everything about his food had to be kept sweet. We scalded the bottle and the quill and washed them in water and baking soda, just as mother said. Then we taught him to drink from a pail. He followed us about like a dog and was very playful and frisky. We fed him a little hay and oats and grass when he was old enough. My little sister wanted us to give him less milk so that he would grow up into a pony, but when he begged for food, she was the first to go for his bottle. He grew up and developed just like any horse and father said he was the easiest two-year-old he ever had to teach to work. He paid us seventy-five dollars for the colt when he was eight months old and ready to shift for himself with the other colts.

#### RAISING SHEEP

Every boy on the farm ought to have his own particular hobby in the line of stock. It is far easier to keep account of your own if they are entirely different from the animals raised by the other members of the family. An account should be kept with the animals, to learn whether they pay or not. It is only by this business-like method that the young farmer, or the older one for that matter, can know whether his animals are visitors or boarders.

If the mother keeps poultry, the boys pigs, and the father raises horses and cows, then why should not the girls raise sheep? There is room on every fair-sized farm for a flock. There is nothing about the care of sheep that a strong, healthy girl may not do if she is not needed to help with housework. Her father will teach and advise her. Tending sheep is far more healthful

occupation and more remunerative than embroidering sofa pillows or knitting "fancy work."

Whoever undertakes the sheep raising must know first some of the needs of his favourites. They are grazers. They will glean a good living in stubble fields and crop grass in pastures where cows would starve; they will bite the weeds in the fence corners down to the quick nor leave one stalk to blossom or set seed. They are among the best and cheapest of lawn-mowers, enriching the ground they feed over. They are easy to care for, as they can take care of themselves most of the year. What a joy it is to take a quiet walk over the hills of a Sunday morning to salt the sheep! They are trustful, playful, docile creatures, and their presence undeniably adds to the picture of content and comfort that every homestead should present.

While it is true that sheep will keep fat on good pasture with plenty of water and a semi-weekly supply of salt, it is not to be supposed that they can pick up a living the whole year round in a cold climate. They do not need stuffing in cold weather, but they do need plenty of good hay in early winter and nourishing food like bran, oats, barley, and clover hay toward spring. Alfalfa is ideal, but many people succeed with sheep who fail on alfalfa. Sheep will over-feed if not restrained. They should have exercise and fresh air in plenty all winter. They should go out every day to pasture, except during storms, until snow covers the ground.

Ewes fed but not over-fed over winter and sheltered under some kind of rain-proof roof will be strong and healthy mothers. A new-born lamb is about as weak and wobbly and inefficient as a human baby. The weakest ones seem bent on dying, but a little coddling and care will put them on their feet. They should be taught how to take nourishment and whoever takes this in hand should use patience and insist that the lesson be learned. I have known of many a good shepherd who sat up late and got up early and visited the sheep at midnight in lambing time and so saved all his lambs. There is something so appealing about a lamb that no owner would like to remember that he slept comfortably through a stormy night while a new-born lamb starved in the presence of plenty or was chilled past help while its mother could only bleat helplessly for the slothful shepherd.

Lambs should not follow their mothers to pasture until the grass is grown enough to be really long and nourishing. They should be out in the barnyard

on warm, sunny days, and not weaned until near six months old. After August they will fatten on clover pasture and be ready for market before Christmas.

Sheep are sheared in spring, about April first, but this depends on the climate. Most farm crops are fall or winter affairs. Like maple sirup, wool is a spring cash crop, which is a great convenience. An eight-pound fleece is worth nearly half as much as the sheep it grew on, and the lambs will soon be worth as much as their mothers. So we have a double chance to make good in sheep raising.

Sheep are so hardy, so harmless, and so easily managed that the only wonder is that any farm is without a flock. Men who know say that the farm dog is to blame for this. How about the farm dog, boys and girls? Honestly, now, is your dog worth his keep? No matter how much better he is than the neighbours' dog. How about your dog? You like him, of course, but is he a loafing, worthless, sneaking, sheep-killing dog? Look between his teeth before you deny that he is a sheep-killer. Are you a good citizen if you let such a dog run at large? If you raise sheep you will need a dog, and remember that a good collie will protect your sheep from all the roving, bloodthirsty dogs in the neighbourhood.



Photograph by Julian A. Dimock

## **"Big Boy Blue" Looks After the Sheep**

### **RAISING GOATS**

Boys, are you really serious about making some money? Do you live on a farm where the hills are too steep to plow and the only crop that amounts to anything is the crop of stones? Are those steep hills covered with brush and good-for-nothing trees that look too hopeless? Don't grind your teeth and say "There's no chance here. I'm going to buy a ticket for the city." Glance at the heading on this page and don't smile derisively nor turn on to some new chapter.

"Goats! Humph!"

If you never heard of anybody making anything out of goats, here's your chance to hear something new. People can and do make money out of goats and so can you. Why, it is too easy!

Here, read these facts about goats:

Goats *prefer* rough, rocky, wild, and hilly land.

Goats *always thrive* if allowed considerable range.

Hilly, *bushy* land is *best* for goats.

The feed of *one* cow will keep *twelve* goats.

*Temperature* need not be considered. Goats thrive where temperatures are *extreme*.

The Angora goat *fleece* is cut annually and is *very valuable*. We import over one million pounds a year. Skins of common goats are in *great demand* for leather. We imported sixteen million dollars' worth in 1898 and more every year since.

*Goat manure* is as valuable as that of sheep.

Angora *venison* cannot be told from lamb.

Goats *scorn* to eat fresh grass if *coarse weeds* like wild carrot, mullein, dock, etc., are in sight.

*Every part* of a goat is *salable*. Fleece, milk, cheese, skin, flesh, tallow, bones, hoofs, horns, and manure.

Goats *improve land*. They are "lifelong scavengers," and can put land covered with useless underbrush into shape for pasture more cheaply and more quickly than dynamite.

A herd of *common goats* can be built up in *a few years*. They breed at one year and usually have twins.

Goats are *hardy*; less subject to disease than sheep.

A good goat is a *money-maker*.

These statements are quoted directly from the writings of men and women of experience. They have no goats to sell, so you can take their word.

The requirements for successful goat raising are few and easy to provide. They are these:

(1) *Space*.—Goats do not take kindly to herding nor to small fields. If they have only a small enclosure they are likely spend more time trying to get at

what is outside than in browsing. To meet a wire fence every few steps makes a goat restive.

(2) *Housing*.—Goats must be kept dry overhead and under foot. The shelter for goats should be high and dry. They will not thrive in wet, marshy land, nor keep well if their shed is muddy. They dislike filth and will not stand in it nor touch soiled food. They prefer to sleep on the roof of the barn, you know, but if a clean, dry bed in an airy place is provided they will not roost so high.

(3) *Water*.—Plenty of clean fresh water should always be available.

If you can supply these three essentials, you are ready to raise goats.

There are two well-marked lines of business in goat raising. Which shall you follow?

Angoras are raised for their fleece; common goats either for leather or for milk. Angoras are not much good for milk and their skins are not so fine nor durable as those of common goats. The Angora is free from the offensive odour of common male goats. The greatest demand for goat products in our markets to-day is for Angora fleece and for common goat skins. The other products, like flesh, hoof, bones and horns, tallow, cheese, milk, and manure, can easily be marketed and should pay most of the expenses. The main products should be clear profit.

#### **BUILDING UP A HERD**

There is a slow way and a quick way to build up a herd of goats. As usual the slow way requires less capital. If you have but a few dollars you will have to begin with cheap goats, but to keep a poor goat is poor business. You can buy good, common goats for one dollar and a half or two dollars each and with time and patience build up from them a herd of Angoras by crossing. If capital is easier to command than years of time, you will begin with good Angora does which cost from eight dollars upward. If you begin with common ones, choose white, short-haired individuals. Keep only the best does in your herd for breeders; you will soon learn how to judge them by the quality of their fleece and the price it brings you per pound. In five or six years it is possible to build up a herd of fine mohair producers from common goats.

The hair grows coarser as the goat passes six years of age, so it does not pay to keep one too long. Buy young does. A goat's teeth tell its age up to the fourth year. If all the eight teeth are full-sized the goat is certainly four to five years old, it may be more.

#### **CARE OF KIDS**

A young kid is not a very sturdy youngster. Good care should be given both doe and kid at this time. A warm shelter should be provided. May is the best month for kids to come, in the North. Extra feeding should be given the doe and plenty of water. If possible each doe with her kid should have a separate stall or pen so that the doe will know her own young one. If you can arrange that each pen in the kid stable can have an outdoor entrance the mother can come and go at will. A board a foot to eighteen inches high across this entrance will keep the kid from following his mother. When about six weeks old the kid will jump this board. By this token you will know that he is strong enough to jump about over the stones wherever his mother leads him.

#### **FOOD OF GOATS**

The comic papers may be right about some things, but they are wrong about goats. A diet of newspapers and tin cans will not keep a goat healthy nor produce a salable fleece of fine mohair. Angoras like common goats are browsers, not grazers like sheep. They eat coarse vegetation such as weedy growths and the twigs and leaves of underbrush, rather than grass. Besides this, particularly in winter, they should have other food. Leaves, table scraps like potato and fruit parings, turnips and other roots, and cabbage are all acceptable if clean. Parings and roots should be washed; if you expect goats to eat swill you deserve to be disappointed. Dirty carrots, rotten apples, sour or mouldy refuse do not tempt a self-respecting pig; much less an Angora. Oats in the sheaf are very good fodder for them. Grain is not required if clover hay, alfalfa, or cowpea stubble is plentiful. Too much grain makes a lazy goat and a lazy goat will not produce a handsome fleece. Bran may be fed for a change, and a little cotton seed or corn may be given, but sparingly. Leaves or other coarse food should be given plentifully at night, as Angoras relish a midnight lunch beside their three square meals a day.

A supply of rock salt should be kept where goats can get it whenever they want it. If it is given only at long intervals they may over-indulge. Water

should be warmed slightly in winter if practicable.

#### **SHELTER AND ENCLOSURE**

Hardy as they are, goats cannot stand exposure to storms. They abhor wet. Cold rain or sleet storms are really dangerous to their health. Goats will go the long way round every time rather than get into mud. Mud is very bad for the fleece, too. Buyers refuse to pay for dirt.

Goat shelters should be dry, but they need not be tight except overhead. In fact many goats die of suffocation when huddled in close quarters. If the roof is just high enough from the floor for goats to go under, it can be open all round except perhaps on the side where the prevailing wind and storms would beat in.

No other animals should be quartered with goats. Experience shows this.

Goats prefer hard beds. Chaff or straw enough to absorb the liquid manure is all that should be put on the floor. Trees are the best shade from the hot sun, but if none are growing in the goats' pasture other shelter should be provided.

It is true that goats thrive best when unconfined. But this does not mean that your goats should be allowed to range on other people's domains. They are a very real nuisance in orchards and gardens, and if your place is small it is no place for goats. A fence need not be very high to restrain a flock of goats. They are climbers and once in a while there is one who would take a prize for the "high jump." Ordinarily a fence three and a half feet high is all that is necessary. Boards, rails, or wire will make a good goat fence. It should go close to the ground to prevent crawling under. If wire is used, take care that the mesh is too small for a goat's head.

You must take your market's demands into consideration when deciding whether to breed Angoras or common goats. An Angora fleece weighs from four to eight pounds. This can be cut every year for ten or twelve years. The common goat's skin is valuable, but he has only one! This makes the Angora look like the best business proposition, although requiring more capital to start, as the care required is about the same and the value of by-products practically equal.

#### **THE COMMON GOAT**

Two arguments may be brought forward in favour of the common goat. In the first place, the herd increases much faster as the Angora doe usually has only one kid, while twins are the rule with common goats. There is a decidedly growing demand for goats' milk near large cities, especially for hospitals. We all know how commonly goats' milk is used in foreign countries. We Americans have a rather silly prejudice against it, but we will get over this when we realize how often goats' milk saves the lives of babies and invalids. The following statements are vouched for by physicians and others of experience:



Photograph by Helen W. Cooke

## **Feeding the Goats**

Goats' milk is more easily digested than cows' milk.

Analysis shows goats' milk has a marked similarity to human mothers' milk and is more readily assimilated by infants.

Goats' milk is generally claimed to be free at all times from germs of tuberculosis.

Cannot be told from cow's milk by taste.

Excellent for coffee and in cooking.

The goat is claimed by its friends to be greatly the superior of the cow for milk, for the following reasons:

The goat is naturally cleanly.

The goat is easy to keep clean because of her small size. Goats can be and are put into tubs and scrubbed and sterilized when being used as foster-mothers in baby hospitals. But no such treatment is possible with a cow.

A goat can easily be taken from place to place with a family. A cow could not be transported without great expense.

Goats eat far less than cows. Eight milch goats can be kept on the food of one milch cow. The same quality of food should be furnished.

I believe there is a great future in America for the milch goat.

### **TWENTY ACRES REDEEMED: THE STORY OF A SATISFACTORY EXPERIMENT WITH GOATS IN NEW ENGLAND**

In January, 1902, I bought seventy-five Angoras, as I had about twenty acres of brush land that I wanted to reclaim. I kept the goats in sheds until May. I had to put up a wire fence to keep them from visiting my neighbours, and in early May turned them into the first section, about one half of the piece. I built a shed for them to stay in nights and during rains.

The work they did was marvellous. In less than a month this section had the appearance of having been struck by a cyclone, and it was evident that the goats would soon require more territory. Consequently I wired the other

section of this twenty-acre piece, and when finished allowed them the range of the other piece, to which they marched in military precision daily, returning to the shed at night or during the approach of rain, which they seemed to foretell as accurately as a barometer. It was not long before it developed that they would require fresher fields or I must reduce my flock, as this ground was all that I had of that kind. Consequently I sold all but twenty-five, retaining twelve registered does, twelve kids, and one buck. For the does I paid ten dollars each, and my buck, which was a kid, cost twenty-five dollars. I had some grades that I sold at eight dollars and eight dollars and twenty-five cents each, and also some wether kids that I sold at five dollars each. I have this same flock now, with the addition of ten kids born this spring from these twelve does, which had twelve kids, two having died, leaving thirty-five now in the field.

During the past winter I have handled more than six hundred that were sent here from the West. The test that I was anxiously watching for at the advent of spring was to see the effect of their work done last season, and I must say I am very agreeably surprised. In the first lot fenced there is scarcely a brush left, no briars, and not even Canada thistles. The entire field between the rocks came out this spring with beautiful, thick, green, grassy foliage, mostly white clover. On the other lot, part of the brush tried hard to show its tenacity of life by coming out with green leaves, but at this writing the shrubs have fallen prey to the devouring Angora, and green grass is coming out in about all the ground that they have trod. This alone to me is a satisfactory commercial experience.

W. O. CORNING

#### RAISING CALVES

Feeding the calves is always the boy's job or the girl's. Usually the milk is prepared by their mother, but the responsibility for the calves' welfare is left to the youngsters. If you look upon calf feeding as nothing but a chore to get over with as soon as possible, you get very little fun out of it. But if you see in those calves the beginning of your own fortune or the foundation of your college fund they look different. Whether the calves are yours or your father's, they are living creatures, capable of appreciating proper care and repaying it. They are just as capable of showing neglect.

If you are going to feed the calves, make a study of calf nature, know what kind of animals you want to make of them, find out how to accomplish your purpose, and then keep a straight course. Find out first the parentage of the calf. Then inquire if it is to be a beef animal or a dairy cow. Knowing its past and its future you can provide wisely for the present.

A new-born calf should stay with the mother from twelve to twenty-four hours. The fluid she gives first is not milk, but is just what the calf needs to prepare its digestive organs for milk. If left longer with the mother it will be more bother to train. The calf should be fed sweet, whole milk for two weeks. If put immediately onto a diet of skim-milk, indigestion is likely to result, and the calf gets a setback from which it may never recover.

When a young calf is taken from its mother, it knows nothing about drinking. The best practice is to let it fast for from twelve to twenty-four hours till it gets good and hungry. It is then in a state of mind to learn anything rather than go without any longer. [They treat human babies the same way if need be.] If started right, a young calf learns to drink in a day or two. Holding the pail with one to two quarts of warm, fresh, whole milk in your left hand, stand beside the calf and put your right hand over its nose. Insert two fingers into its mouth. Did you ever feel anything so funny? The calf will suck your fingers hungrily. Gently push its nose down into the warm milk with your fingers still in its mouth. After a while gently pull out one finger. If he misses it put it back and later try again. In a few lessons the calf will drink readily. Patience and kindness must be exercised if one little scamp proves dull. A calf that gets a slap for not drinking will come to think that the two disagreeable things always come together and his education and his growth will be delayed.

For the first ten to twelve days the calf should have about five quarts of milk a day, divided into three feedings. This should be warmed to blood heat, ninety-five to a hundred degrees Fahr. At two weeks you can begin to substitute skim-milk. A half-pint a day at first is about right. Watch the effect on the calf. Increase the quantity gradually, until at a month or six weeks old the calf is getting seven to eight quarts per day of skim-milk, always warm and perfectly sweet.

The worst disease of calf-hood is scours, and this disease is caused by feeding cold, unclean, or sour milk. I'd be ashamed to have a calf of mine

sick with the scours! To cure it, add lime-water to the milk or mix a teaspoonful of dried blood in a small amount of water, then stir into the milk. Or an ounce of wheat bran or kaffir corn meal stirred into the milk will be helpful. Some recommend oat or corn meal fed dry, or a little linseed meal mixed in a little water and then stirred into the milk.

If your calves are all heifers to be added to the dairy herd, you do not want them to lay on great amounts of fat, but to grow strong and be able to digest great amounts of hay. If they are to be beef, they need more fat. Grain is fattening, especially corn. Begin to feed hay as soon as the calf will take it. Clean, dry clover is best, but any good hay will help prepare their stomachs for the work which is expected of them later. Milk and hay are best for growing calves. Grain, oil-meal, and pasture furnish variety.

Have you seen a wild-eyed cow being literally dragged behind a wagon, scared past endurance and behaving like a savage creature? There is not the slightest excuse for that sort of thing. What fun it is to slip a halter on a calf to-day and let him get accustomed to it; to-morrow lead him about a little with coaxing. In a few days he will lead like an old horse. He will learn to expect only kindness from his feeder and trainer. It would be well to accustom the calves to the presence of your dog, too. There are men who think a frightened animal is a humorous sight. But such a man is "no gentleman" and I certainly would never think of trusting him to drive my horses, or milk my cows, or even feed my pigs.

Our calves were kept in an old orchard, convenient to the house, with good pasture, plenty of sun and shade, and a suitable fence. A shed for wet weather is essential, for a clean, dry bed must be provided. Calves have no way of cleaning themselves, therefore they must not be allowed to get dirty.

Milk should be fed until the calves are four months old, and may be continued longer. After the first few weeks, when they have begun to take some hay and grass, the milk may be given in two feedings. Water should be given freely especially in hot weather. If your pasture has a clear running brook, your calves are in luck and so are you, for carrying water for a bunch of calves is no joke. A garden hose or a series of v-shaped troughs from pump to pen saves a lot of time and backache.

A calf whose mother has a record for milk rich in butter fat and a sire of good family has in it the possibilities of a prize-winner. Whether she will

earn seventy-seven cents a year over and above her keep, like those one thousand and twenty poor cows that Illinois boys and girls know about, or thirty dollars a year, like the twenty-five good cows, depends very much on the care she gets. No amount of care given to a cow will make up for neglect to the calf. There's a big responsibility on the boys and girls of the farms, for calf feeding is their job.

#### THE STORY OF TWO BOYS AND A COW

The suggestion that the suburban home might be a money-making investment would strike the average suburbanite as ridiculous. But a few moments of careful calculation may put preconceived notions to flight and show how considerable money may be made—or saved, which is quite as important.

Some years ago a family, which included two boys of eleven and thirteen years, took a house in the outskirts of a good-sized town, about thirty minutes' ride from the city. The father was a buyer for an importing house, and absent from home for several months of each year. His salary was large, as such salaries go, but there were seven children to be raised and educated, several of them with marked abilities that needed the very best possible instruction to bring them to their highest development.

The boys spent one summer vacation at the country house of an old friend of the family and got ideas. They talked them over, went back to their friend for counsel, then turned their batteries on their parents to gain their consent to an important new enterprise.

Attached to the house was about an acre of ground, three fourths of which was old pasture grown to weeds and a tangle of brier bushes.

By promising to work for a farmer during the coming vacation the boys arranged to have the field, which they cleared and made ready, ploughed, harrowed, and marked in the most thorough fashion.

They planted it with the best variety of mid-season sweet corn. The farmer cultivated it, and the boys hoed it and kept it in almost perfect condition.

The season was very dry, but they laid a hose so as to start a stream of water into the lines between the rows of corn; then with a good pump they filled the trenches they had dug and completely irrigated the entire field.

The crop was a great success. The boys picked and sold at retail prices to private customers twelve hundred dozen ears of the finest corn raised in that section. As it averaged twenty cents a dozen, it footed up the very comfortable sum of two hundred and forty dollars with small ears and left-overs quite sufficient for the use of the family.

Two weeks from the first picking the stalks were cut and set up to cure for the cow that was really the object of their endeavour.

The friend of the family selected the cow. She was a fine, fresh, young Jersey and Alderney cross—a high-grade animal, good for quality as well as quantity of milk and cream.

There was small, well-built barn on the place, and here the cow was stabled. Cleanliness was the first, last, and intermediate law in and about the place. The boys had clothes expressly for barn wear and white aprons with long sleeves to put on when milking.

Such unusual attention to details attracted customers until the demand went far ahead of the supply.

For the first six months the cow gave, on an average, sixteen quarts a day, fourteen of which were sold to persons who came for it, thereby saving all trouble and cost of delivery. Two quarts were kept for the family.

For the next four months the sales were twelve quarts a day. Feed for the cow cost one dollar a week, besides hay and corn-stalks.

The cow was bought late in July, and by the first of August the milk trade was well established. After ten months' experience the boys made up a statement to show to their father when he returned from a trip to Europe.

CREDIT	
1,200 doz. corn at 20 cts. a doz.	\$240.00
Stalks	20.00
Milk, 184 days, 14 qts. at 8 cts. a qt.	206.08
Milk, 120 days, 12 qts. at 8 cts. a qt.	115.20
	<hr/>
	\$581.28

DEBIT

1 cow, \$60.00; 1 ton hay, \$18.00; feed, \$40.00	\$118.00
	<hr/>
Profit, cash on hand	\$463.28
Value of 1 cow	60.00
	<hr/>
Total assets	\$523.28

NELSON S. STONE

### RAISING PIGS

When I was nine years old I laid the foundation of my college fund. My grandmother had a flock of twenty or thirty geese which were kept for the pillows and feather beds they filled. Great was my delight when grandma told me that she would give me a pig if I would help her pick the geese. Helping her would have been reward enough, for I was a great grandma girl, but the ambition of my childhood was to own a pig. Did not my elder brother now own a beautiful mare and colt, and had he not started with a pig?

Wednesday was the day set for plucking the geese and all my leisure on Monday and Tuesday was spent in building a pen. Plenty of material from which to construct this edifice was found about the place. I wisely located it at the back of the henhouse which left me only three sides to build. One corner was roofed with the best boards I could find, for I didn't wish my precious pig to suffer from sunstroke or have his bed transformed into a mud-hole when it rained.

When the geese were picked to the last feather they could spare, I went with grandmother to select my pig from the litter of sucklings now ready to begin taking their food from the trough. She generously allowed me my choice, and if I did not get the pick of the bunch it was not her fault. I wonder how a girl of nine succeeded in transporting a lusty pig the three quarters of a mile between grandmother's house and ours. I should not like to undertake it now, but my confidence in my ability to do what I wanted done in those days was unlimited. A piece of rope, a stout cudgel, a pair of strong, young arms, and a high disregard of appearances sustained me. I got my treasure home and into his pen—no mean triumph even as viewed by

my elder brother who had passed by the pig stage and even the calf stage and entered into the exalted realm of horse ownership.

My father was not the "your shoat, my hog" kind of a father. There came a time when he used to say that the girls owned all the cattle and the boys all the horses on the farm. When my pig grew up, I traded it to my father for a fine calf. This calf was the nucleus of my "herd," for I never owned a horse. All through my college course when I needed money, I used to write to father to sell "Rowena" or "Corinne" or "Natty Bumpo." (We named our calves after the people we read about.) There was always a buyer ready at hand and the price paid was strictly in accord with the market quotations. The cow which bought my graduation cap and gown was the last of her race, "Betsy Bobbett," one of the great-great-granddaughters of the calf for which I traded that original pig.

No one can deny or doubt that there is profit in pig raising. Pork "on the hoof" is ten cents a pound even as I write these words, with prospects good for going higher. A profit of one hundred per cent. is recorded by growers when the price is only six cents a pound.

With the one exception of poultry, hogs bring the quickest returns for investment of any live stock. It is poor economy to keep any animal which cannot pay its board, except for sentiment, and few people keep pigs on that account. If I were beginning again I should not trade my pig for a calf but should raise pigs.

In selecting a mother for my family of hogs I should care more about her individual character than about her breed. A good brood sow ought to have a good disposition, which means a good digestion, and respond quickly to kindness. Nervous, irritable sows often develop vicious habits. A short, broad face, a wide space between the eyes, a deep chest, broad back, and large hams with rather short legs are all considered good points. A good-natured, healthy pig has a bright, friendly manner when accosted and a look of shrewd though guileless interest in his master.

"Dirty as a pig" is a slander on the pig and a censure on its owner. Pigs and goats are more particular about their beds than either horses or cows. Success with porkers is spelt *c-l-e-a-n-l-i-n-e-s-s*. They like to wallow in the edge of a sluggish stream on a warm day. Well, so do you. Mud is not dirty unless mixed with foul manure and decaying vegetable matter.

All feeding troughs, floors, and beds should be thoroughly scraped, swept, and dried if the pigs are to be healthy, happy, and comfortable. Under no other conditions does keeping pigs pay.

You will be very fortunate if your young sow's first litter numbers ten or a dozen lively youngsters. Six or eight will not be bad if she raises them all, and with care she ought to. Improper care and feeding before the pigs come are usually responsible for any cannibalistic habits developed by the sow. Corn alone is not a good ration except for fattening. Used with wheat, middlings, bran, and ground oats, with plenty of clover or alfalfa hay, corn is all right. The sow should be put into a pen by herself before farrowing time. The best bedding is clean wheat or rye straw, which should not be left until it is wet and filthy. Sprinkle air-slaked lime in the sleeping pen under the fresh bedding. A sick pig means a neglectful owner.

Pigs ought to grow fast and without any check. At six months old they should weigh two hundred pounds, an average gain you see, of over a pound a day. With a good, healthy mother little pigs need no extra feeding the first month. The sow should be given nourishing food, bran and ground oats and rye, lots of skim-milk and an abundance of clean, fresh water.

If the pigs seem hungry when only a couple of weeks old a little, new trough should be made for them. A small quantity of boiled corn and skim-milk should be put into this trough where the little fellows can get to it but the sow cannot. They may not take much at first, but several hours later the trough should be rinsed and a fresh supply given. Sour, dirty milk may produce serious sickness in young pigs and check growth. The sow will wean them when she gets ready, and they will not know the difference if they get used to their trough early.

It is possible to raise and fatten pigs in pens, but it is not economical. Pasture is essential to their best growth. It gives them exercise, and the green food not only nourishes them, but aids in the digestion of the more concentrated foods. The expression, "Pigs in clover," is based on fact. A happy, healthy, money-maker is the pasture-fed pig. He will put on his ten cents' worth a day of bone, muscle and fat at less expense in a clover patch than elsewhere. Alfalfa or cow peas will serve him about as well. Fruit windfalls are good for him, too.

If you live on a place where grain or fruit are the main crops and a few cows are kept, you are losing a great opportunity if you are not raising a few pigs. They dispose of the surplus on such farms, as well as the unsalable garden crops and weeds, and pay their board day by day.

The owner should keep a close account with his pigs. If they eat what would otherwise be wasted you are so much to the good. What you sell them for, less what you have paid out for food, equals what you get for your time.

### **RAISING CHICKENS**

Success with chickens does not depend upon the breed, nor upon any patent devices for hatching and brooding, nor on any special mixture of feed. You can find frenzied advertisers trying to disprove these statements, but do not your own observations bear me out? However, I venture to say that with common-sense and gumption, and a real liking for chickens, success in this line is nearly certain. There are dozens of good stories of boys who have begun chicken raising at twelve to fourteen years of age and have made money at it, beside training themselves at the same time in business methods and efficiency. There are no good reasons why girls also should not succeed.

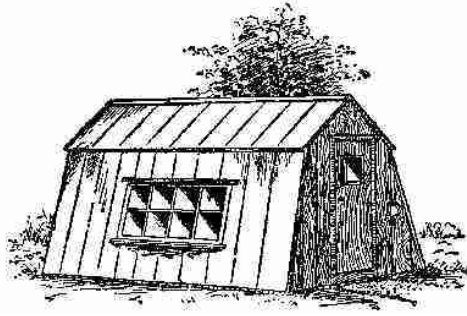
There are certain principles of poultry culture upon which most people agree. These are based on a knowledge of hen nature and are the result of study and experience. We will discuss them under the following heads:

1, Housing and Care; 2, Food and Feeding; 3, Raising Young Stock; 4, Business Methods.

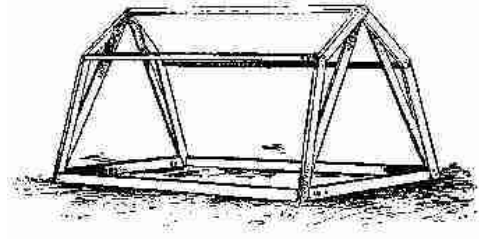
### **HOUSING**

This first department properly includes not only the house proper with all its interior fixtures and its care, but the runs, the scratching shed, and all that has to do with the supply of air, warmth and sunshine and the protection of the flock from disease and vermin. No matter how plain and ordinary your chicken house is, the test of your fitness for the business comes with its care, not once a month, but day by day.

Many people have an idea that the only way to keep hens healthy and productive is to let them range. Of course it is true that chickens on the farm



**Chicken house a boy can build**



**Frame for eleven-dollar chicken house**

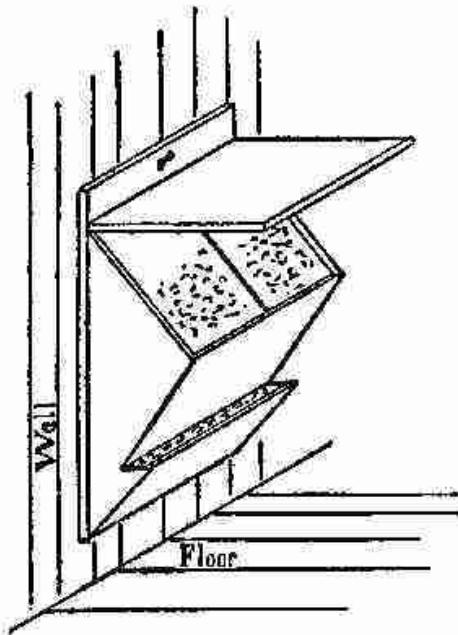
seem to pick up a free living, but it is equally true that, as a general thing, the

farmer does not keep any account with his chickens, and if they get into the corn crib or granary he does not know how much grain they eat and how much they waste. If they hide their nests and the eggs spoil, or if they sit and the chicks do not live to get to the barnyard, the owner is unaware of his loss. If, having no house and nest boxes, the hens lay in the weeds, in the wood pile, in the straw stack, in the haymow, it's no loss, for the women and children hunt the eggs and their time isn't worth anything! But do you believe there are any farm hens whose portraits will appear in the big magazines? Did you see that one last year in *Collier's Weekly*? Do you suppose there are many 200-eggers on farms with all their supposed advantages? I don't. But we shall never know, because no accurate records can be kept of chickens that run at large.

I shall take it for granted that you expect to begin in a small way with very little to invest. Remember that a few hens pay better per hen than a large number, but on the other hand it takes about as much time to care for a dozen as it does for one hundred. You will therefore look forward with satisfaction to increasing your flock as your capital grows and your time becomes more valuable.

Have you a suitable place for chickens? It should be dry, sunny, though with some shade, protected from severe winds and storms. The sun is the greatest purifier and disinfectant in the universe, and you must have your house face the south or east if possible. Whether your first house is made of store boxes or of expensive matched lumber the principles are the same. To make the house *dry* it should be built on well-drained soil and should sit up six inches from the surface of the ground so that air can circulate freely beneath.

The only heat in the hen house comes from the hens and the sunshine. Therefore, to make the house *warm* you should have it small enough so that your hens can generate heat enough to keep warm in winter. The exposure should be such that the sun can get into it. If possible it should be shaded by trees or other buildings against storms and summer sun. Every hen needs from four to five square feet of floor space and only eight to ten cubic feet of air space. Square houses are more economical to build. Figure out with diagrams and drawings to scale just how large a building is needed to house your flock when you get it. How low at the back can you make it without bumping your head when you go inside? How high in front must it be to provide space for your door and window? What shaped roof will be easiest to build, most economical of lumber, and most satisfactory as a rain shed?



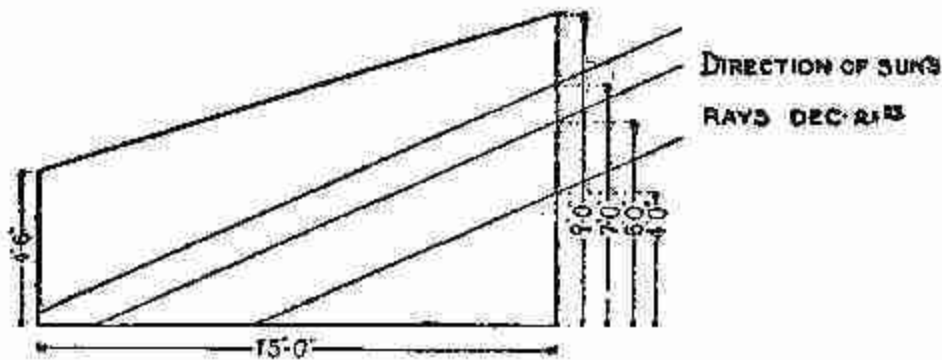
**Self-feed grit box**

Consider many things in the selection of material. Rough boards are a little cheaper, but how they do ruin good paint and whitewash brushes! Matched boards are cheaper and tighter than unmatched boards with strips nailed over the cracks. For the roof some kind of waterproof roofing material will keep the house warm and dry. If you have ever seen a chicken house with a cement floor you will be determined to have that kind. At first the expense may be greater than for boards, but if you live in your own home you can afford to put a cement floor in the chicken house sooner or later, especially if you do the work yourself. If you are a renter you will not feel like putting in expensive, permanent improvements. It will be warm and dry,

saving many losses from wet feet and diseases brought on by dampness and cold. It is easy to clean. It will do away with the rat problem, and last forever. You can put it in after the house is built. Figure out the cost of a layer of cement one and one half inches thick laid on a bed of gravel and small stones. The cement is mixed as follows: one part Portland cement, three parts clean sand, five parts gravel. Mix the cement pretty thick, tamp it down conscientiously until perfectly level, then with a trowel smooth it

and smooth it, over and over, until the surface is free from anything like a stone or large pebble.

The door to the chicken house should be well hung, easy to open, shut, and lock. The window is to admit light and sunshine, especially the latter. Very small panes may be cheap but they shut out the sun; twelve eight by ten panes in a single sash make a window of convenient size. The window should be placed so that the sun can get way back to the very farthest corner of the house. A high window is better for this than a low one. The diagram shows why.



**The windows should be placed high enough to let the sun in to the back of the house**

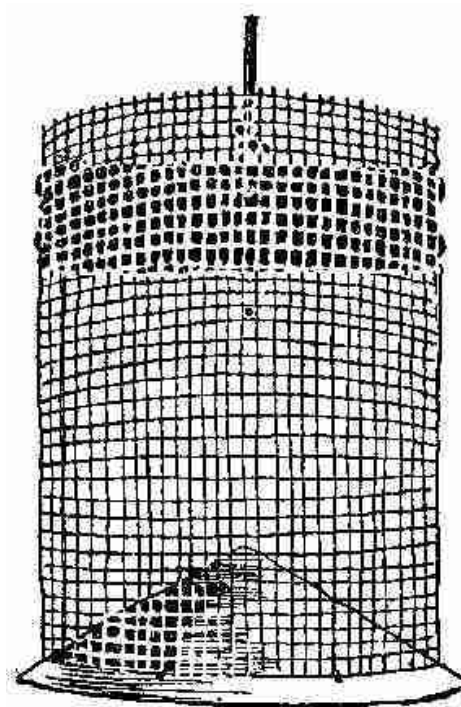
Sunshine and exercise are necessary for healthy fowls. They can stand cold weather well, if they are kept dry and active. Scratching sheds or open-front pens provide sunshine and exercise.

Scratching for food in the litter keeps hens moving and they get to be very athletic, jumping up to cabbages and fresh meat or grain self-feeders hung just out of reach. Scratching sheds in the North need adjustable curtains of coarse muslin to keep out driving rain, snow, and sleet. The State Agricultural Experiment Station at Orono, Maine, has made valuable studies of curtained sheds, and the use of this form of poultry house has found favour all over the country.

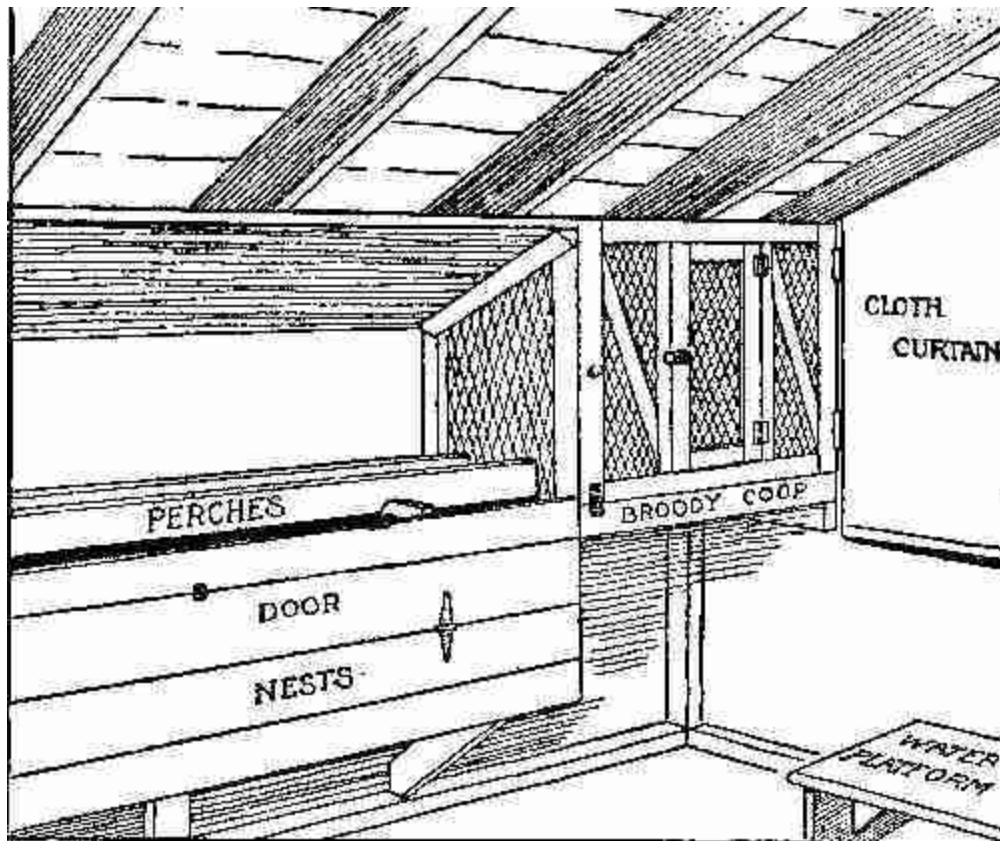
The furniture of the hen house consists of roosts, dropping board, nests, dust box, and utensils to hold ground feed, grit, shell, and water. In making and erecting each piece ask yourself, "Will this be easy to clean?" The

roosts should be in the corner farthest from door and window, out of all draughts. There should be enough of them to provide each fowl with six to eight inches of room and they should be set at least a foot apart. Do not have the roosts at different levels. It is hen nature to want the highest place, and they will fight and crowd and worry each other if there is a higher roost. Pieces of two by two, with the upper edge rounded, make good perches.

As the floor of the chicken house is also the dining table for the occupants it is extremely important that there should be a well-built platform under the roosts for droppings, in order to keep the floor clean. There should be space enough between this board and the perches to allow you to clean it frequently without difficulty.



**Grain self-feeder for fowls**



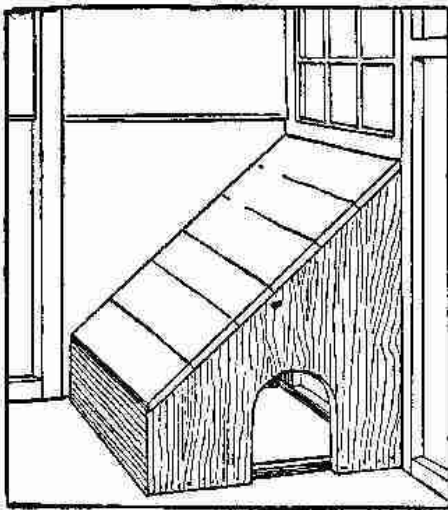
**Corner in chicken house, showing up-to-date furniture**

If you ever tried to clean a range of wall nests you know why the up-to-date poultry men are discarding them as unsanitary. Many are now placing their nests under the dropping board. They are out of the way here, not too high for the hens, nor too low for you. Square nests, fourteen inches each way and at least a foot from the droppings platform, are satisfactory. A long door hinged at the top and hooked at the bottom should form the back of a row of nests. You open this to gather eggs and to clean the nests. The front, where the hens enter, should be in behind under the platform. As it is rather dark in there, the hens are pleased, because they like to preserve the old-time fiction that they are hiding their nests away. The nest should be five or six inches deep. Straw is the best nesting material. Short hay is next best. A hen cannot be happy with excelsior twisted round her toes and an unhappy hen is an unproductive hen.

The dust bath must be provided. Most baths are wet but hens are dry cleaners. The dust bath must be dry to be of any use; the lighter, finer, and

dryer the better. A sunny corner of the house or shed is the best place. Sifted coal ashes and street dust is a good mixture.

Allow just as much space for the runs as you can afford to fence. If possible divide the enclosure in two and keep one part seeded to clover while the chickens are in the other. The heavier fowls usually make very little trouble flying over a fence of five foot wire netting even though it have no top strip. Clipping one wing may be necessary to restrain some individuals. Small trees in the runs are most desirable. Plant there such small fruit trees as plum or cherry and the hens will help to keep insects in check.



**Covered dust bath in sunny corner**

One of the biggest items of work in the chicken business is keeping the house clean. The health, comfort, happiness, and the very life of the hens, as well as the business, depend on this. Many a boy with a sort of natural knack at carpentry can build a chicken house out of second-hand lumber or out of a couple of piano boxes. But it takes a long distance form of gumption to keep any chicken house sanitary. The droppings should be cleaned up often and right here a word to the wise. Hen manure is a valuable garden fertilizer *if* it is sprinkled with land plaster while fresh. Otherwise it may become very nearly worthless. So if you have a garden

or can dispose of your fertilizer every day or two you can make something extra on this by-product by a semi-weekly cleaning of roosts and droppings board. Litter is not dirt in the chicken house but it ought to be dry, fresh litter.

It is not enough that the house should look clean. The obvious dirt, bad as it is, does less harm than the almost invisible vermin that lurk in the crevices of roosts, nests, and walls. Whitewash is a very wholesome finish for the interior and should be put on at least twice a year. This is not enough however. Every square inch of surface should be wet thoroughly with some liquid which is sure death to vermin. Spray or brush may be used. I wonder if this could be done too often in hot weather. Once a month is probably

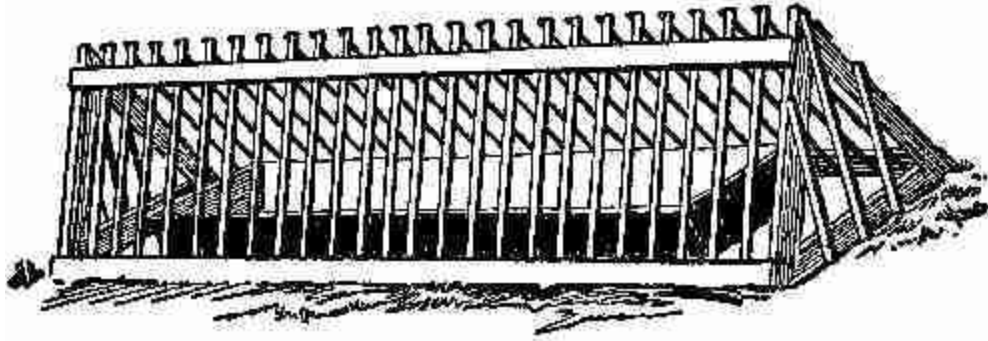
often enough if good insect powder is used on the hens and in the nests. In winter the vermin are less active, but it is not safe to neglect them even then.

### FOOD AND FEEDING

Hens are known to be omnivorous. They must have animal and mineral as well as vegetable food. They need these things in variable quantities depending on their occupation. The hen's main duties are growing, laying, brooding, moulting, fattening. She needs a great variety of these three classes of foods throughout her life. Study your flock, read of the experiences of others in magazines, bulletins, and books, follow their advice, and work out mixtures and methods to suit your conditions after you gain experience. The hens will give you many a hint. Let them out of the pen now and then just before feeding time and see how they make for the grass. In the evening the earthworms are near the surface. The hens devour them greedily. You can get the flock back easily if you have a call, whistle, or other signal which they associate with grain-scattering, but they will go in at twilight anyhow.

Sitting hens need less food because of their sedentary occupation. The main thing is to keep food and fresh water where they can get it when they want it, or see that they go to it regularly.

Broody hens are a trial. The common practices of starving them, ducking them, and otherwise subjecting them to indignities, are little short of cruel and often fail to cure their natural desire to sit. Stop and reason not with, but about, the hen. Having laid all the eggs nature has provided during the spring, the hen's instinct is to brood and rear a nestful. She has worked hard and maybe is run down physically. Feel her bones. What you want from her is more eggs. Instead of wasting time "getting even" with her for being a nuisance, try some rational way of breaking up her desire to sit. Remove her immediately from the nest to a coop. Instead of starving her give her a plentiful supply of the diet you have found best for layers. She will probably soon begin to lay again if treated sensibly.



### **Racks over feed pans prevent waste and soiling food**

Moulting is a perfectly natural process but it occurs at the end of the season and the chickens are often in a low state of vitality. For this reason it is a critical time. Study the hens. Find out what their physical condition is at moulting season. The best condition is half-way between fat and thin. If they are thin, provide a wholesome diet rich in fatty foods, as corn, oats, sunflower, and some flaxseed, with bran, meat scraps, and clover. If heavy with fat from too rich a diet in the summer, less of the fat-producing foods makes a better moulting diet.

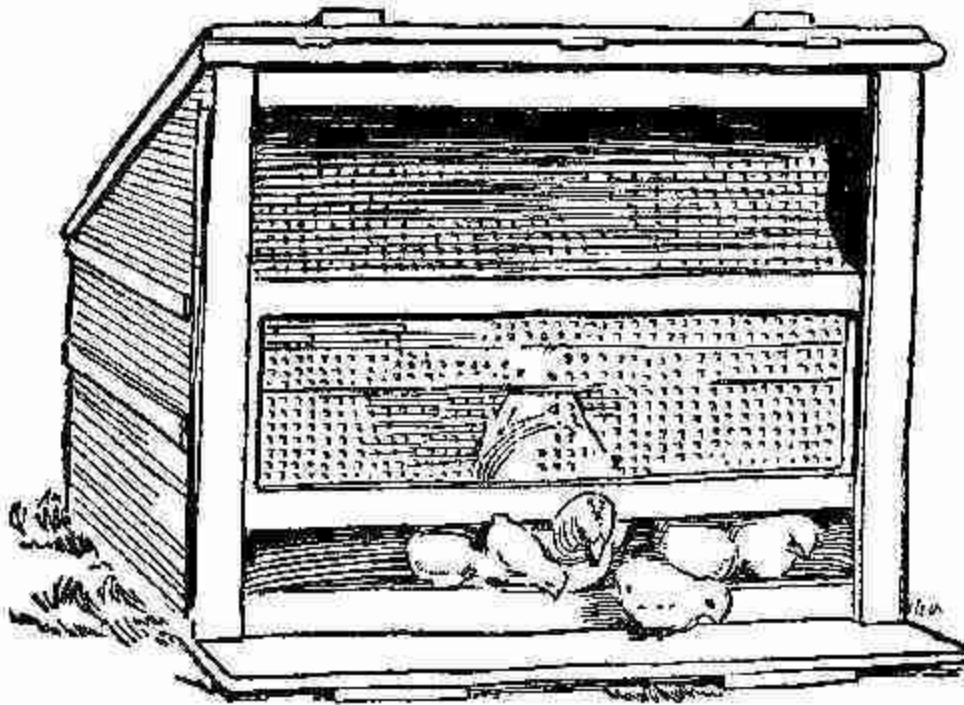
The quality and flavour of the eggs and meat depend pretty much on the kind of food given. If filth is taken into the hen's system it affects her general health and efficiency. There is an opinion that hens and pigs are by nature dirty. We will not stop to argue that, but your hens will eat nothing but clean food if nothing else is provided. That's certain! Look to your feeding racks and watering pans. Use water freely and a stiff brush or cloth. Clean water is positively necessary. All sorts of diseases lurk in dirty houses, filthy runs, and stale, unclean feeding and drinking pans.

Regularity in feeding is important. Do not go into this business if you expect frequently to be otherwise employed at feeding time. The main feedings are two, morning and late afternoon, for whole or cracked grain scattered in the litter. Ground grain should be there, in a hopper, at all hours in summer and all the afternoon the rest of the year. The exercise they must take to get the grain keeps the hens from getting fat and lazy.

A busy hen is a happy hen and a productive hen. Hang a half cabbage up just out of reach in the house on a stormy day and see them train for the standing broad jump! If you can get what is known as "the haslet," really

the lungs, heart, and liver of a porker or lamb, you can suspend this in the same way and they will work all the better for it.

### RAISING YOUNG CHICKENS

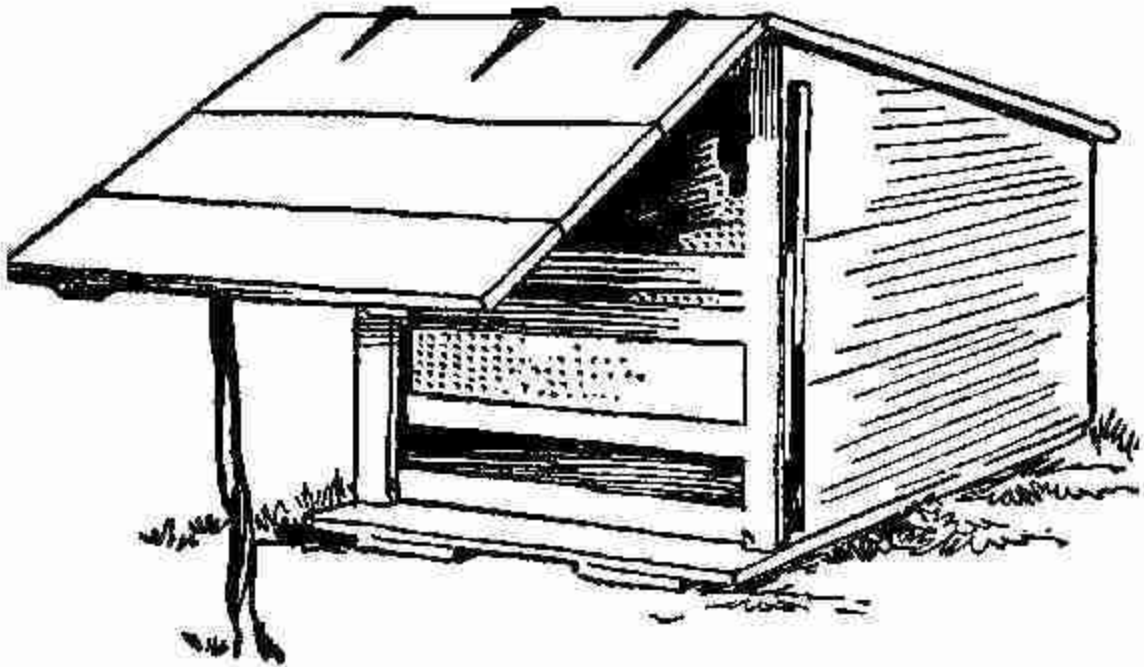


**Model chicken coop—open on pleasant days**

It is poor practice to set your hens in the chicken house. Prepare as many fresh nests as you expect to need. Put them in the cellar, unused shed, under the porch, or any convenient and protected place. Doors of wire netting or slats are a great convenience. When a hen is broody, take her off the nest the first night and put her into the new place with an artificial egg or two. Ten to one she will stay all right. If not, do not waste time with her. When assured that her mind is unalterably made up, give her thirteen eggs and close the door on her again. Set two or three the same day and later combine the flocks under one hen. Select the eggs with reference to their shape, size, and quality of shell. Misshapen, very large, or very small eggs or those with thin shells are worthless for setting. Set the eggs of the best layers. Every morning take sitters off nests, leave food and water for them,

and return in half an hour. Usually they are all back in their places in less time than that. If not, you can replace and shut them in again. In eighteen to twenty-one days the eggs will hatch.

Probably more little chicks die from lice than from any other cause. Preventive measures must begin early. Get fresh, dry insect powder and treat the nest and hen about the third, the ninth, and the fifteenth day of incubation. Rub the powder all through the feathers. Fine dust obstructs the breathing pores of the lice and kills them. When you take the chicks from the nest examine the head, neck, and vent regions of every one. If lice are present a drop of melted lard will put an end to them. Constant vigilance and nothing short of it, will prevent death from lice.

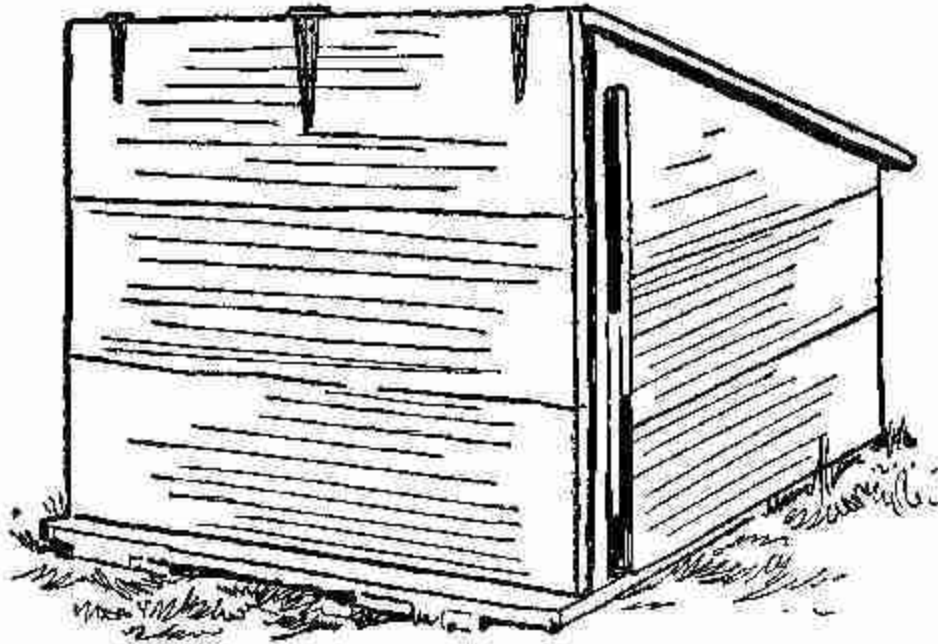


**Prop the door open, thus, in rain, wind, or too hot sun**

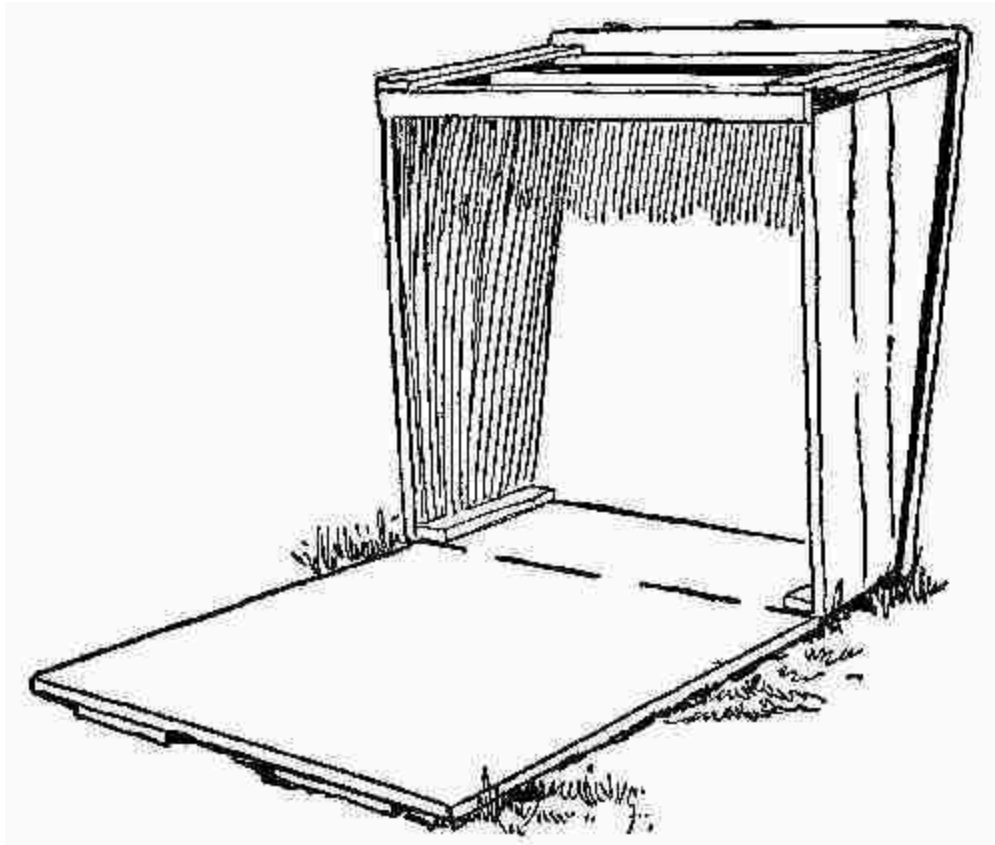
A good home-made lice powder, costing only about four cents a pound, may be made as follows: Mix together one quarter pint crude carbolic acid (90 per cent. pure), and three quarters of a pint of gasolene. Stir into this enough plaster of Paris to take up the liquid, (about two and one half pounds). Mix thoroughly and rub through a wire mosquito screen to break the lumps. This can be used to dust through the feathers, the day after it is

made. Keep in a tight jar or box. This powder is the invention of an expert in poultry husbandry.

The coops for hen and chicks need not be ponderous, but they should be rain proof. A coop two and one half feet square with removable roof and floor is not too heavy to handle and answers every purpose. A wire netting run three or four feet long attached to each coop is necessary and this combination will house a hen and from fifteen to twenty chickens.



**Closed for the night. Vermin-proof, weather-proof.  
Screen-covered ventilator on one side**



**Bottom of model coop can be cleaned by lifting up the coop**

All the food a young chick needs the first twenty-four hours is provided by nature. After that it is "up to you." Their first meal may be hard-boiled eggs minced finely, shells and all, and mixed with oatmeal or custard made of milk and eggs baked hard, or it may be baked and crumbled corn bread. By the third day they will be ready for raw broken grain. There are many good commercial kinds: less trouble than making your own mixtures. The chicks will learn to scratch for this in a week or two. The hen is their teacher. Fine grit, charcoal, and clean water must be kept where they can get what they want. Soft food should not be fed in unlimited quantities; give what they will eat in five or ten minutes, then take it away. They are likely to over-eat of wet mashes, but what they have to work for is not likely to give them indigestion.

When chickens are two months old they no longer need wet mash. They should now have access to food whenever they want it. A mixture of

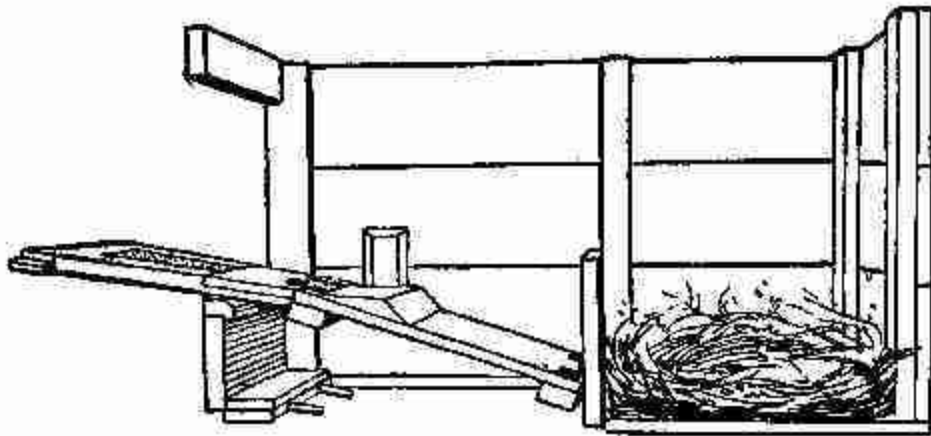
cracked corn, wheat, beef scrap, bone, grit, shell, and other grains, with dry middlings and bran, may be put into a slatted self-feeder, like the illustration, easily constructed by yourself. It is not much trouble to see that this is never empty. If fed only at intervals they rush at you, bolt the biggest grains, stuff their crops, crowd away weak or modest ones; result, some are under-fed, others are over-fed. If food is kept where they can get it whenever they happen to think of it they take a reasonable amount, then visit the growing clover or grass, pick up a casual pebble, take a drink of water, scratch out a worm, and return to the feed tray, all in natural course of the day's work.

You will want to get rid of most of your young cockerels as soon as they are marketable. Broilers bring highest prices. To put them in tip-top condition they should be fattened for about two to three weeks when they are four months old. There is nothing better for fattening than a mash made of equal parts finely ground corn meal and wheat middlings with one fourth the quantity of meat meal. This should be wet with sour skim-milk or buttermilk and fed in a semi-liquid condition, about the consistency of pancake batter. Ground oats may be added. The product is known in the highest priced city hotels as "milk fed" or even "cream fed" chicken. If you can get skim-milk cheap why not buy a bunch of young cockerels and stuff them for market? They have been known to put on a pound for every five pounds of this mixture eaten.

#### **BUSINESS METHODS**

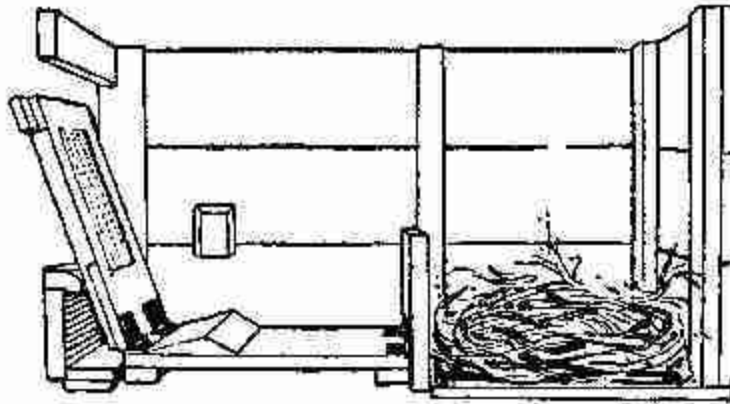
The day you drive your first nail into what is to be your chicken house you should start an account. Every item should go down, cost of materials, cost of stock, cost of feed. Economize where you can by utilizing vacant space for growing clover for summer feed and some root crop like mangolds for winter supply. Apples are fine in winter for hens. You can often get bushels of windfalls for the picking. Sunflowers are easy to grow and their heads hold a tremendous lot of chicken feed. Table scraps ground with a hand mill vary the hen's diet, but do avoid sloppy messes.

There are two sides to every account. If you charge the chickens with what they cost you, it is only fair to yourself and to them to credit them with the eggs and meat they furnish, as well as with increase of stock, etc.



**Trap-nest open. The hen's weight shuts the door behind her**

In every flock there are some idlers. They lay only a hundred or so eggs, they leave their eggs too long when sitting, or they never put on any weight. You want to be rid of all such. You can mark the bad sitters, and send them to the pot, as well as those whose habits are such as to make them a nuisance. But you need to know which fowls lay the biggest and best eggs and which lay the largest number. For market in our country where eggs are sold by the dozen it is numbers that count, but for breeding you want eggs of good size and shape. You also want to set the eggs of the good layers. These eggs taste no better in cake or omelet, but by careful selection you can breed a strain of extra good layers, right in your hen house. The device known as a trap-nest is the thing you will need if you go at it scientifically. You want it in winter, too, to prevent killing your best hens for potpie, while the idlers cheerfully eat your grain without recompense. The simpler the mechanism of the trap-nest the better. It must stand open until the hen enters, then close without frightening her. Most of them keep the hen a prisoner until you go and examine the nest, credit the hen by her leg-band number, and release her. By following the drawings in the bulletins of the New York and Maine Experiment Stations referred to in the list of bulletins on chickens you can construct your own trap-nests.



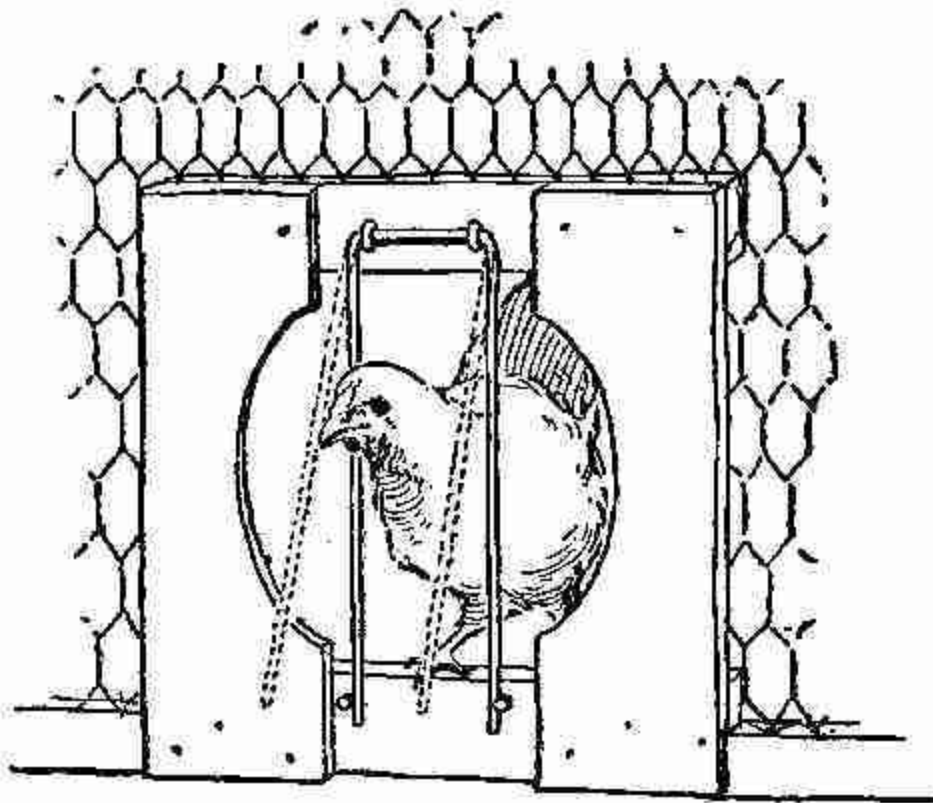
**Trap-nest closed after hen has gone in**

There are people who claim that "common chickens" or mixed breeds are hardier than pure bred fowls and better all around producers. How many can show records to make good that claim? American boys and girls who go into chicken raising will want to breed from good pure stock. Nothing is too good for them. Did you ever hear any one show any enthusiasm when passing a flock of mongrels? Contrast this with the delight you and all your friends take in the sight of a hundred fowls all white, all red, all spangled, all black, all piebald, all blue, or all speckled, as alike as peas in a pod! I vote for the pure stock every time. You can keep it pure and strong by exchanging cockerels with other breeders of the same variety and with similar ideals and practices.

Keeping chickens isn't mere child's play. There's lots to be done. You must be carpenter, gardener, breeder, merchant, and even doctor, all rolled into one. But there is fun in it and profit in it. Better than all, there is a satisfaction in doing a good job and doing it well, and it keeps a boy out of doors where he belongs if he's a healthy boy.

EGG RECORDS	HOUSE NO.	HATCHED																															BIRD NO.	
	PEN NO.	VARIETY																																
DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTALS		
NOV.																																		
DEC.																																		
JAN.																																		
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MAR.																																		
APR.																																		
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The egg record is the up-to-date way of keeping tab on idlers. It goes with the trap-nest



A useful hen gate

As with many other products of home industry the first and best market is the home market. Credit the hens with every pound of meat you furnish for the table and every egg consumed by the family. But you will soon need to extend your market. Across the street, up and down on both sides, you can find people who like "personally conducted" eggs and prefer that the fowls served on their tables should be acquaintances rather than the embalmed kind. You must be business man enough to work up a trade for fresh, clean eggs in attractive packages, and for wholesome meat. It would be a good stroke of business to date your eggs if you know what demand you can depend on. That would help impress the idea of real freshness on the consumer's mind.

If you pluck fowls for market it will interest you to know that feathers have a market value. They should be plucked dry and the wing and tail feathers kept separate. Any large city dealer in chickens will probably take your feathers. By-products often make the difference between plus and minus in a year's business.

The winner of the first prize of one hundred dollars in the Junior Poultry Contest of the Oregon Agricultural College tells this story:

#### **RAISING CHICKENS**

Boys and girls should raise chickens in the city as well as on the farm because it pays and is a fine occupation. It is a work that never grows tiresome and new experiences are always awaiting you. Various theories are advocated as to the proper manner of feeding and housing to get the best results but simple rules are the best to begin with. Plenty of clean water, clean houses and yards and good feed are needed to get the best results. Spade up a little in the chicken yard every day that is pleasant, but if it is cold and in wet weather provide a scratching shed. Keep the hens busy. Read the bulletins furnished free by the government and the various experiment stations. Also subscribe to a good poultry paper. The ideas you will get from these together with your own experience will make you a successful poultry raiser. By doing all that was stated above I was able to win first prize in the poultry contest just closed.

CLARENCE A. HOGAN

#### **SUCCESS WITH CHICKENS**

The contest of the Portland Junior Poultry Association has closed. It lasted a whole year, and it seemed as if it would never come to an end. But if it had not been for the contest I would never have known many of the interesting things I now know about chickens.

I had twelve white Leghorn hens and a cock entered. They were all little beauties and I enjoyed working with them very much.

They laid one thousand six hundred twenty-two eggs during the year. The eggs were worth from twenty-five to sixty cents a dozen. We fed them wheat, corn, barley, oats, and bran in which table scraps were mixed, oyster shells, grit, prepared beef scraps, charcoal, and green foods such as grass from the lawn, cabbage, kale, and lettuce and other green things from the garden. Each hen made us a profit of two dollars and seventy-two cents for the year.

Chickens need lots of care. Their house must be cleaned out, there should be some fresh ground dug up in the yard, and they need some green food every day. Papa took care of the house, and I mowed the lawn and gave them the clippings and gathered cabbage leaves, kale leaves, and lettuce leaves out of the garden and gave them each day.

In the spring time we let them out a few minutes every morning to get bugs and worms. They soon had all the bugs and worms scratched out of the garden and then they ran out in the yard and scratched up the flower beds, which did not please mamma very well. After that they wanted to go to the neighbour's yard but we had to keep them up. This was before we made the garden.

Chickens make nice pets. They are much nicer than dogs or cats, and if you take good care of them they will pay well beside. I had a nice little white Leghorn hen I called "Petty." When she was a little chicken I would catch her every day and play with her. She would go in the nest and wait for some one to take her out and pet her. She got so tame that I could catch her any place in the yard. I would go in the yard and get her and take her out in the garden and dig for her and let her find the bugs and worms.

I had another little chicken that I called "Jim." He was a cute little rooster. When he was just a little chicken I would put him to bed every night and when he grew a little older he would not go to bed alone. One night we

weren't at home at his bedtime and when we came home that night we heard a funny little noise in the back yard. It was raining and Jim had gone under the sweet pea vines to sleep instead of going into his box.

The first little chicks we hatched we took away from the hen and raised them by hand. For about a week after they were hatched we put them in a basket and covered them over with warm, woollen cloths and set them by the stove to keep warm over night. I had a peach box with a wire covering to keep them in, in the daytime. On sunshiny days we set them out in the sunshine but after about a week they were not satisfied with that. I decided that what they wanted was to get out and run for bugs. So one afternoon when I came home from school it was nice and sunshiny and I let them out of their box. When they first stepped into the grass they were surprised. That was the first time they had ever stepped on the lawn. They ran right to a rose bush and stayed right there all the time picking off bugs. Each evening I let them out they would go a little farther away from home. At last they had caught all the bugs around the place and if we did not watch, they would run over to the neighbour's yard. I am anxious for the time to come when we will have more little chicks.

RUTH HAYES

The girl who tells this story is thirteen years old. She won second prize, fifty dollars.

#### ANOTHER PRIZE WINNER'S STORY

During the time that I have been taking care of poultry I have been successful. I only had six chickens in the Oregon Junior Poultry Contest, five hens and a rooster, but I have about fifty other chickens to take care of. The chickens that I had in the contest were Black Minorcas, but I also raise White Wyandottes. I seem to have better success with my White Wyandottes than with my Black Minorcas. The house I have for the contest chickens is twelve feet wide and six feet long. The place they roost in is four feet by six and the rest is a scratching shed, which is eight feet by six. The house is open front and has a ground floor, which is dry and the chickens can dust in it.

I feed them three times a day, grain morning and noon, which I feed in litter, and a warm mash at night so they can go to roost warm. I also keep

bran, charcoal, and grit before them all the time. I have a bone cutter, and feed cut bone to my chickens once a week. I clean off the drop board every morning, and once a week I coal-oil the roost and where the roost rests. During this cold weather I do not let the chickens out very early and when it is raining I do not let them out at all. Every night after the chickens have gone to roost I go out and throw a little grain in their litter and that gives them something to do the first thing in the morning.

I am sorry that I did not have a photograph of myself to send you.

FRANK MITCHELL

#### A BOY FEEDS SIX THOUSAND HENS IN HALF AN HOUR

What do you know about that? I saw this feat done last winter by a fourteen-year old California boy, and I took his photograph as he was doing it. What can a boy not do if he has the opportunity? There are other boys who find it a harder task and a more disagreeable one to feed half a dozen hens. A boy can feed six thousand hens and gather two or three thousand eggs a day and go to school.

This California boy had a gray pony to help him, but what enabled him to perform this feat day after day was system. His uncle, the owner of the farm, had planned the work to make it easy. The farm contains one hundred and twenty acres, and the six thousand hens are scattered over the whole farm in colony houses. The system of feeding was a liberal feed of soft mash in the morning. Three colony houses were placed together. The middle one was a laying house; the other two, roosting houses. In one end of the laying house there was a wheat bin holding several sacks of wheat. The bin was a self-feeding hopper. After dinner the fourteen-year old boy jumped on his gray horse and made the rounds of the houses, opening a door to the hopper of wheat, so that the hens could eat at will during the afternoon. It took just a moment to jump off of his horse, open the door, and jump on again, the horse going on the lope between the houses. He made the rounds in less than half an hour. About three or four o'clock he hitched his pony to a low wagon and visited all the houses, gathering the eggs. This was a bigger job than feeding the hens; he could not go as fast with the eggs. In the morning, about seven o'clock, he makes the rounds of the houses, and without getting off his horse opens the doors to the laying houses, and does it all in fifteen minutes. What do you know about that?

JAMES DRYDEN

AN AMATEUR'S EXPERIENCE

In April, nineteen hundred and one, I purchased four broody hens, two settings of White Wyandotte eggs, and two of Plymouth Rock. I live in a suburban district where dogs and cats abound and poultry cannot have free range. I therefore made two wire-covered board runs, six feet by eight, eighteen inches high, and against a six-inch hole sawed in one end of each I placed a box turned on its side for a coop. Of twenty-eight Wyandotte eggs, twenty-six hatched, and three chicks died. Of twenty-six Plymouth Rocks only three hatched, and these I put with the Wyandottes in care of the two most motherly hens.

Every morning I fed a mash of meal, shorts, and beef scraps, in equal parts, mixed dry with boiling water; at noon and night oatmeal, cracked wheat, or occasionally cracked corn, and clean table scraps at any time. Oyster shells and fresh water were always before them. Mothers and children ate together, each taking what she liked best. As often as they soiled the grass I shifted the runs, and on fine days I let the families out for an hour before dark into an adjoining field, keeping an eye on their wanderings.

October first I sold the four hens, which had laid meanwhile fifteen and a half dozen eggs. Twelve chicks were cockerels, which were killed as needed.

November first I reduced the daily feed to two meals—a warm mash at half past eight A.M. so that they would scratch awhile before being fed, and for supper grain, generally oats, scattered about the yard, with a few handfuls inside the house to induce more scratching. They had all they would eat, but if they left any food I skipped the next meal and let them get hungry. The water was renewed often, dishes kept clean, and field excursions continued occasionally.

November sixth I sold the first dozen eggs, and for eleven months the supply never failed. The eggs were large, and the hens were active, healthy, and happy. Any success I attribute to moderate feeding, exercise, and cleanliness.

*May 1, 1901, to August 15, 1902*

EXPENSES

Eggs, White Wyandotte	\$2.00
Express	.25
Eggs, Plymouth Rock	1.00
4 hens	2.60
Boards, net, and boxes	1.22
Grain, 15½ months	31.41
	<hr/>
	\$38.48

RECEIPTS

Eggs, 14 pullets, 162 dozen	\$47.33
Eggs, 4 hens, 15½ dozen	3.92
12 cockerels, 55¼ pounds	10.35
4 hens	2.00
14 hens (sold by reason of my illness)	8.00
2 barrels dressing	1.50
Runs, etc., on hand	1.00
	<hr/>
	\$74.10
	38.48
	<hr/>
Profit	\$35.62

BELLE S. CRAGIN

**HOW I STARTED WITH HENS**

I am a boy, thirteen years old, and have always been very fond of farm animals, especially chickens. I like the White Wyandottes best for all-around, general-purpose fowls. They lay well, and when they are dressed for market there are no dark pin-feathers to spoil their looks.

In April, nineteen hundred and five, I purchased two settings of White Wyandotte eggs at the Rhode Island College, and borrowed two broody hens. I bought one of these hens later, but she soon died. I fixed up an old pig house that was on the place, and set the hens in this house.

While they were sitting, papa helped me make two coops and pens for them. For the coop I took a dry-goods box, about four feet by one and one

half feet by fifteen inches, and made a door in one corner large enough to admit a hen. In one end I bored some holes and covered them with wire netting, for ventilation.

For the pen I took four pieces of scantling and a good supply of laths. I used the pieces of scantling for the corner-posts and nailed the laths on the sides, top, and one end. I did not put anything on the other end except the top and bottom strips. The pen is just the length of a lath, but the width is a little less. The open end is placed against the front of the coop; the hen can then come out into the pen, and the chicks can go anywhere.

After awhile the chicks hatched and there were sixteen of them. At first I fed them a mash of corn meal and bran and later a little cracked corn and wheat. They grew finely, but I raised only thirteen of them, eight of which were pullets.

I fed them in the back yard for a while, but they dug the grass up so that I had to stop it. Then I built a scratching-pen by the wood shed, to feed them in.

In the summer the chickens were roosting in the trees, and when cold weather came and I wanted them to roost in the hen house they would not do it. I tried feeding them there, and driving them in; but that did not work very well, because I could not drive them all in at once, and when I drove some in and tried to get the rest, the first ones would come out again. So I had my brother help me, and every night we would carry them down to the hen house. After a time they learned to roost there.

The pullets began to lay early in November and laid well all winter. I am proud of one of my hens. She laid two hundred and thirty-eight eggs from the eighth of November, nineteen hundred and five, to the fifth of August, nineteen hundred and six. I think this is a very good record, considering that during the most of that time she was fed nothing but cracked corn.

During the first part of the winter of nineteen hundred and six to nineteen hundred and seven the hens did not lay very well, and I asked one of the poultry men at the Rhode Island College what to feed them to make them lay. He told me what he had fed with good success, and as it made my hens lay, it may make somebody else's hens lay.

Equal parts, by weight, of	{ Whole corn
	{ Wheat
	{ Oats
MASH	
Equal parts, by weight, of	{ Bran
	{ Middlings
	{ Corn meal
	{ Beef scraps

This means that they will get more wheat and oats than corn, and more bran and middlings than corn meal. I feed the grain morning and night, and the mash at noon. The mash may be fed either wet or dry. I have tried it both ways but I like to feed it dry fully as well for two reasons: First the hens cannot gobble it up so fast and all get an equal share; second, the hens lay just as well and it saves labour.

Feed is expensive here and it cost me three dollars and thirty-nine cents for one hundred pounds of both kinds. I think I shall continue to feed it till I find something better, and I would recommend it to any one who desires a good, satisfactory feed.

My poultry record for one year is as follows:

POULTRY ACCOUNT			
DR.		CR.	
Jan., feed	\$3.15	Jan., eggs	\$2.63
March, feed	.24	Jan., roaster	.75
April, shells	.20	Feb., eggs	2.28
May, feed	1.85	March, eggs	1.88
June, feed	1.26	April, eggs	1.41
July, feed	1.28	May, eggs	1.96
Aug., feed	3.38	June, eggs	2.32
Oct., feed	1.24	July, eggs	1.85
Nov., feed	1.24	Aug., eggs	.63
	—————	Sept., eggs	1.12
Total	\$13.84	Sept., roaster	.65
		Oct., eggs	1.32
		Oct., premium	.75

Nov., eggs .38

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\$19.93

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Profit \$6.09

Two of my hens died during the first year, leaving six, hence these six paid a profit of one dollar and one and one half cent each, above cost of feed.

LESLIE E. CARD

#### HOW ONE YOUNG WOMAN MADE A START WITH POULTRY

We had long dreamed of a country home, my mother and I—of a place where living expenses would be lessened and which would be pleasant during the summer for my sisters, who teach eight months of the year—a place where we could add materially to our income by keeping chickens.

After discarding the idea of buying near New York City, because of the higher value of land and greater cost of living, we chose a place of twelve acres on the edge of an aristocratic old town in western New York. Being within the corporation limits we have water and sewer connections, hardware and lumber delivered (which is quite an item when one is building poultry houses); and, best of all, the expressman comes for all eggs and poultry. A woman intending to go into the poultry business will certainly find such a location a great advantage over being farther from town. The increase in taxes is slight. The cost of expressage is, of course, greater than if we had located near New York City, but grain is cheaper.

We purchased the place in the fall to have possession the following March. During the winter, I took the three months' Poultry Course at Cornell University. The course is comprehensive and very practical. Beside learning the principles of poultry husbandry, I gained confidence and courage.

We paid two thousand six hundred dollars for the property and spent four hundred dollars more in plumbing and repairs on the house. The place consists of about twelve acres of very good land, especially suited for poultry, being somewhat sandy and sloping enough for drainage. The house is small but well built. The view is magnificent, and the place is easily

adaptable to some charming bits of landscape gardening which good taste and personal supervision can accomplish without expensive gardener's fees.

We first built some brooder houses, gasolene heated, as used at Cornell, and purchased day-old chicks of a good laying strain. Late in the summer we built a five-pen laying house, the pens being twenty by twenty feet, using one pen for a feed room. The entire first year we took care of the poultry ourselves, with the assistance of a schoolboy who worked for his board. Most of the land was in hay, which we hired cut and sold, and we raised some corn. I knew nothing about farming, and was so interested in chickens that I had little time to study; however, I got the Cornell bulletins on alfalfa and started an acre according to their suggestions. This has been successful and is fine feed for poultry.

The second spring we hired a man by the month. One man can take care of twelve hundred hens and the horse, carry coal, and drive for us some of the time. The regular farm work we hire done by the day. A woman needs to pay special attention to keeping down the labour expenses.

The laying hens have about three acres for yards. This is divided into three different yards, one for the four hundred best pullets which I take the time to trap-nest, and the third one to be alternated with the other two so that they can all be ploughed and seeded, in order to keep the ground from becoming contaminated. I have planted cherry trees in one yard and will in the others later, to furnish shade for the fowls. I chose cherries for various reasons. They can stand the enrichment and the treatment of the land necessary for poultry; also, if they are well cared for, sprayed, etc., I can get a fancy market for them at home. The place had been noted in former years for its fine cherry orchard, so I believed the soil and location to be well adapted to them.

We felt we could not afford to build an incubator cellar, so we moved the furniture from a north-east bedroom where we placed three four-hundred-egg incubators. We closed the east shutters so that the morning sun would not interfere with the temperature and used the north window for ventilation. It was successful and convenient.

The brooder houses are located near the house as long as the little chicks need heat. I have started a hedge for a windbreak in front of them, which will also screen the poultry part of the plantation from the house. When the

chicks no longer need heat the hovers of the brooder houses are removed and roosts put in. The houses, which are on runners, are drawn to a cornfield as soon as the corn has grown enough not to be injured by the chicks. Here they have free range all summer. By moving the first hatches to some shack houses, which are cheaply built, when the chicks no longer need heat the brooder houses can be used once again.

There are two cornfields for growing the pullets, to be used in alternate years so the ground will be fresh. The corn gives shade and a sense of security, besides furnishing a considerable part of the winter feed. I hope to be able to grow corn for several successive years on the same ground by sowing either clover or rape at the last cultivation to furnish humus for the land.

The following were our initial expenses:

3 400-egg incubators	\$111.00
8 brooder houses	320.00
4 shack houses	60.00
Laying pen for 1,200 hens	1,500.00
Fences	94.00
Tools and equipment for poultry	100.00
	<hr/>
Total	\$2,185.00

Last year I cleared two dollars over the cost of feed from each of my layers, from the sale of eggs alone.

The pleasure and freedom of country life are worth much. A garden with high quality vegetables, fruit of all kinds and varieties, fresh eggs and poultry, goes a long way in making the cost of living less. (We save cracked, small, or misshapen eggs for our own use.) With a saddle horse and a tennis court, life in the country is far from dull.

AVA HOOKER

#### PRESERVING EGGS FOR WINTER USE

When eggs are cheap and plenty is the time when it will pay to preserve some for winter use. Remember, though, that no amount of preserving, or cold storing will make a fresh egg out of an old egg. As infertile eggs keep

better than fertile ones, it is well to separate the laying hens from the roosters when the hatching season is over.

Cold storage is undoubtedly the best method for keeping eggs in wholesale quantities, but for home consumption there is nothing more satisfactory than a preservative called water glass which is *sodium silicate* and can be bought in crystal or liquid form at drug stores. Prof. J. E. Rice of Cornell University says that "the liquid form is very much to be preferred owing to the fact that it is very difficult to dissolve the crystal. One part of water glass to nine parts of water makes a liquid having a consistency not quite heavy enough to cause the eggs to come to the surface, but still sufficiently strong to furnish the coating which prevents the air from entering the shells."

Stone jars are recommended as inexpensive and not likely to leak. Eggs taken out after nearly a year in the water glass and washed look like fresh eggs. As to taste, a very fastidious person might find the flavour not quite right when served as boiled eggs. In all other ways they are entirely satisfactory.

With water glass, eggs can be preserved for less than two cents a dozen. In communities where the price of eggs varies from a cent apiece to four cents apiece it would be very profitable to preserve all the surplus.

#### RAISING GUINEA FOWL

What would you expect if you ordered "American pheasant" from a bill of fare in a London restaurant? No matter what you expected, when the bird came onto the table it would be guinea hen! This is a dish you probably never ate at home unless you live in the South, "where they know what's good," or make a practice of dining at fashionable hotels where they serve fancy game and poultry.

Most of the guinea fowls marketed in this country are put into cold storage and sent to England. They also bring a good price in city markets in this country.

Farm boys and girls all over the country are familiar with the strident squawk and the furtive, hunching trot of the speckled guinea fowl. I doubt if any farmer could tell why he harbours one on the premises, unless it is to warn his chickens of the presence of danger. I know of very few people in

the North who eat either eggs or birds (if they know it), and the young are very seldom seen. Here is a really valuable game bird which silly prejudice is depriving of its fair share of attention.

If farm boys realized that there is a good and growing market for guinea fowls, eggs, and birds, they would read this: A fashionable New York hotel served three thousand of these birds between January first and April thirteenth, nineteen hundred and five. Listen to the prices: from one dollar to one dollar and a half per pair for young broilers in midwinter in the large Northern cities. Eggs twice the price of hens' eggs. Taking into consideration the fact that they are hardier even as chicks than ordinary poultry and that the market is strictly fancy and not oversupplied, the chances for success in guinea raising are good.

In beginning this branch of business it is not best to buy old fowls. They are swift of wing, and they are extremely likely to take "French leave" unless closely confined for a week or more to their new quarters. This confinement is not very good for them. My advice is to begin with a setting of fifteen eggs under a common hen in May or June. The eggs are smaller than hens' eggs and have good, strong shells. They take from twenty-six to thirty days to hatch. The treatment and care of young guinea fowls varies from that given to young chickens in a few particulars only, *e. g.*, the chicks should be fed very *soon* after hatching and need a large percentage of animal food when first hatched. Dry bread crumbs and hard-boiled eggs minced finely or pieces of cooked meat cut very fine are a good first meal. Bread and milk and finely chopped lettuce, cress, or other vegetation should be given a day or two later. They will pick up innumerable insects if allowed the privileges of the garden or fruit plantation. Little guineas should have access to feed all the time as a few hours without food is very likely to prove fatal. Like little pheasants they require a greater percentage of animal food than chickens because if in the wild they would eat little else. Soft grains should follow the earlier rations, and the mixtures given to ordinary poultry should gradually take the place of these.

Old guinea fowls have the reputation for making very tough meat. For this reason it is better to market them while the breast bone is still tender, the claws still short and sharp, and before the crest or helmet has reached its full size or changed colour. In young birds the helmet is nearly black, growing lighter with age.

Ordinarily it is more economical when raising a few guinea fowls not to confine them to runs, in which they are less hardy. Partial confinement, such as coming to the barn yard to roost and appearing regularly to be fed, is more practical. If kept in runs it is necessary to cover the pens. High roosts should be provided. During the laying season the hens are almost certain to hide their nests and need close watching. They may lay in nest boxes if these are in dim, secluded corners. Guinea hens are very wary and may resent having their nests visited, by quitting. Also, the hens seem to be able to count and will usually desert their own nests if all but one or two eggs are taken away. They are rather impatient sitters, often leaving the nest when the eggs are half incubated or when the first chick is ready to go, even though they have a dozen pipped eggs. The little ones are, like little turkeys, susceptible to dampness and cold. Very early and very late hatchings are undesirable.

#### RAISING TURKEYS

Among the pictures which my memory calls up is that of an old bushel basket by the kitchen stove on a damp spring morning. From the comforting folds of an old flannel petticoat in the depths of the basket came the feeble "peep-peawp" of a dozen or more miserable little turkey chicks rescued from the shower. What a chase they had given us through the wet tangles of grass, weeds, and bushes, scooting to cover like partridges, hidden by their colouring almost as effectually as their wild cousins. We shall never be quite sure that we got them all, for we weren't certain how many there were originally. If the chill had not penetrated to their vitals, and these important organs lie disastrously near the pin-feathers, we had been in time to save them.

Experiences like these impress upon the minds of farm children much that is characteristic of the turkey. As grown-ups we read of the precautions necessary in raising turkeys and realize that we knew all that years ago. A turkey hen will stay close around the barn yard eating and drinking with the other fowls all winter, roosting in convenient tree tops, and giving no hint of wildness or firmness of purpose. But in April you miss her. She may return about meal time, take a dust bath perhaps, then she is off again. Now you must test your wits against her instincts and see if you can find her nest. She may have secreted her eggs in a perfectly safe barrel, provided with straw and cunningly secluded in the shrubbery. She is likely, though, to go

far afield and give you a merry chase. It is wise to take away the eggs each day until she has finished and wishes to sit. Then you may give her a nestful, fifteen to eighteen, or you can set the eggs under hens and when the turkey's broody spell is over she will lay again.

Four weeks is the time required to hatch turkey eggs. Newly hatched turkeys are far from spry. They have no interest in food nor in the world about them. It is forty-eight hours or even longer before they begin to take notice. Hard-boiled eggs chopped fine is a good first meal for them. Some growers take a pint of sweet milk in a saucepan, let it come to a boil, and stir into it two eggs well beaten. This makes a sort of custard and this quantity is said to be enough for fifty new turkey chicks. Cottage cheese without salt is recommended. A dusting of black pepper in the food is good for week-old turkeys, especially in cool weather.

Two deadly enemies of little turkeys are lice and wet. These are responsible for the high rate of mortality in flocks of all breeds. Keep them free from these by all known methods and with ordinary care in other details your profits are safe. If you tide over the first two months you will see the delicate chicks transformed into hardy little poults, holding their own with any kind of fowls.

I don't know of any one who ever made a success of turkeys on a small lot. Their habit of ranging can be restrained to the extent of keeping them off the neighbours, but close cooping opposes their natural instincts. They are great insect eaters and will pick up a fair living away from the feed trough. It is best to train them by a regular evening feeding to roost at home. You will want to count them frequently, especially as November draws near and the price begins to soar.

There are a number of breeds in cultivation. The biggest and perhaps the hardiest is the bronze turkey. Some consider their flesh less delicate than that of the smaller kinds. There is always a good market for any size. If all your neighbours have bronze turkeys and the flocks are always getting mixed, why not try the buff or black or the white Holland? The latter are almost as beautiful an ornament to the country home as peacocks, and can be seen at a great distance because of their brilliant white plumage.

If one wants to get enthusiastic over turkeys let him drive through a thrifty farming community in the fall and catch glimpses of the sunshine reflected

from the burnished backs of the great flocks which ornament every farm yard. Or, if inclined to a meal of turkey, just inquire the price on the farm or in the market, and you will decide to raise some for your own use next year, and a few to sell.

### RAISING PEACOCKS

We have it on the authority of the curator of birds of the New York Zoölogical Garden, Mr. C. William Beebe, that peafowls are not difficult to raise if the owner is watchful. Wouldn't it be a triumph to raise a family of these wonderful birds? Mr. Beebe says also that "peacocks are so common that we sometimes fail to appreciate their really wonderful colours." I wonder if that can be true. They were so uncommon in the Mississippi Valley when I was a child that I never saw one; it was less than ten years ago that I saw for the first time this regal bird spread his wonderful tail in the full sunlight. It was one of Mr. Beebe's own pets and I shall never forget nor fail to appreciate the sight.

A peahen lays fewer eggs than most birds of her size. She will lay three times a year if you succeed in "changing her current of thought" when she is broody. She usually wishes to sit on the first six eggs and as she has pretty good judgment in placing her nest and is a patient and courageous mother, you had better trust her to bring up her family, unless you wish to raise the first lot under hens or turkey mothers.

Like young turkeys, the little peachicks are very tender and susceptible to dampness. Woe unto them if the chill of an early May rain gets into their bones! This is the time when watchfulness on the owner's part is necessary.

For newly hatched peachicks a few meals of finely chopped, hard-boiled eggs and minced lettuce are right. As they develop appetites, feed some of the mixtures prepared for game, pheasants, etc. By all means let them have space to run in; a little coop is bad for their health. Make it twelve feet long at least. They will eat quantities of insects and will need feed only morning and evening after the first month or two. Corn, wheat, barley, and millet make a good mixture.

No regular house is required for peafowls, though shelter must be provided against rain. They prefer to roost high, where the air is fresh and cool. Wind and cold weather they like.

Indian peacocks cost twenty dollars to thirty dollars a pair. You can grow them for far less from eggs and sell the birds. They live to be twenty or thirty years old.

If you are convinced that you want to try your hand at any of these kinds of fancy poultry, collect all the information you can first. Visit some successful poultry plant, ask questions, take notes. Get all the government and state experiment station bulletins available. Breeders often publish information about rearing birds. They are glad to help any one who is interested. It increases their business. Write to your agricultural college for information. They may not have a bulletin on the subject, but the men in their poultry department are glad to answer questions. Giving advice is part of their business and you can count on it being good advice.

#### RAISING GEESE

March is a good month to set goose eggs. As it takes them a little over a month to hatch, they will come out in April and the early birds catch the best prices. It is really surprising that more farmer's boys and girls do not raise geese. They will "board themselves" if given a chance at pasture, but need fattening with ground grain if held for Christmas trade.

Goslings can be raised under hens, six eggs in a nest, but the goose is an admirable mother. Unlike most of his feathered kindred the gander is a true helpmate, often "spelling" his mate during the sitting period and caring for the young afterward with great solicitude.

Watchful care is needed to prevent the damp, cold April from getting the best of little goslings. They should begin their careers with a meal of bread crumbs, scalded meal, and hard-boiled eggs, chopped vegetable tops and grass included in the mash. They eat small quantities at a time, but need it frequently to stay their stomachs.

Water for drinking should be accessible, clean, and fresh always. Many a sick gosling can trace his disorder directly to the bad water. A large tub of water for bathing, too, is advisable for geese after they are feathered.

Toulouse and Embden geese are tremendous creatures, even reaching the enormous weight of twenty-five pounds. Their meat is highly prized in European countries and is becoming popular in America so that a good market is assured.

The business of fattening geese for market is quite specialized now. Men engaged in this business visit the farms where a few geese are kept and buy the eight-weeks old goslings for seventy-five cents to one dollar and a half apiece. If you can get this price your profit is fair and certain and your work ended. You can put your cash into some other business. Raising geese is a good summer vacation job. On a goose fattening farm near a good Eastern city market as many as fifteen or twenty thousand geese are fattening at one time.

Geese on farms when I was a girl were kept principally for their feathers which found their way into the pillows and feather beds then used. The best pillows in my house are filled with the feathers plucked from geese with which I was personally acquainted. These feathers have a high market value, higher when you buy than when you sell to be sure, but you may be able to supply a local market and thus get a better price. Geese, like all the other feathered tribes, moult naturally in late summer. If the live geese are to be plucked, it should be done very carefully, three or four feathers at a time. The geese do not show evidence of minding much when they find that your designs are peaceable. Only the breast feathers and the smallest ones from the back are ordinarily taken for home use. Avoid the feathers with coarse stiff shafts. No down should be removed. Goose quills make good toothpicks, cleaned and scalded and trimmed into shape. Or they may be sold separately as feathers.

Geese are plucked before sending to market. Most of the feathers and some of the down now extensively used by manufacturers of bed clothing comes from the marketed geese.

#### **RAISING DUCKS**

Probably in many neighbourhoods you would be laughed at if you tried to raise ducks without a pond or stream of water. It is not customary. True, if you have them for ornament principally, they look best disporting themselves in what seems to be their natural element. But if you believe there is money in raising ducks for market, nothing is easier than to prove that the people who laughed were not up to date.

You have heard the old saying on a very wet day, "Good weather for ducks." Don't you believe it. If you go into duck raising you must be just as careful about ducks getting wet as you are about your chicks. The duck

must have plenty of water inside, all he will drink, but keep him dry outside. Little ducks are hardy if kept dry and warm. Even cold drinking water will give them cramps and should be avoided. The drinking vessels should be so covered that the duckling can get only the bill wet.

The advantage of ducks over chicks is this: they do not bring quite so big a price per pound, but they grow so much faster during the first two months of their lives. Ducks should be marketed at eight to ten weeks old. At ten weeks old a good broiler will weigh about two pounds and will sell for seventy-five cents, but a duckling will weigh four to five pounds, which at twenty-five cents a pound will give you from one dollar to one dollar and twenty-five cents. The cost of feeding the two will be about the same.

Ducks have other advantages over chickens. They are not nearly so subject to vermin, though lice sometimes attack their heads. They seem to thrive in confinement and cost less to house than chickens. Their feathers will bring a good price, and eggs of pure breeds for hatching are in demand. They are excellent layers, even better than some hens, as experience will show. If a duck lays nine dozen eggs at four dollars a dozen, and raises a family, she does a pretty good year's work, and is more profitable to keep than some cows. She eats grubs and insects, too, and grass and surplus from the vegetable garden.

The commonest practice for beginners is to set duck eggs under hens in April and May. The biggest varieties are the best to raise as all are hardy, fast growers, and good layers. The eggs take about twenty-eight days to incubate. Treat the hen and nest for lice just as when sitting on hens' eggs.

When ducklings are twenty-four hours old, they are ready for their first meal. Mashed potatoes mixed with meal of corn or oats and middlings are good for them. Milk, too, is excellent as for all fowls. Begin to stuff them immediately; you will find them quite agreeable. Green food of all kinds—grass, lettuce, cabbage, vegetable tops—all chopped small, fills them up and is good for them. Such things as turnips and potatoes should be cooked. Ground meat should be fed three times a week. Have the feeding troughs so arranged that they can get their shovels into it but cannot walk over the food and foul it; same thing with the water. Feed four times a day. They must not get empty. Growth will not be rapid unless continuous. Grit should be supplied.

On duck farms one hundred ducklings are kept in brooders five by seven feet, with yards five by sixteen feet. They are kept absolutely clean and dry. Those you keep over winter for next year's egg supply should have access to a pond and grass. Old ducks do not bring high prices for table use and do not put on weight very fast.

It was perhaps a young Boston housekeeper who asked when her market man offered her Pekin ducks for her table, "How are they esteemed?"

He replied, "Oh, my wife, she don't never steam ducks. She just stuffs 'em like you would a chicken and bakes 'em."

### RAISING SQUABS FOR MARKET

A few years' experience in raising fancy pigeons for pets is the best kind of training for a young man who wants to raise squabs for market. This business on a small scale ought not to take all one's time and can easily be combined with some other business or profession or with attending college. But your experience, varied though it may be, has not acquainted you with all that is worth knowing on the subject. The time has gone by when a man can afford to ignore books and bulletins even on a subject upon which he may himself be an authority. A library of pigeon literature will increase your wisdom. A practical man writing of his experience in your business may save you hundreds of dollars if you heed his advice. Don't scoff at college bulletins as your grandfather probably did. He had reason, but the bulletin is not what it was. Great strides forward have been made. Visit some big squab raiser's plant and take mental and written notes of significant facts observed. The colour of his pigeon loft does not affect the price he gets for his squabs, but the quality of the grain he feeds has a direct influence on the fullness of his wallet.

Full-blooded homers are declared by many to be the best, all things considered, for table use. Good, mated birds of this variety can be bought for about two dollars a pair. They are hardy, bright, active on their feet, and the squabs have a larger breast than some of the other sorts.

Homers are not all the same colour; some are white, others black, reddish, and mixed colours. Good stock will rear six or eight pairs of squabs in a year, while some exceptionally good ones will raise ten pairs. If you make a clear profit of one dollar and twenty-five cents per year on an average from

each pair you should do well. It is not profitable to keep birds which produce less than five pairs a year. A record must be kept in order to weed out worthless birds. You do not wish to spend your leisure running a free boarding house for pigeons. You must know which are the big producers and keep only their young as breeders. Nests should be numbered and every bird have a leg label with a number corresponding to a numbered description in your book of records. This is good economics.

Squabs of homers should be ready for selling at four weeks old; they should be fully feathered but still in the nest. The heaviest grade weigh eight pounds per dozen and these bring highest market prices. Lighter birds are considered poor quality and bring a correspondingly low price. Prices vary from four dollars and fifty cents to one dollar and seventy-five cents per dozen. Dispose of pairs which habitually produce light-weight squabs as indicated by your records.

Minute directions for killing and dressing squabs for market are given in Farmers' Bulletin No. 177, which every squab raiser should have in his library.

There is, as yet, no indication of over-production in squab raising; although many more are grown every year, the demand is still on the increase. It is a good business for two people to go into together, a brother and sister, two brothers, or adjoining neighbours.

Descriptions of house and furnishings, fly, foods and feeding, and details of care are given in Chapter IV under "Raising Fancy Pigeons."

#### RAISING PHEASANTS

The young people on a big ranch or estate with its up-to-date poultry plant, raising not only plain and fancy chickens, but pigeons, ducks, geese, turkeys, and guinea fowl, all attended by men hired for the purpose, may look about in vain for a chance to try their hands at raising anything with feathers. To such boys and girls I say, "Did you ever see any pheasants?"

"At the Zoölogical Gardens, yes."

Aren't they beauties? How would you like to grow pheasants? There is a line that has not been overworked. Profit in it, too. Look at prices you must pay for birds and get an idea of how yours will sell later.

Numerous experiments in pheasant growing have been tried in this country. It is well to know of these and to profit by them. Some men raise many varieties, importing them from every quarter of the globe. Their ideal is to have a complete collection. A visit to a large aviary will give you some idea of what a gorgeous family of birds the pheasants make. They are highly prized as game birds. In Germany they are served in a most surprising way. The edible parts are cooked and arranged on a platter on a bed of parsley. At one end of the platter the cook puts the head with its beautiful neck ruff and at the other end the tail feathers. Imagine the waiter's triumphant entrance into the dining-room, platter held aloft, and the pheasant's brilliant tail feathers streaming far behind like pennants from a mast top!

The pheasant most easily grown in the United States is the ringneck or Mongolian pheasant imported from its home in China. There is hardly a state in the Union where no attempt has been made to raise pheasants. It is an industry that appeals to sportsmen everywhere. Massachusetts, Ohio, New York, Indiana, Illinois, California, New Jersey, and some other states have made pheasant rearing a part of the work of their Fish and Game Commissions. The state of Oregon is the only one where a remarkable success has been won. Evidently the climate and conditions there were ideal. About three dozen pheasants were set free in the Willamette Valley in eighteen hundred and eighty-one. So rapid was the increase that when the first open season of two and one half months was declared eleven years later it was estimated that fifty thousand birds were shot the first day! They have continued to increase in that state and towards the north, and many other states get their supply for propagation from Oregon.

The first thing to do after becoming interested in pheasants is to learn something about their nature and needs and to consider whether your conditions are such as would make the business possible or profitable. They are not domestic fowls but more like the jungle fowl from which, in all likelihood, our barn yard fowls are descended. But they can be raised in captivity if due regard is taken of their habits and characteristics. Books and bulletins are mentioned in the appendix of this book. In some respects pheasants are very like chickens, being especially susceptible to the diseases of the poultry yard. In England, pheasant rearing is quite common. One sees in open meadow land on great estates the tidy coops where anxious biddies cluck after their wayward foster children. It is a pretty sight

to see the fifteen or twenty brown-striped birds scuttling wildly to her protecting wing at the approach of danger.

Pheasants' eggs for shipping should be most carefully packed in cotton, hay, or excelsior to insure safety from jar. You do not have to begin with grown birds which cost five dollars a pair for ring-necks, as the eggs are best set under hens. The eggs should be set in late April or early May for best results. Bantams are often preferred, but any good mother will do if she is cleanly and not too clumsy. Great precautions should be taken that the nest be clean, and that the hen should have all the comforts of home, *e. g.*, a dust bath, clean water, and regular feeding. Can you afford to run the risk of young chickens getting lice as soon as they are hatched? Well, you simply can't take any chances with baby pheasants. Hens should be dusted three times during incubation with insect powder. Visit an aviary or a pheasantry if you can and ask questions and take observations on how to make nests, coops, and pens. Study your books, too, and be guided by the experience of others.

While you wait for your young pheasants to hatch there is plenty to do in preparing coops and learning what to feed them when they arrive. Much of our lack of success in rearing all sorts of wild game is because we know so little about what they eat. We probably make lots of mistakes with the animals we have domesticated but the more adaptable of them have grown accustomed to civilized food, and thrive.

There could be no better place for a rearing ground for young pheasants than an orchard where clover abounds. Coops, like chicken coops, should be rain proof, well ventilated, bottomless, and so built that they can be closed to keep out vermin and to shut the chicks in when the grass is wet.

Pheasants are omnivorous but they need more fresh animal food than is supplied by ordinary "chick mixtures," to balance their ration. Probably they share with other young birds a relish for insects and while their mothers do not actually bring this food to the open bills of their young, they take the flock to the feeding ground and show them how to find worms, bugs, caterpillars, etc., by scratching. There are ways employed by experienced pheasant growers of raising a supply of meal worms, maggots, and ant pupæ for their flocks, but cheap, fresh meat ground very fine furnishes suitable animal food. During the first three or four days after

feeding is begun a custard made of ten eggs to a quart of milk, baked well, is their best food. Hard-boiled eggs finely minced (put through a potato ricer), fine bread crumbs, and fresh vegetables cut into small bits can be given during the first week. Later, small grains of a great variety of kinds. A sprinkle of red pepper in their food during cold, damp days is good for half-grown chicks. The young pheasants must have access to fine grit and gravel and they must have fresh, cool water all the time.

In building pens for pheasants we should take into consideration their habits, their safety, and their lack of hardiness in domestication. Select the site for the pens after due thought. There must be both shade and sunshine. The soil should be well drained and rich enough to grow grass and clover. Each run should be at least ten feet by ten with netting of medium mesh for sides, eight feet high, cover of the same. A house is an unnecessary expense, as it is pheasant nature to stay in the open or seek a covert of brush. A rain proof shed, where they can retire when it rains, and where a dust bath will always be in readiness, is a necessity.

Wild birds of prey evidently consider it perfectly legitimate to visit pheasant runs. Raccoons, foxes, rats, and mink, too, may work ruin there. The cover of netting protects from above and it may be necessary, where burrowing animals abound, to dig a trench a foot deep and set the netting down in the ground that far. A few steel traps set unbaited along the outside of the runs may prevent a serious loss and provide you with a handsome mink or raccoon fur skating or motoring cap. Severe cold, even storms, are not fatal to pheasants. Provide perches in the pen as well as in the shed and they will usually choose those in the open air.

Because of their great timidity the birds should be disturbed as little as possible. Unfamiliar sights and sounds alarm and distress them. What a triumph it would be to induce your pheasants to eat from your hand! It can be done by exercising great patience, gentleness, and perseverance.

All you know about chicken raising will be useful now. Make up your mind that everything that is bad for chicks is simply fatal to young pheasants; for instance, wet feet, lice, dirty, or sun-warmed water, over-feeding, wrong feeding. If you play this game you must expect a constant succession of hazards, of narrow escapes, and losses. But it is a noble game.

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## IV

# RAISING ANIMALS FOR PETS

### SHETLAND PONIES

**T**HE perfect pet is the Shetland pony. This diminutive horse is a model of gentleness, patience, good-nature, and horse sense. One writer says of him: "If more than eight children get on his back he will shake himself like a wet Newfoundland dog and then stand motionless, while they pick themselves up and out from among his four hoofs." So many generations of ponies have lived right in the family circles of their cold little island that children do not make them nervous.

Is there a prettier sight than a well-groomed Shetland pony, a carriage made in Lilliput, and a small driver, and a reasonable number of little passengers of assorted sizes? A goat team is a joke, a dog team is impracticable, a team of young oxen is too plodding and lacks style. The pony outfit is charming and always delights everybody. But who likes to see a grown man in a pony carriage? A small grown person may be necessary, especially if the baby is to be taken for a drive, but a full-sized adult makes a pony carriage look top heavy.

The Shetland pony is a sort of "boy horse" so far as work is concerned. (Some say, too, that he gets out of as much work as possible.) There is no better helper at light jobs than the pony. Like the yak:

"He will carry and fetch  
You may ride on his back  
Or lead him about with a string."

Indeed he will follow his master about without a string and can carry a good load. With a light cart or wagon suited to his build and a boy to do the rest, one of these hardy little fellows will be of greatest help in doing the endless odd jobs that always fall to the boy's lot. The pony will more than earn his board if the boy earns his.



Photograph by Helen W. Cooke

### **The Shetland Pony is the Ideal Pet**

A thoroughbred Shetland pony should be less than forty-five inches high and weigh less than three hundred pounds. Many are raised in this country. A boy is lucky who has a chance to train a pony colt. Training should be begun early. One successful breeder says that his children do all the training of his ponies. His boy, seven years old, broke the first one they raised to drive to a little wagon. Little boys and girls under ten take entire care of the ponies in another man's herd. No doubt their father or mother oversees the work, but it is fun for the children to groom and feed and pet these wee horses.

Breeding Shetland ponies is a very practical way to make a few hundred dollars a year. They eat less than full-sized horses and will keep fat on grass from frost till frost. The price of ponies is 25 per cent. higher than it was five years ago. This makes the cost of going into this business higher, but the sales begin the second year and selling prices are higher, too. Shetlands are hardy and require shelter only in bitter cold weather. Ponies of various sorts are becoming far commoner here than formerly, so the demand is

increasing. I wish every boy and every girl whose heart is set on having a pony could have one. Let us all raise ponies until there are enough for every one.

### RABBITS, GUINEA PIGS, AND CAVIES

Rabbits, guinea pigs, and cavies are not poultry, yet there is always a department devoted to them in the great Poultry Show at Madison Square Garden in New York. It was there that I first made the acquaintance of these three kinds of popular pets. Many a boy has made a neat little addition in two figures, at least, to his college fund, by raising hares, rabbits, guinea pigs, white rats, fancy mice, or cavies. Common white rabbits can be bought for one dollar a pair, but these days it is not uncommon for a breeder to pay from fifteen dollars to twenty-five dollars for wearers of blue ribbons. If you had guinea pigs for sale you would be glad that the best ones cannot be bought for less than ten dollars apiece.

Rabbits are the most popular of these pets, while cavies come next. There is just now a great demand for cavies. They are odd little creatures, neither intelligent nor affectionate. Neither are they very hardy; in the North they have to be kept indoors in cold weather.

Cavies are easy enough to feed, for they eat everything that is set before them, and keep at it all the time. All sorts of vegetables, bread and milk, and corn are the "chief of their diet."

Before going into the business of raising any of these creatures it is well to consult some other boy who has had some experience and find out if there are any peculiar difficulties he can help you provide for. Maybe your locality and conditions are better fitted for one than the other. A dealer will often be able to give you valuable information about the different sorts of pets, and may be able to recommend the best book on the subject.

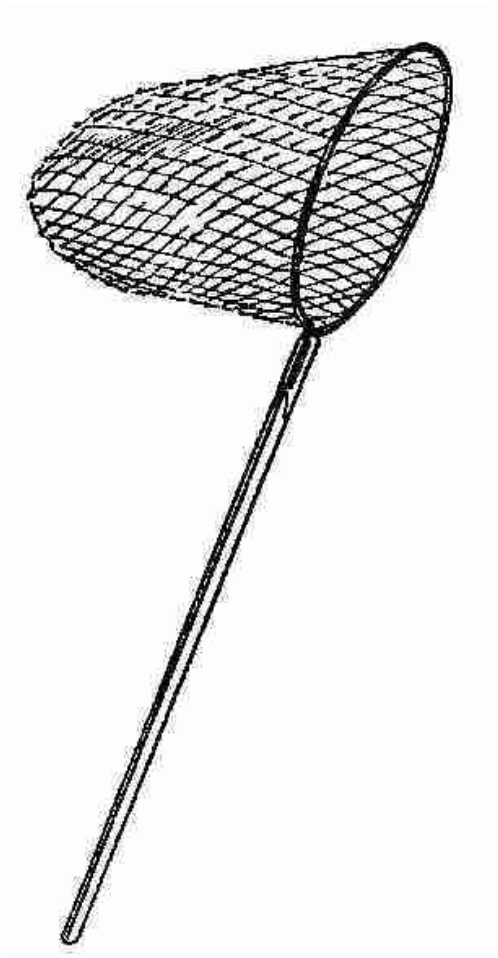
### FANCY PIGEONS

If I were a boy or a girl to-day there is nothing I should so much like to do as to raise pigeons. Not that I think it an easy job. (Wouldn't you almost as soon work as to look for an easy job, anyhow?) There are lots of disappointments, discouragements, and hard labour about pigeon rearing. But young folks with hobbies like this are getting more fun out of life than the idle ones.

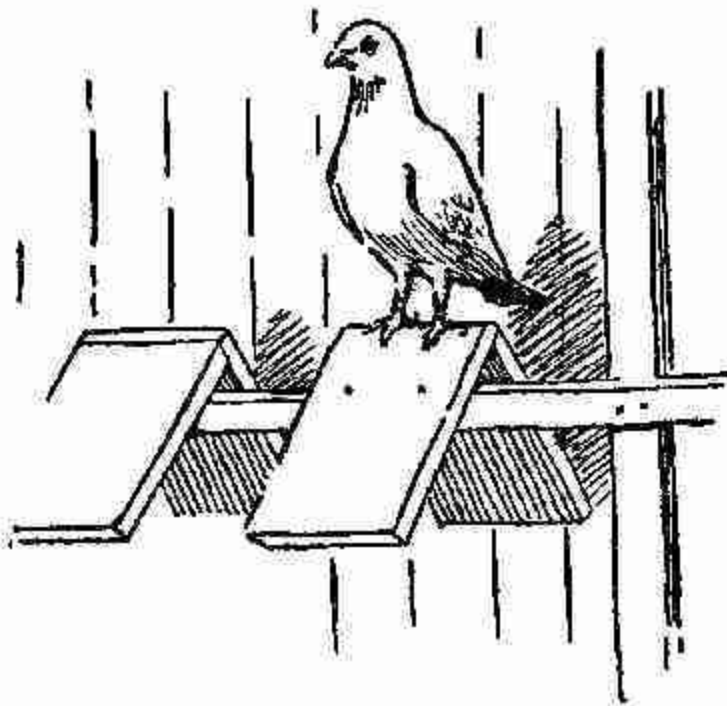
Pigeons are hardy, easily tamed, prolific, and can be made to pay their own way. It would be impossible to associate with them, care for them, learn their nature and habits, without becoming thoroughly interested in them. No pets could be more gentle, more beautiful, more docile than pigeons. Success in rearing them will not be immediate, but will come with experience.

The business of raising fancy pigeons for pets is quite distinct from squab raising, treated in the chapter on poultry, and is far more likely to interest boys and girls. If you were to go to a big poultry show you would be bewildered at the number of breeds of fancy pigeons. The pouters, the tumblers, the barbs, the dragoons, nuns, helmets, the fantails, and carriers are all there in endless variety. What you like will be different from what I like, probably, so it is not easy to recommend. Beginners would do well to choose some one variety and try their hand at that before investing very extensively. The flying tumbler is recommended by many good authorities. These are not difficult to breed, are small eaters, do not need to be caged continually, and although they are to be had in nearly all the colours of the rainbow they are not very expensive. It is not good economy to buy cheap stock, in anything. Though by getting good ones you must start with a single pair, it is the best economy. Your increase will be very much more valuable. You should ask the breeder for a written guarantee that the pigeons are as represented, healthy, young, mated stock. If he does not care to give the guarantee, I should not consider him reliable.

Pigeons are not much influenced by elaborate dovecotes. They are quite as happy living the simple life in a dry-goods box, provided it contains the conveniences they require, and is placed where the light will be plentiful, the air pure, and the roof rain proof. City boys and girls need not sigh and give up the idea because they have no place for pigeons. The attic or the roof serves them just as well as the barn yard, perhaps better, as mice and rats are less likely to disturb them on housetops. Every precaution should be taken however against these vermin. Cracks, doors and ventilators should be covered with fine wire netting. Even the entrances, holes six inches high by four in width, should be protected by tin guards which rats and mice cannot creep over.



**Net for capturing pigeons**



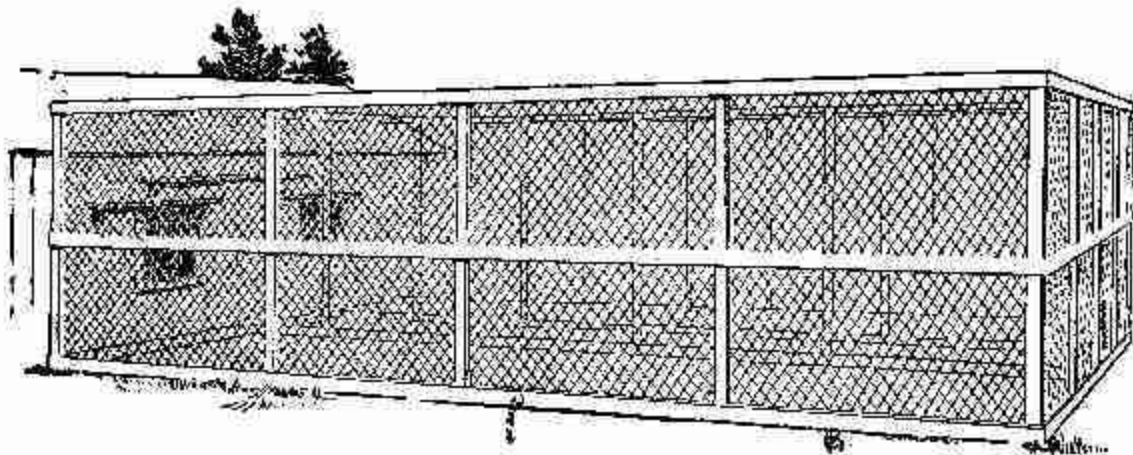
**Pigeon roost**

Each pair of pigeons will need two nesting compartments. A good kind is described in Farmers' Bulletin No. 177, and is constructed as follows: Inch boards, twelve inches wide, with parallel cross cleats nailed on nine inches apart, are set upright full twelve inches apart against one wall, and securely fastened at top and bottom. Cut twelve-inch squares of inch boards for the bottoms of the nest boxes. It is easy to see how convenient these sliding bottoms will be to clean. Provide small earthenware dishes as nests, with a foundation of tobacco stems, to discourage lice. The birds will build nests of straw above the tobacco stems, the male bringing the material which the female arranges to suit her ideas of house furnishing. Some growers use sawdust in the nest. If your pigeons are allowed their liberty with no shelter save the pigeon loft, perches will be needed inside. As the pigeon's feet are formed for perching on flat surfaces instead of on rounded branches like many of their feathered relatives, you should provide what suits their needs. A good form of perch is made as follows. Cut half-inch, dressed material four or five inches wide into five or six-inch lengths. Nail together two of these pieces in v-shape. This can be nailed to a square foundation piece and hung angle up on the wall of the loft. The slanting sides afford no lodging

for droppings and as only one bird at a time can perch on so small a place, quarrelling is avoided. Iron brackets with perches attached are also used.

Two nest dishes are provided for each pair, as very often the hen will lay a second pair of eggs before the earliest young ones are ready to leave the nest. The male pigeon is untiring in his devotion to the young and their mother, taking his turn on the nest regularly during the seventeen days of incubation, doing his share of the work, and even beating his wife if she shows any disposition to slight her duties.

If the pigeons are confined in a wire fly, perches should be provided there, and board walks for them to alight upon and walk about on should be placed at a distance of four or five feet from the ground. Nothing in the shape of roosts or cross pieces should be put in the fly, as the pigeons need all the space in which to exercise their wings.



**A fly for pigeons. Put no roosts across the fly. Flying against these would injure the birds**

For one hundred birds the fly should be thirty-two feet long, eight feet high, and the entire width of the house. It will be a fine problem in practical arithmetic to figure how much netting will be required to cover the frame of this fly, how many posts, and how much one by four-inch stuff will be needed to complete the frame. The advice of some one who has built a pigeon fly would be most valuable to the inexperienced person, and the pictures in books, bulletins, and magazine articles will be helpful in making your plans.

Holes, at least two, rounded at the top and six inches each way, provide for the going and coming of the birds between house and fly. For yourself, an outside door into the fly is a necessity, of course.

Before installing your pigeons in their house, use the whitewash brush there freely. Into each gallon of your mixture of lime and water put a half-teaspoonful of crude carbolic acid. Clean sand is recommended for the floor of both fly and house. It is very bad practice to scatter food for pigeons on the floor or ground. You will see, if you try it, how much is wasted; any that they leave becomes soiled, moulds, or sours, and if eaten in that condition is nearly sure to injure the birds. A shallow feeding trough should be placed near the centre of the house. Fine charcoal, table salt, and cracked oyster shells should be kept permanently before the birds, the boxes cleaned out at

least weekly. Clean water in stone or galvanized iron fountains should always be there, too. Daily or semi-daily is none too frequent to clean these vessels.

Pigeons are not gluttonous feeders but "they want what they want, when they want it." In other words, regularity is important to their well-being. An early morning feed, six-thirty in summer, seven in winter, of equal parts cracked corn, wheat, and peas, and an afternoon feed, at four in summer, three in winter, of equal parts cracked corn (with no fine meal in it), kaffir corn, millet seed, and peas, is a fair ration. Pigeons like a variety but not as a steady diet. Hemp may be substituted for millet once or twice a week; a little broken rice, green vegetable food, like lettuce and onions, will be taken sparingly, and tiny bits of fat bacon seem to be acceptable. Nothing but first-class grain should ever be set before pigeons. The quantity needed should be determined by watching. If food is left in trough, feed less next time.

Water for bathing is as necessary for pigeons as the dust bath is for hens. A broad galvanized iron pan three inches deep makes a first-rate bathtub. Although fancy plumbing is out of place in a pigeon house, it is the greatest convenience to have running water passing through a trough constantly; this solves completely the problem of sanitary drinking water.

The best fanciers clean their houses weekly. With a few birds this may not be necessary. But when your nose gives unmistakable evidence that it is time, do not put it off. A spade to scrape the floor, an old knife for the nest boxes, and a broom are necessary utensils.

Mated birds will choose a nesting box after becoming accustomed to their new quarters. The nest pans, with their foundation of tobacco stems cut in six-inch lengths, should be in place, and a supply of short hay or straw where it can be found. Two eggs are usually laid, with a day between and sitting begins as soon as the second egg is laid.

If the sight of a young squab does not make you sick of your choice of a hobby, you are a hopeless case, and I predict great success for you. Young robins are not beautiful to behold, but squabs are such ghastly looking little beasts, with nothing to recommend them except their entire helplessness. Evidently the parents are well satisfied with the appearance of their offspring which look just as they expected, no doubt, and begin almost

immediately to feed them. "Pigeon milk" is injected into their open throats by the parent birds, in whose stomachs it has been manufactured. The squabs gain rapidly after a few days of this "milk" diet; pin-feathers replace the scanty yellow down in about a week. At three weeks they are able to walk, but are still fed by their parents, although grain is brought to them instead of the predigested food.

Although they are hardy, do not suppose that pigeons have no diseases. However, the author of a government bulletin on squab raising says that with "wholesome food, proper housing, and proper care, very little disease is usually encountered." To prevent disease, and avoid dampness in house and fly, keep the food and water untainted, and the house clean.

It is very desirable, whether raising squabs for market or for pets, to keep a record of the performance of each pair. This is usually done by the use of numbered tags on the birds' legs. The record makes it possible to prevent inbreeding, gives you knowledge of whether certain pairs are profitable, and keeps up your own interest far more than haphazard methods do.

#### BANTAMS

Almost every family that keeps chickens has two or three "banties" for the children. What an amusing sight it is to see a tiny fuss-budget clucking and bristling to protect a half-dozen lubberly Plymouth Rock "broilers" that she has been inveigled into rearing. But the raising of pigmy fowls is not confined to the child's play of the chicken yard. At the big poultry shows almost every breed of fowl from Brahma to Silkie has a diminutive mimic, and the requirements for the dwarfs are just as rigid as for the big fellows.

To be just right a bantam ought not to weigh much over a pound, the cock should be impetuous, pugnacious, and haughty; the hen should be smaller than her lord, and meek in demeanour except when her flock is in danger. Bantams are very popular with amateurs who regard them as a sort of joke, but the poultry fanciers take them quite seriously. It is not unusual for the prize-winning bantams to bring as high prices as the heavy weights.

Game bantams are great favourites with fanciers. They are easily recognized by their game-fowl characteristics: tall, upright carriage, oval body tapering from shoulder to tail, very long legs and neck, small head, and almost no show of comb. There are eight standard varieties in America,

and the Game Bantam Club is interested in improving the breeds and increasing the popularity of the birds.

As the varieties of bantams are pretty thoroughly mixed, it is no simple matter to breed birds fit for exhibition. But after all there is so much fun for boys and girls in growing any sort of pigmy chickens and such a good market for both eggs and pairs for pets that I wonder that more young people do not go into the business. Bantams take less room than ordinary chickens which is an advantage on a small place. Care should be taken to save for setting eggs of none but the smallest and most perfect members of the flock, and to dispose of any which are larger than the standard or poor in shape or colour or in any characteristics peculiar to bantams. If you start with eggs of some fine breed, try to keep your stock pure, and improve it by selecting the best individuals for breeding.

In matters of housing, feeding, cleanliness, and care, bantams should be treated just like other chickens. The young of some varieties are exceedingly delicate and cannot stand the least neglect. These are more like little wild things, partridges or quail, than like domestic fowls. Other varieties are as hardy as Plymouth Rocks, but any one who has tried it knows that raising Plymouth Rocks is no mere joke, especially in a cold, damp spring.

If your father objects to your going into the bantam business instead of raising standard size fowls bring these arguments to bear upon him: Bantams occupy one fourth the space. Their food costs one fifth as much. Their eggs are two thirds as big. Pairs can easily be sold without expensive advertising.

#### FANCY FOWLS

If you want to make the neighbour boys open their eyes, and the passers-by stand still to admire, try the experiment of raising fancy fowls. Growing them for exhibition purposes is such a separate and distinct department of the poultry business and demands familiarity with many "show standards," "tricks of the trade," and special practices in breeding and grooming to bring a fowl up to a high score, that it may be best not to undertake to compete with more experienced breeders.

A visit to a fancy poultry exhibition is like a trip to Wonderland. Just looking at the pictures of the prize winners, and studying the alluring advertisements arouses enthusiasm. But to read the accounts of the fanciers, or to hear them talk about the merits of their favourites makes a chicken lover fairly thrill with ardour. How to decide upon which variety to try is a hard problem. Take a lot of things into consideration. Discount what the enthusiasts say about the one they have for sale; they mean every word of it, but they are prejudiced. Don't be influenced to select one breed when you really prefer another. Here is a department where personal preference should cast the deciding vote; the one you like best is the best one for you.

It is not well known except by specialists that there are so many distinct varieties in breeds of fowls. For example take the Polish. There are blue Polish, plain white, golden, white-crested, black, buff-laced, and silver; of the Hamburgs there are black, silver-and gold-spangled, silver-and golden-penciled white, and so on through the list. The Polish and the Houdans are remarkable for their tremendous top knots, the Hamburgs, Lakenvelders, and many others for their wonderful plumage and colour combinations, while the most astonishing creatures in the whole chicken tribe are the Yokahamas whose snow-white tail feathers trail gracefully behind them like a bride's gown and veil at a fashionable wedding. These must be the originals of the extraordinary fowls represented on Japanese and Filipino pottery and embroidery.

It is not much wonder that fancy breeds are growing more popular in our country. Although as a rule they are non-sitters, they are all described by their advocates as prize layers, some hens even reaching the remarkable record of two hundred eggs a year.

The Hamburgs, for example, are called "Dutch Everlasting Layers." Their eggs are smooth and "satiny white"; Polish eggs are very large and snow-white, but they are not winter layers; Houdans lay white eggs of great size and almost certain fertility, and are, besides, excellent table fowls; the Lakenvelders rank with Leghorns as layers and their eggs are also "of a porcelain whiteness" which insures a fancy market in New York where the preference is for white eggs.

Do not think that you can just as well house your fancy breeds in with your ordinary chickens. It is a mistake. They should be kept apart from the

beginning. Light hens of commoner breeds are successfully employed as foster-mothers for the fancy fowls, but it is important to provide separate pens even for the young. If young chicks are kept in the same run with those somewhat older, they are crowded away from the feeding dishes; chicks with top knots should never be raised with other sorts. The crest interferes with their sight, and they are not fighters and will allow themselves to be driven away from the food. Crested chicks should be treated with a grease lice-destroyer at least once a fortnight. A little of the lard or sweet oil is enough but it should be worked into the feathers to be effectual. Use powder on the hens, but not while the chicks are oily.

Making the neighbours gape in open-eyed astonishment is not all there is to raising fancy chickens. With a few years' experience in chicken raising back of you, it would not be risky to raise them for commercial purposes. The popularity of fancy chickens is just beginning in this country. There is a fine market for eggs for hatching, but as it is extremely important to keep the breeds pure your fancy birds should be kept by themselves practically the year round. Most of the breeds mentioned are quite hardy, and the same care required for ordinary poultry as to housing, food, prevention of disease, cleanliness, and records will insure a good measure of success with fancy fowls.

## DOGS

Raising dogs may prove a profitable business for any one who likes dogs, understands them, and is willing to doctor them when they are sick, and train them to good habits. An untrained dog is a nuisance, however well bred he may be.

To start a small kennel does not require any more room than to start in the chicken business in a small way. Just now the prices are so absurdly high on high-bred dogs of popular varieties that few but fanciers can afford to own the best stock. Why is it not better to raise some first-rate but not fashionable breed, and not enter into competition with men whose living depends on the number of blue ribbons they can win at dog shows? Buy a young female dog, teach her, and train her. Get experience with one dog and her young ones before you put in much capital. Find out by going to a good dog show what are the points of a good dog of your chosen breed, make out a score card, and mark your own dogs. Sell for pets those which do not

come up to the mark. I have before me a balance sheet made out by a young man who began raising white English bull terriers in nineteen hundred and three. In spite of a lot of bad luck, which, with better arrangements, need not have happened, he netted nearly a hundred dollars the first year and over two hundred the second year. This young man kept chickens, too, beside his regular business which kept him at an office seven hours a day; and he found dogs better money makers than chickens.

In raising puppies there are three important essentials: the right sort of food, fresh, clean water to drink, and exercise. I believe more dogs get sick from water or lack of it than from any other one cause. If a dog's dish is not clean enough for you to drink out of yourself, then it is not fit for your pups. Keep that in mind. Fresh air and sunshine are as necessary for puppies as for children. Kennels should be airy, face the south, and have shavings or straw bedding.

Authorities differ about a dog's food. It is safe to feed him about as you would a growing boy. Like the boy he may overeat of his favourite dish. For breakfast, oatmeal or other cereal with milk and no sugar; for lunch, some dry dog biscuit or stale bread; for afternoon tea, soup or gravy thickened with boiled rice or corn mush. But a puppy's supper ought to be a good square meal because he is an outdoor sleeper, and it is easy for dogs to take cold on an empty stomach. For supper, then, give the puppies some bits of cooked meat, stale bread, and gravy or cooked vegetables. "Never feed a puppy hot bread or any rich, greasy, or highly seasoned foods. Avoid all sweets." Doesn't that sound like a book on what children should eat? But it is quoted right out of a dog book.

If your dogs get sick, eczema, distemper, or fits, consult a veterinary surgeon. A good book on dogs and their care will be of greatest value to you for such minor troubles as dogs are heir to.

Full-grown dogs do not need more than two meals a day. Most dogs are over-fed, under exercised, and are therefore unhealthy beings. Dogs eat slowly and should not be hurried. They should be fed regularly but not fussed over.

A word to boys and girls who own pets: if you live cooped up on a small lot you have no right to keep a dog, much less dogs. If you have a dog and let him run at large, you will probably lose him, and you deserve to. Nobody

has any right, law or no law, to allow his live stock, let them be chickens, dogs, cats, or children, to annoy the neighbours. A dog or a cat, a rabbit, or a family of chickens can do more damage in a garden than anybody would believe,—except the gardener. Your dog may be worth ten dollars; he may do ten dollars' worth of damage in ten different bulb beds in ten days. A thirty-cent cat can frighten away more birds in five days than an owner can attract to his garden in a whole season. Be fair to yourself, your neighbour, and your animals, and keep them on your own place. If you are out with your dogs, that is a different matter; if you have them trained "to heel," people will welcome you.

### GOLDFISH

I have already said that the Shetland pony is the ideal pet. That is true still, but I should have said "for out of doors." Of all the candidates for the office of ideal indoor pet, I believe goldfish would get the most votes.

They are peaceful and innocent, their needs are few, and their manners engaging. They are attractive in colour, shape, and movements and never get under foot. Above all they have no bad habits. They neither squawk nor whistle, bark, sing, nor howl. They never stay out late nights, nor make trouble with the neighbours. They require a minimum of attention and a minimum of expense both for quarters and for food. For developing a sense of responsibility in children they serve a good purpose, and they can even be taught. It is very evident that they have memory as well as sight, hearing, sense of smell, touch, and taste. They easily learn, if patiently taught, to know their master's voice and to come when he signals. They will learn their feeding time and place and seem to enjoy attention.

Just as with horses, dogs, or elephants, the first essential in teaching goldfish is to gain their confidence. This can only be done by patience and gentleness. A restless, nervous goldfish rushing from one side of the tank to another when any one approaches tells its own story. Teased, frightened, neglected, and unhappy they are indeed in a sorry plight, for they are, even more than some other pets, utterly at the mercy of their owners. The sooner they die and pass into oblivion, the better!

But what a pretty sight it is to see a well-balanced aquarium, water plants spreading their delicate fronds, a clean, pebbly bottom, and bright-coloured, healthy, happy, care-free goldfish glancing in and out in the sunshine.

China is the greatest place for goldfish. Rearing them there has been reduced to a science. We find them running wild in our waters, but they are not native to America. Under ideal natural conditions they are said to live to be a hundred years old. Many are known to have lived to the age of ten years in one aquarium.

Goldfish are hardy, live in sluggish streams or ponds, and eat all sorts of vegetable matter. They also eat soft-bodied insects, worms, and small fish, even their own spawn and young.

For directions for keeping goldfish happy and healthy in an aquarium in the living room of your home, I must refer you to various books and articles on aquaria and on how to make and maintain them.

Raising goldfish for profit is "a horse of quite another colour." Goldfish are sold by the thousand in department stores as well as in shops which deal wholly in pets. Some fish are imported, but the bulk of them are grown in this country. One of the most scientific growers in this country is Mr. Hugo Mulertt, whose book on the subject is quite enough to make its readers enthusiastic fish culturists. The best markets are in cities, and transportation is difficult and expensive. Fancy varieties would not be in demand except in large cities.

One can begin goldfish growing in a small way at very small expense. Four tanks or reservoirs are required. Any boy who can make a hotbed frame can make these. They should be in a series: No. 1, spawning pond; No. 2, rearing pond; No. 3, storage pond; No. 4, winter pond.

Whether one makes artificial tanks or utilizes a natural valley, separated by little dams, it is essential that the four ponds should be so fitted that they can be emptied at will. They should be sheltered from cold winds and from direct summer sun.

The spawning pond should be built first, and furnished with water plants as much like nature as possible. Female fish ready to spawn can be bought from growers. These men are reliable and know how to advise you. It is to their advantage to increase the interest in goldfish.

While building tank No. 2, keep watch for eggs in the spawning tank. Laying begins late in April or early in May outdoors. The egg is no bigger than a pinhead, yellow, or cream-coloured. Look for them on the plants.

Snip the twigs off with great care and transfer the eggs, twigs and all, into large candy jars in clean water; one hundred eggs is enough for a gallon jar. Be careful that the water is of the same temperature in the jar as in the tank. Eggs should be kept not lower than sixty degrees Fahr., and not higher than ninety degrees Fahr. They hatch in two or three days or at most in less than a week. Do not disturb the water. Sudden changes of temperature will kill the young fish.

When the fish are three days old, they are pretty lively and will soon begin to need other food than that supplied by the egg. To transfer them from the "incubator" to the rearing tank is a delicate operation. Mr. Mulertt advises putting the tiny fish into a small, shallow, "nursery" tank first to make the change more gradual. The jar can be emptied very gently, fish and all, into this tank.

Prepare the rearing tank, taking every precaution against enemies. It should be covered with a screen to keep the dragon flies from laying their eggs in the tank. Dragon fly nymphs are death on new-hatched goldfish. If the fish get a good start they will hold their own. Let me warn you again to take great precaution against chilling the fish. A few degrees difference may be fatal. When the fish are a week to ten days old, they should be about a half-inch long, darting swiftly about in the nursery tank. Be sure the temperature of the water is right, then set a wide-mouthed pail or jar full of water down in the tank with the fish, and dip the biggest one at a time with a little hand net of soft material. Do not crowd the fish in the transfer pail, but rather make more frequent trips. Extremely delicate handling is absolutely necessary. Do not dip the fish out of the jar, but put it down in the water deep enough so they can swim out of their own accord. They are to stay a long time in the rearing pond so must not be crowded. In a tank covering an area of one hundred and sixty square feet, two hundred to three hundred fish can be reared. When they are only one half an inch long, the tank looks thinly settled, but they soon grow.

The young are silver-gray at first. They usually get their permanent colour before reaching the age of two months. In warm ponds, in sunny weather, goldfish may grow to be six inches long in the first summer, but between two and three inches is more normal.

Goldfish in outdoor rearing ponds do not require artificial feeding. Nature supplies them with their natural food.

The storage tank is simply to keep the fish in while awaiting purchasers. It should be divided by partitions into small compartments. It is convenient to sort the fish taken from the rearing tank, so that those of one size or colour or variety can be separated and buyers can readily see the stock. It is easier to catch them in the small tank also. In the storage tank some feeding is usually needed. Fresh, dry bread crumbs are recommended by most fish growers; feed small amounts until they get used to it and until you know just how much they require.

The winter pond costs the most to build. It should be three feet or more deep, lined with boards or cement, and located so that water will be moving through it, in and out slowly all winter, to prevent freezing. It should be covered during storms. Growers plan to get rid of their stock except breeders before winter sets in. One can dispense entirely with a winter tank if he can establish a house aquarium successfully for wintering the fish from which he expects to obtain spawn the following spring.

As might be expected of animals which have for so many centuries been associated with man, goldfish have a good many diseases. Their ill-health can almost invariably be traced to neglect or ignorance on the part of the person upon whom they are dependent. The signs of ill-health are usually quite noticeable. They are: Faded colours, bloody streaks, coated or inflamed fins, and swollen gill covers. Most of the troubles have to do with air supply. When a fish loses colour and appetite, has a slimy coating, and acts weak and dejected, it should be put into a "hospital" aquarium where plenty of plants are flourishing, at a temperature of seventy to eighty degrees Fahr. One teaspoonful of salt to each gallon of water will be good for the fish, but no food should be offered for several days. This remedy will usually restore the fish if its trouble is asphyxia or itch and has not gone too far. In the open water conditions right themselves more readily, but fish acting queerly should be taken out from among the others.

The greatest harm may result from hail storms and heavy rains on unprotected tanks. The natural enemies of goldfish inhabit the same ponds and to succeed one must daily wage war against crayfish, tadpoles, salamanders, snakes, fish-eating birds, muskrats, and aquatic insects. Toad

and frog spawn found in goldfish ponds should be removed to some other pond to mature. These creatures are useful as destroyers of insects but you can dispense with them in goldfish tanks.

#### THE STORY OF A BOY'S ANIMAL CAGE

Two years ago, when I was ten years old, my father built me a house for my animals. It is twenty feet square and ten feet high. The framework is of wood. The walls are covered with wire netting. In winter they are boarded in. Last winter we had a fire in a stove in the passageway, but we decided that the animals were better off without it. The pen cost about one hundred and fifty dollars. I keep in it three 'coons, ten to thirty rabbits, and about twenty pigeons. Two 'coons, Tom and Jerry, I have had three years; the other one, Pauline, I have had two years. My oldest rabbits, Harry and Lily, I have had six years. The 'coon pens and the passageway have wooden floors. The walls of the 'coon pen have double wire to prevent the 'coons from grabbing the other animals. Their pens go up to the roof of the house. The rabbit pens are separated by movable wire panels six feet high. On this side of the house there is a second story for the rabbits and pigeons. This is reached by a step-ladder, and is divided by movable panels. The pigeons' house is over the passageway. There are shelves with nappies in them for nests. It is open at both ends in summer. I have kept crows and white rats; they were not a success. The crows killed the rabbits, and the rats smelled bad.

I feed the rabbits morning and night and water them once. Their feed is oats in the morning and hay at night. They have from two to eight little ones in a litter. When they multiply too fast we eat them. Their meat is like chicken. The only way to distinguish it is by the bones. I feed and water the 'coons twice a day. They have a sort of cake made of corn meal. They grow very fat in the fall, but in the spring and summer they get very thin. They are not of any use except to look at. I did play with them until they bit my sister. Since then I have been timid about playing with them. I feed wheat to the pigeons once a day. I have tumblers and magpie pigeons. Both kinds are great fighters. I have four ducks, also, two Mallards and two Pekins. Their pen is outside of the rabbit pen. In summer I keep them shut up here. In coldest winter weather I keep them in the barn. The rest of the year they wander about as they please. They have a tub, which I keep filled with

water, where they can bathe. I feed them corn. They are much more interesting pets than hens.

#### A STORY OF SUCCESS WITH DOGS

Some years ago two young women, one a bookkeeper, the other a stenographer, decided to exchange city for country life. Born and reared on farms, they secured seven acres of farm land, with cottage, but sixteen miles from Chicago, and started a chicken business. This did not prove entirely successful, mainly, as the now prosperous farmers admit, because of ignorance and inexperience.

Meantime the fine collie dog, kept as guard and companion, was bringing many requests for good puppies, and it was determined to raise collies instead of chickens. So Daisy Rightaway, an English champion, was purchased, later being joined by imported Master Clinker, son of the famous Wishaw Clinker, which was brought from England about three years ago by J. Pierpont Morgan at a fabulous price. Warned by the trying chicken experience, Miss Porter, who conducts the farm while Miss Benson retains her business position and looks after the "city end" of affairs, resolved to "make haste slowly" in the new direction. Few, but good, animals were chosen, only the best of the young stock was placed on the market, and if the farm books at first showed but small profits, the upward trend, both in cash and reputation, was gratifyingly steady. With less than four years of professional dog rearing behind them, and with all buildings, runs, etc., originally lacking, the pleased proprietors of "Sylvan Farm" rejoice in promising financial statistics for the last half of that time.

About two years ago came, apparently by chance, that branch of the business which has, perhaps, proved most lucrative, and which is especially worthy of note by other women with country homes, love for and some knowledge of dogs, and a desire to make money. A friend who owned fine collies envied the splendid environment under which the "Sylvan" canines flourished, and asked permission to board some of his young puppies with "Porter and Benson," to give the young women their official title. The dogs sent thrived remarkably, and he mentioned the matter to other dog fanciers, and they to still others. Almost without knowing how it happened, the delighted farmers soon found themselves caring regularly for from forty to seventy-five well bred dogs.

Only collies were at first accepted, but business and accommodations alike gradually widened until practically all kinds of dogs are now handled, in a most progressive and hygienic manner. An isolation house for dogs when first received or suspected of illness; heated homes for young mothers, puppies, and lapdogs; winter houses, with shelters for open-air exercise in bad weather; commodious separate runs—these are among the conveniences now enjoyed by the happy "visitors" whose owners are off for the summer or winter or are otherwise unable to care for their cherished pets. The Desplaines River runs by the farm and a picturesque "river run" is much appreciated by water dogs and those enjoying an occasional frolic in cool water. Two fine cows provide fresh milk in abundance for the nursing mothers and young puppies. Every dog, whether boarder or family resident, is personally and intimately known to Miss Porter, who takes sole care of them with the aid of an intelligent boy to perform the rougher tasks.

Five dollars monthly is charged for the board of healthy dogs, with special rates for those needing special care. The standard dietary, varied to suit individual and class needs and varying occasions, is composed of soup made of meat and vegetables, meat jelly, rice, plenty of bones, and dog biscuit, with warm milk every two hours for the young mothers and puppies. The other dogs are fed twice daily—to the minute. In this incessant, indispensable care is found the chief drawback of the business for those fond of personal freedom, since the important duties of feeding, inspection, etc., seldom can be delegated to those not personally interested in the dogs.

The little farm provides all the vegetables needed and some corn, but all other food supplies must be purchased. With more ground the recurring feed bills might be made smaller, but the labour outlay would be correspondingly augmented. Eliminating unnecessary details, the financial situation for the two years in which the dog experiment has been successfully running stands thus:

EXPENDED	
Stock, buildings, and fences	\$785
Miscellaneous expenses, labour, etc.	286
Feed	815
Cash on hand	716

	Total	\$2,602
	RECEIVED	
Original investment		\$400
Sale of puppies		990
Board of dogs		1,212
	Total	\$2,602

The balance of seven hundred and sixteen dollars does not represent a bad profit in less than three years made from an investment of four hundred dollars, and while the young farmers feel that perhaps in other lines of work such increase might have been more quickly and easily acquired, they feel that perhaps in no other field could they have received such high dividends of health, happiness, and independence. The work is hard but enjoyable, while its widening scope and success bring true satisfaction. Sylvan Farm now receives dogs from, and sends dogs to, all parts of the United States, and the "farm family" of high-bred animals from time to time receives judicious addition. Some famous canines have been raised, welcomed, and boarded, and one young puppy, born on the place, recently sold for one thousand dollars.

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## V

# WORK AND PLAY WITH TRAINED ANIMALS

## DAIRY COWS

**I**F THE boys and girls of the farms are looking about for a big thing to do, the very best place for them to look is at their father's herd of cows. Even if it isn't a strictly dairy herd it is kept partly for dairy purposes. Every cow demands stabling, pasture, feed, and attention. She is supposed to give value received for all this. But how many cow owners know which cows pay their board with a bonus, which barely keep even, and which are eating their heads off? The margin of profit when feed is high is too small to risk feeding an unproductive animal.

If your father has not been in the habit of keeping accounts with his cows, you can make him open his eyes. You do not need ledgers and daybooks for your simple statement of facts. Bring every animal face to face with her record. On one side of the account put the cost of what you give each cow. On the other side what she gives in return. You will have a page like this:

*Roberta Grade Holstein 5 years*

### DEBIT

To feed (at prices you would have to pay if you bought it)	\$
To stabling, estimate	\$
To care (so much an hour)	\$

### CREDIT

To milk, so many qts. at so much	\$
To calf	\$
To compost	\$

You will have to reduce the item "feed" to many items, and remember that hay produced at home is not free hay. It is worth to feed to Roberta just what you would have to pay wholesale for it if you had to go to the feed store, minus the cost of cartage. To work this out is good arithmetic, better than covering acres of blackboard space with examples in "partial

payments." Now Roberta may give a good quantity of milk but of poor quality. At first you might think that didn't matter; it brings just as much a quart. But does it, when your mother and sisters make it into butter, for example? Or, if you sell cream, wouldn't you want a cow whose milk tested high in butter fat? Your customers would, whether they bought milk or cream, I know.



Photograph by Julian A. Dimock

### **Holding a Conversation**

The boys and girls in many of the great dairying states, notably Illinois and Wisconsin and New York, are learning in school how to test milk for the butter fat it contains and the chances are that every agricultural college in the United States is ready to instruct boys and girls by letter in this important part of dairying. Many of them send out printed lessons giving careful directions about using the Babcock testing apparatus, and I have seen a class of boys and girls in a country school testing milk from their fathers' cows.

It is astonishing how many cows are kept on farms purely for ornament—or maybe to give the boys plenty of chores. These cows consume as much

food as good ones, but they are idlers. It isn't their fault but the farmer's. Can your father or you afford to keep money invested in any cow that returns him less than a dollar a year over and above the expense of feed? A good cow may cost twice as much to buy, but a good cow will make thirty or forty dollars a year clear gain. These figures are not guess-work but facts.

So I say again to the farm boy and girl—if you want to do a big thing for your home place and for the neighbourhood, reform the dairy herd. Keep a record for every cow. Weigh the milk of each one separately every day for a week, then again two months later, and so on through her milking days. Take an average of all these weights as the weekly weight of milk and multiply by the number of weeks the cow gave milk. This will give the total number of pounds produced. Learn how to test for butter fat. Your neighbourhood creamery tests the milk with a Babcock test and you can learn how. Persuade your father to sell all the cows which fall below a fair standard and buy good ones. Test the milk of the cows he thinks of buying. A poor cow often looks as well as a good one. The Illinois Experiment Station shows by tests that twenty-five of the best cows in the state produce as much butter fat as ten hundred and twenty-one of the poorest cows, while eating only one fortieth as much food, to say nothing of the stable room, the time spent in milking, etc. And a quarter of the million cows in the state of Illinois are making their owners only seventy-seven cents a year apiece. Can your father afford to keep that kind of a cow?

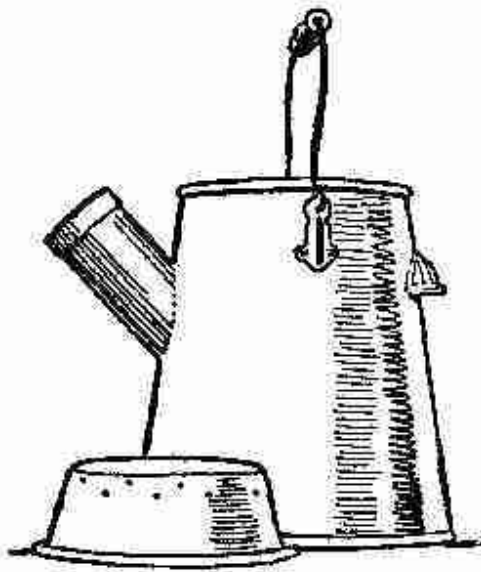
#### CLEAN HOME MILK

I know what milking is on the farm. Take it on a frosty October morning about sun-up, when you make the cow get up from her bed so that you can stand in the "warm spot" to warm your feet. It gets no better from that time on, even if you do milk in the cow stable. But the boys that do the milking do not realize how perfectly filthy the milk often is when it gets to the house.

Take a milk pail from the shelf, go down to the cow barn. There is the cow. Throw her down an armful of hay to chew on while you milk, brush off the stool, rub off the cow's bag with a wisp of hay if she is especially dirty, never mind your hands or the open pail, throw a stream of milk onto each palm and begin. Is there a little hay and dust in the pail? Never mind; it will strain out. When you get through, set the pail down while you drive the

cows out to pasture. To be sure, they will raise a lot of cow-stable dust and the smell is pretty bad in there, but if you set it outside the pigs would get into it. It is nearly school time and you have other chores to do. Take it to the house and strain it. Mother always doubles the strainer cloth, but it takes an awful time for it to run through that way. There, you said the dirt would strain out, and look at it there in the cloth!

This is a cold-hearted picture of one of the chores the farm boy particularly hates. Compare each item with your own methods and improve on each. Home milk is not always clean milk.



**Sanitary milk pail**

The boy that milks ought to do a better job than this. He ought to bring clean milk into the house. How shall he do it? A clean place to milk, a clean cow, a clean boy, and a sanitary milk pail; these four things are within the reach of every farm that can afford a cow.

I have seen a good many patent milk pails, mostly in stores, seldom on farms. The sanitary milk pails *keep the dirt out*, they don't strain it out. Here is one described by the man who invented it for his own use. This pail is tin, holds ten quarts or so. On one side is a spout two and a half inches in diameter and three inches long. The spout has a tin cover like a baking powder can

cover. To keep the dirt out of the top of the pail the man bought a tin pan, just the size to fit tight into the top of the pail. Just above the bottom of the pan on one side he had a tinner cut eight or ten small holes, like a collander. Scald the pail, double the strainer cloth and lay it across the top of the pail. Press the pan down on the cloth till it goes down into the pail tight, taking care that the edge of the cloth comes up all round. Do all this at the house. With this pail, a clean milker can milk a clean cow in a sweet smelling place, and get clean milk. This may look like a pound of prevention, but think of the tons of cure it will save.

#### **MARKETING MILK**

There are lots of boys delivering milk in towns and cities. Most of them do their part well. But I believe they would like to do it better. Driving from one house to another is pretty dull business for a live boy and unless he has something to think about his mind wanders. Why not put some thought on the very business he is engaged in? Does he know what milk is? That children's lives depend upon the care he gives it? Does he know that dirt in ice and dust from streets may be deadly if they get into milk? If dust gets into that little puddle that ought not to be on top of the bottles does he wipe it off with a dirty rag, ignorant of the danger? If he thought of these things and studied out ingenious ways of keeping his bottles free from dust, life would no longer be dull but interesting. He would be well started toward good citizenship.

#### TRAINING PET ANIMALS

Trained pets have a greater market value than those which have no education. Parrots, for example, with nothing but their native harsh squawk, can be bought for very little. But every word added to Polly's vocabulary can be expressed in dimes added to her price. There are very few domesticated or tamed animals so lacking in wit that they cannot be taught. But it takes a particular kind of patience and persistence.

Some animals learn very quickly; mice for instance. One trainer has taught them to walk the tight rope, climb ladders, swing in a trapeze, pull tiny wagons, and do other little tricks.

We have all seen trained animals in shows and have marvelled at them. It is hard to believe that they are real. It takes genius to train fleas, for example, or geese, yet these animals are tamed. Every boy has a little spark of such genius and with use the spark would grow.

Dogs are about the easiest animals to train. Teach a dog first to obey. He must learn to understand just as a baby does. How long does it take a baby to learn what "no, no" means? A bright dog will learn to "charge" about as quickly. When he knows what you mean and that you really do mean it and are not fooling, he will suit the action to the word or signal. A little training every day will do the business. Rewards in the form of food or caresses appeal to the dog's understanding. Never forget to give the reward. You may sometimes have to punish a dog, but you should be careful to make certain that he associates the punishment with the crime. Whipping a dog to "get

even" with him is not the way to make him a good dog. He may take his chance to "get even" some day. Do you blame him?

Most children expect a dog to learn too fast. For instance, a boy wants his dog to draw a wagon or sled. The dog is big and strong and there are leaves to be gathered or kindling to be brought in. Don't make a harness, force it onto the dog, hitch him up regardless of his protests, and expect him to trot off like a pony. Ponies are trained to the feel of the harness from their youth up. Your dog will rebel, not angrily, but none the less emphatically. He will lie down or slip the harness or otherwise rid himself of the burden. Or he will balk. Train him gradually, just as you would a colt or calf. He will learn faster than either.

Dogs are sometimes trained to carry baskets or bundles and can even be trusted to go on errands alone, if, by going over the same route daily, their minds are impressed sufficiently.

Training a dog should begin in puppyhood. Make commands in single words and accompany the word with a sign. Use always the same easily interpreted sign with the command word. Teach him his name first, then to come when called. After these commands are thoroughly learned, teach him to come "to heel," "charge," and similar commands. A poor teacher will make a poor dog, so teach yourself patience. Your voice should be firm but never loud or high-pitched.

A young dog will learn to herd cattle, sheep, or goats more easily from an old dog than from you. He will follow his leader at first, then later he can go on ahead driving the herd on his own responsibility or in obedience to a command.



Photograph by George G. McLean

### **Gyp Has An Ax to Grind**

Did you try to teach your dog to retrieve by ducking him? How silly! How soon would you learn to swim by that method? Begin by letting him think he is bringing you his play-ball, although really you are pulling it by an attached string. Insist on his giving up the ball every time. Do it again and again till he is out of the primer class. Throw the ball a few feet at first, then farther and farther away till he has that trick "down fine."

When the water is well warmed by the spring sunshine, take him to the shore and repeat the same lessons patiently, a little each day. If you have an old retriever with you the youngster will be ambitious to "go him one better" and will learn more quickly.

It is necessary in training dogs to consider the inborn instincts of the breed. A terrier is a "nat'ral ratter" and needs little training for that, but you would have to train a long time to get a spaniel to catch rats.

A dog on the farm can be trained to save the boys a lot of steps. We had a shepherd dog once which was a famous runner. When my father suspected

that the cattle were breaking into the cornfield, he would go first to the top of the knoll by the house, hold Nimp up in his arms, point in the direction of the cows. Nimp would whimper and squirm and when let down was off like a streak of brown lightning. He would not go in a bee-line, but followed first the road, then the line fence to where the marauding cattle were at work. By the time my father or one of the boys on horseback reached the break in the fence the fleet-footed dog would be hustling those cows. If he didn't actually get them back into pasture he kept them moving so that they got no more green corn than was good for them. "Good old dog" was all Nimp expected for little deeds of kindness like this. He wagged his head, hung out his long pink tongue, and almost smiled with satisfaction. There was no doubt that he was pleased with having outwitted the cows, for which he had small respect.

Teaching a collie to herd sheep or goats is a special sort of business; experienced shepherds can teach you how it is done. Training hunting dogs is also a work for experts. Anybody knows that a poorly trained dog makes the difference between real sport and disgusting failure. A young man with a real aptitude for training dogs for various forms of hunting can find opportunities to turn this genius into cash.

#### TRAINING YOUNG HORSES

"Breaking colts" is a phrase handed down to us, I think, from the days way back when our pioneer ancestors used to go out and catch a wild horse and break it to saddle and harness. On ranches where colts range over vast areas and never get acquainted with human beings except at branding time, it is little wonder that they must be broken. They do a little breaking on their own account, too. But on the small farm where three or four colts a year or fewer are raised, no colt should need to be "broken." All should be trained, which is one way of saying taught or educated.

Everything depends upon the colt's learning each thing right first. If you put an old, worn strap on him, or a fraying rope which he can break, he will just as likely as not become a halter and bridle breaker.

A little colt starts out without any habits. All the bad ones as well as all the good ones are learned. Every bad habit harks right back to some mistake. You can manufacture balky horses by overloading a wagon for your team of

colts. I have seen boys tease a colt "just to see him kick." That strikes me as lacking in "horse sense."

Every time you go out with your father to visit the two-year-olds and the yearlings, be sure that you pet and caress them. Don't attempt to mount one till you have accustomed him to the feel of a burden on his back, a very small weight first, then the saddle of an old harness, then a very light saddle. Don't act as if you were in desperate need of a saddle horse. His training cannot all be done in one visit. A yearling must be taught to lead, then to be driven.

After a two-year old has been accustomed to the feel of a harness, one part at a time, he can safely be hitched with some old stager to a light wagon, and taught what pulling means. He should already know that a pull on the right rein means "gee" and on the left means "haw"; never give the command "whoa" to a colt, unless you have the muscle to make your command good. A runaway may not break any harness, nor any vehicle, nor any bones, *this* time, but a runaway horse is an ill-trained horse.

It is almost an impossible thing to train an old, high-spirited horse to regard an automobile or a trolley car with anything but disfavour. A young horse can learn easily. Soon after a colt is well "halter-broke" he should be led around where the farm machinery is at work. He must be held with a strong hand and not be allowed to bolt when the mowing machine starts. Break the automobile to him gently. Lead him up to a quiet one. Have a bit of his favourite dainty to offer him from the seat and see to it that he is convinced that the automobile is harmless. (Would that it were true!) Speak reassuringly to him. If he jerks back, don't get mad and whack him, just to vent your impatience. He will associate your whack with the automobile, and you will have your work to do over again. I have known of a colt being made "trolley-wise" in an hour and he never has forgotten; he would no more shy when one whirls by than he would at his own mother hitched to a load of hay.

#### TREADMILLS AND CRANKS

How a boy does hate the sight of a crank. Turning the grindstone, running the washing machine and churning are part of a country boy's daily life. He may do these things cheerfully, because he knows they are boys' jobs or because he hates to see his mother doing them even worse than he hates

doing them himself. But that doesn't prove that the boy's tastes run to crank turning.

Why not train a dog or a sheep to turn the crank? That's a scheme. It's fun to train an animal and then it will be more fun to see him do the work while you read a book and watch him.

Here is a picture of a big wheel from which a belt runs to a grindstone out under a tree. In the wheel stands a good dog; by his bright eyes, his erect carriage, and the "near-smile" on his face, you can see that he is no brow-beaten labourer. A man at the grindstone holds the axe and the wheel is ready to turn. This fine dog knows that a certain signal means work. He does not skulk off and hide, nor yawn and look limp. He steps up into the wheel, waits for the signal, then begins a steady tread. On Mondays he does the washing, on Tuesdays and Fridays he churns, on other days he helps grind the axe, the sickle, the scythe, or the butcher knife. When the job is done, at a well-known signal, the dog stops, steps off the wheel, and waits for the kindly pat of his mistress or the "Good old fellow" of his master.

#### **MAKING ANIMALS HAPPY**

In training any domestic animal you will find their greatest weakness is fear, just as with wild animals. You do not want to develop this but to win their confidence. With horses taken right from the range or wild, the men who are most successful are those who train by kindness. A horse whose spirit is broken and who does his task because he is afraid not to is not a safe horse. I wouldn't trust him in an emergency. A horse who lives in a state of fear has very little sense.



Photograph by Julian A. Dimock

### **A Group of Happy Farm Animals**

One blow, yell, jerk, or even a threatening motion will often obliterate all the work you have done. So the animal trainer must not lose his temper, especially with dogs and horses. The more intelligent the animal, the more kindness and gentleness are required. On one farm, you will see the calves trembling when coming for their food, trying to keep one eye out for sudden blows while drinking; the horses jerking timidly up as if expecting their tender mouths to be yanked; the cows kicking the milkers; the colts hard to toll in from pastures; the dog with tail between his legs; the cat on her way up a tree. Do you know the owners of such animals? How are the boys of the family liked in the neighbourhood? Are the girls popular and good-natured? Has the mother the sweet and patient look that the best mothers have?

Every domestic animal ought to be kept happy. A happy hen will lay eggs, a happy cat will purr and rub your leg in passing, not because she wants anything out of you, but because she thinks you are a good fellow and that's her way of expressing herself; she will catch mice for you, too. A happy

cow will give down her milk; a happy pig will lay on fat faster than a miserable one, a happy horse will almost trot at the plough. So really it pays to keep animals happy. Having creature comforts alone is not enough for most animals. They like attention, caresses, and even seem to enjoy and understand conversation.

Boys that train animals will find that the animals train them. If you have a hot temper and can keep it in enough to train a dog to draw a wagon, you will find it isn't so hard to hold in when you are playing ball. Self-control is one of the biggest things in life.

The training of a calf or colt should begin early, just as with other animals. If the animal has never been frightened the task is easy. Begin gradually. Petting for a day or two will get him used to being handled. A rope may be knotted round his neck and worn for a day or two, or a rope halter put over the head; something that slips on easily so that you don't have to hold the youngster's head. When he is accustomed to the feel of the halter, you can lead him to his food without his realizing it. Unconsciously he gets used to the pull on the rope.

A pair of well-matched oxen, trained by kindness, taught to "gee" and "haw" at the word without reins or goad, with no bad habits like kicking or turning in the yoke, are worth between two and three hundred dollars. They started out worth four or five dollars a head for veal. Training and grass have done most of the rest. If trained in kindness, they are docile, gentle, industrious, and though less spirited than horses, they are also steadier and far better suited to many heavy farm tasks than horses. The harness for oxen is very simple, costs little, and seldom needs mending.

Every county fair ought to offer prizes for animals trained by boys and girls. I believe boys train animals more often than girls do. I wonder how that comes. Practise on the hens, girls, and on the cat. I know of a cat which picks up nuts and puts them in a basket quite as a child might. This cat treads a wheel, too, to turn the churn.

If all the animals were happy and earned their living, helping do the work, as well as reproducing their kind, farm life would be less dreary and hardships would seem less hard and the country would be a better place to live in.

## TAMING WILD ANIMALS

All little children are interested in animals. It does not take much argument to convince a boy that he needs a dog or the girl that she needs a canary bird. If, as they grow older, they seem to lose their pleasure in the companionship of animals, it means that something is wrong. Probably home conditions are such that an intimate acquaintance with any animal is inconvenient or else some unnatural lessons in natural history have been forced upon the children at school and their interest in the real things has been deadened. I have heard many boys and girls say that they dislike zoölogy. Take these same boys and girls out on an excursion, with an opera glass or with an insect net, or show them a rabbit's tracks in the new snow, and who will say they are not awake and interested?

The first thing you want to know about an animal is its name. The same is true of a new neighbour or a new schoolmate. The name does not tell you much about the animal or the boy. When you know them better you will give them names that fit. The new boy's name may be Reginald. When the boys get to know him they may call him "Piggy," or "Chief," depending on what kind of a boy he is. But a name is a great convenience.

Next after the name you want to know where he lives, how he lives, and above all what he can do. After all "what he can do" is the boy, and the same is true of other animals.

How are boys and girls going to find out what animals can do, how they live, how they make a living?

The good old natural way to find out what an animal can do and will do is to catch him and watch him. Some small neighbours of mine did not catch grasshoppers and throw them into the water because they were cruel, although their mother berated them for cruelty. They wanted to find out whether grasshoppers could swim or not. The boys who catch squirrels and rabbits and birds and put them in cages want to take care of them and teach them tricks.

But, seeing the wild ones unhappy and drooping, most boys will voluntarily let them go. There is no good word to be said for the practice of caging wild creatures merely for the entertainment their misery will afford an irresponsible and curious crowd. I am glad to know that those horrid

whirling cages in which squirrels used to be shut have become less common.

In these days of hunting without guns, there is also a good deal of taming without cages. This is the real thing, and has everything in its favour. There are two sides to it. From the animal's side the tamed one has nothing to lose. He, and for his sake, all his fellows, receive protection, consideration, care. If he tells any secrets, his confidence is not betrayed to the enemy. He comes and goes at will and pays his debts by keeping true that balance which existed in nature before mankind upset it. From the human side taming wild things is a delightful though not an easy way to learn to be patient, persevering, and gentle. You simply have to practise these virtues or you will fail. Furthermore, the domestication of wild animals useful to man results in very great practical value. From the naturalist's point of view, this is a most fruitful method of discovering the true habits of the wild creatures, about which so much is yet to be learned.

Most efforts to tame full-grown animals result in complete failure. Taken when young, almost any of them can be tamed.

No one ought ever to have a pet of any kind unless he sees one thing clearly: Forcing his pet to become dependent upon his protection and care involves a real responsibility. When I consider the number of cases of neglected pets I am inclined to discourage children from keeping them. It is a very good method of developing responsibility, but, if the method fails, the innocent pet suffers. The uncaged pet has an advantage over the caged one in that he can, if neglected, return to the wild and shift for himself.

#### **BIRDS**

A great many famous people have made friends with our native birds. John Burroughs could depend on an audience of robins to perch on his knee. They would listen politely while he remonstrated with them for stealing his grapes, well assured that the next forkful of earth he turned would yield worms enough to repay them for waiting. It is not uncommon to see photographs of birds perching on the hands of children or grown people. One noted naturalist is pictured with a piece of bread in his mouth, out of which a bird is taking a bite. To really tame a full-grown bird is practically impossible. To gain its confidence is difficult. It means that the person has never in its presence made a motion sufficiently sudden to startle the timid

creature nor lost his patience or self-control once during many trials. A bird is not tamed in an hour nor a day. A quick wave of the arm or a sharp noise is enough to undo all that has been accomplished in long, patient hours spent in establishing friendly relations. The photographs are records of triumphs.

Professor Hodge encourages the taming of young birds in the interest of increasing our valuable bird life. He says: "It is a rare lesson in gentleness to capture a young bird without frightening it, but, if successfully done, your bird is practically tame. If even a young bird is caught after a severe chase, it is likely to be days, weeks, and even months, before the effects of its fright can be obliterated. If they can be picked up without frightening them, they will often immediately perch on the finger and feed from the hand. I have tested this with young vireos, chipping sparrows, orioles, grackles, and repeatedly with young robins, which some even put down in their books as untamable. Think what a monster the open hand must seem to a bird!"

Those of you who have read Mrs. Stratton-Porter's story of Freckles will remember how he tamed the wild birds. They were residents of the great primeval woodland and had not learned yet from sad experience to hide from men. They swarmed about the gentle Irish lad because he had made himself a part of the forest. To them he was like some new kind of beneficent tree, yielding nuts for the nut-eaters, grain for the grain-eaters, and bits of suet or scraps of meat for all who came for it. He called them all, "Me chickens." Was there anything wonderful in this? Yes; so thought the Scotch woodsman with whom Freckles lived. And no, because anybody can do the same who will follow the same tactics. If you read on in the story, you will readily believe that his relations with the birds and the forest helped make Freckles the lovable boy and the fine, sweet-natured man he grew up to be.

How to do something toward domesticating wild birds in order to make the country a better place to live in is treated more fully in a later chapter.

Humming-birds are said to be entirely without fear if tamed when nestlings. They sometimes fall from the nest and are, of course, helpless so far as feeding themselves is concerned. They will take sweetened water from a spoon, but should not be expected to thrive on this diet alone. Their natural

food while growing, and probably afterward, too, is largely insects. A supply of these should be given the young birds. They become very tame and perch on the hand and on the flowers in vases. They will visit your best hat, too, if it has flowers on it, and will even try to collect nectar from the flowers on wall-paper or curtains.

#### TOADS AND THEIR KIN

One is really surprised at the long list of wild animals that have been successfully tamed. That is, they are sufficiently tame to come to the tamer, eat from his hand, nestle in his pocket, follow him about—in short, to show perfect confidence and little or no fear.

The toad for example, "ugly and venomous," (we have Shakespeare's word for that, but he was mistaken)—, a very useful animal and absolutely without disagreeable traits. It has been carefully estimated that every toad is worth twenty dollars to the garden he lives in. Yet how seldom one hears of a tame toad. At best they are tolerated, but not often encouraged by protection or by a little attention. To tame a toad, one only needs to feed him. Frogs, salamanders, newts, snakes, turtles, and fish have all been tamed in the same fashion. As nearly all are insect eaters, we are benefiting mankind when we encourage them.



Photograph by Charles W. Miller

**The Crow May Be Tamed When Young**



Photograph by Chester K. Reed

### **The Skunk is an Amiable and Well-Mannered Pet**

#### **SQUIRRELS**

Tame squirrels are amusing. It takes very little encouragement to make them tame enough to eat from the hand and even to rummage the pockets for nuts. I remember a case when the red squirrels made so free with the books in a great man's study that he became positively annoyed, although he had himself encouraged them and had enjoyed their friendliness and tameness. The case got so bad that he was forced either to vacate or to get rid of the squirrels. He finally had a trap set. The first squirrel that came in ran straight into the trap. The great man had really not counted on any such circumstance. He was nonplussed. In all his diplomatic career no such a situation had arisen. He gave the matter earnest thought. He considered all the *pros* and *cons*. He weighed all the evidence. The squirrel was guilty!

When asked by a friend what penalty he pronounced, the great man replied: "I read him such a lecture as he will never forget—and turned him loose!"

The relations of the red squirrel with the birds are such that we are pretty sure they should be discouraged. They are, alas! egg-suckers and nest-robbers. The gray squirrel has not been caught in this nefarious occupation. If plenty of nuts, fruit, and water were supplied for red squirrels, maybe they could be cured of their bad habits.

The flying squirrel is to me the most beautiful member of his family. He is said to tame easily, but I remember the only pair we ever caught were shut in a convenient closet "till morning." When morning came there were only a little pile of gnawings and a hole under the door to tell the story. They had flown, nor could I blame them.

#### **RACCOONS, WOODCHUCKS, AND SKUNKS**

A raccoon is a most satisfactory pet and will afford about as much amusement in the back yard as a cage of monkeys. Raccoons are more numerous, especially in New England, than formerly. They are extremely fond of green corn, but corn in any form is eaten greedily. Also, I regret to say, they are nest-robbers. In fact, they will eat fish, flesh, and fowl, as well as vegetables and insects. This makes the food problem for a pet 'coon a very simple one. But we can not afford to encourage them, because of their bird-eating habits.

Sometimes a hunter finds a suckling 'coon in the woods. He cannot let the helpless thing starve, as it certainly would if left. When he gets it home, he will realize that its natural food is 'coon's milk. Some bright member of the family will suggest that a bottle of cow's milk with rubber nipple will do the trick. Having no such convenience as a rubber nipple, we once successfully brought up a baby pig on a bottle. We took a goose quill and wrapped it with a strip of clean old cotton cloth till we made a stopper for the bottle. This was fine, and I can recommend it for suckling lambs, pigs, fawns, 'coons, and other young mammals. There are well-authenticated stories of baby 'coons being adopted by cats whose young have been "disposed of."



Photograph by E. S. Kane

### **A Bottle Baby**

A 'coon is a most mischievous creature, and if you tame one you should really not expect your mother to feel all the enthusiasm you do about him, for his mischief is sometimes exasperating. An animal enclosure in the back yard may be necessary, but that means more work for you to keep the 'coon and his mates happy.

Tame woodchucks are said by experienced boys to be a great success. Young ones are easy to capture, for they are not allowed to "hang around" the home nest after the parents decide that they are big enough to earn their own way. In "American Animals" there is a good story of a tame 'chuck for which the author traded an old fish line with a broken hook and thirteen cents "to boot." This little chap was brought up by hand and developed most interesting traits. He made life miserable for the family tabbies by nipping their heels, and he tunnelled under the door step till he made the earth cave in. A wild woodchuck will show fight when in danger of capture, but the tamed ones are not vicious.

The last creature I should ever think of becoming familiar with is the skunk. Yet I have a photograph of a lady feeding a full-sized one from her hand. The account that went with the picture said that this skunk was in "perfectly good working order," too. Several naturalists have tamed these little animals, and there is no doubt that they make amusing and well-behaved pets.

Prairie dogs, chipmunks, badgers, fawns, 'possums, crows, and many other native wild animals have been successfully tamed. You may have read of "Red" Saunders's pets, the bob-cat, the snake, and Judge, the hawk. Whether you would call them tame or not depends. They certainly had "wild, wild ways," though they frequented the kitchen and slept under the stove, one at a time. The same methods must be employed, no matter what the creature is. Gentleness, patience, and common sense will succeed almost every time with young animals.

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## VI

# MAKING BROOKS AND SPRINGS USEFUL

### RECLAIMING A TROUT STREAM

I USED to ketch trout that 'ud weigh two pound in that little crick back of my pasture when I 'uz a boy."

Who has not heard old men say that? They seem to have just accepted the lack of trout as one other piece of bad luck, like wormy apples, blighted wheat, and other dispensations of Providence. The younger generation are not satisfied with this view. If good wheat can be grown by modern methods, and wormy apples prevented by spraying, why shouldn't trout be caught in grandpa's old brook? No reason in the world. In between you and grandpa there was a generation of neglect. Your father and his brothers probably went to town to seek their fortunes. Anyhow, everybody was too busy to fish, and something went wrong with the brook that needs to be righted.

Any stream that has been a trout stream once can be so again, provided that the water is not fed with poisoned drainage from some mill or factory. If the forest has been removed and natural conditions so changed that the brook that used to be perennial is now only semi-annual, going dry in time of drought, it will be necessary to build a series of dams to make sure that the water will always be deep enough for trout. A spring-fed brook is best; it is cool and constant. Lower the channel by digging where refuse has choked the natural course of the stream, but don't tidy it up enough to make it artificial.

The ideal brook, and the country is full of them, has gravelly or sandy stretches which serve as spawning beds, swift rapids where exercise is necessary, and deep pools for rest and quiet, shallow places where insects lurk in the overhanging vegetation, and once in a great while a real little waterfall where the water gets well churned and mixed with air. The brook ought to supply enough food for all, but I have seen fish so plentiful in

well-cared-for streams that it was necessary to feed them. We would take great pans of specially prepared food to the water's edge; as we threw it broadcast on the surface the trout would leap entirely out of the water in their eagerness to get the morsels. We did not feed them liver because the epicure does not like his trout to have a liver flavour. The natural food of the trout should be encouraged to breed in the trout stream. You can restock your stream with the little crustaceans, insect nymphs, and similar fish food from other streams if you think it necessary. A few pails full of mud carried across will start them.



Photograph by Helen W. Cooke

## **Plenty of Trout in This Stream When Grandfather Was a Boy**

The greatest necessity is to protect your fish from their natural enemies. Big fish will eat little fish, trout will eat trout, so will bass, pickerel, and suckers. You can keep the big fish out by screening the spillway at the upper dam.

There is good fun to be had in raising trout from the egg. This work has been regarded by most people as too complicated and too difficult for any but an expert. As a matter of fact, it is no more difficult than many of the occupations boys engage in, chicken raising, bee-keeping, and photography, for instance. Visit a fish hatchery if you have one near, get all the government bulletins on the subject, and, if you have available running water, you can try your hand at trout growing. It would not appeal to many, but it is really fascinating work.

### **SPRINGS FOR TROUT CULTURE**

If there are constant, cold springs on your place, you are neglecting a golden opportunity for earning money in an easy and delightful way. A spring is capable of furnishing living room for a large family of trout. You can sell live trout at sixty-five cents to a dollar a pound to a first-class hotel. The big fish bring the smaller prices per pound, those weighing from half a pound to a pound being most popular.

Clean out your spring first and make a basin ten to twenty feet square, the bigger the better. Put a fine, galvanized iron netting over the overflow of your reservoir. Young fish can be bought from a fish hatchery in the form of eggs, fry, fingerlings, yearlings, or even larger. The government will stock your streams for you free, but it imposes certain conditions, which is quite just and proper. Get all the information you can from state fish hatcheries or the United States Bureau of Fisheries, before you decide finally.

### **RECLAIMING A SPRING**

There is often a neighbourhood tradition concerning a wonderful spring somewhere near, a spring that never ceases to flow, no matter how complete the drought. The water is pure, cold, and clear; maybe the oldest inhabitant

had it from his grandfather how the Indians used always to camp near it on their cross-country marches from the Catskills to the Blue Ridge. They call it "The Old Indian Spring." Sometimes they tell hair-raising tales of midnight adventures and hair-breadth escapes, till you wonder that the spring itself never turned red with the spilt blood. From stories of early pioneer days one gets a good idea of the very great importance of the ever faithful spring. With the certainty of a pure water supply for family and beasts, a man might safely carve a home in a primeval forest. Without it, he must push on yet another lap toward the wilderness.

I remember such a spring. Generations of red men, trekking from one hunting-ground to another or maybe waging their own peculiar war in the enemy's country, have depended on this spring for their success. Later generations of pioneers have passed that way and refreshed themselves with its sweet water. As years went by, the spring fell into disuse and gushed on forgotten. But forty years ago it was re-discovered by a searching party, identified as an historic spot, reclaimed, and made permanently useful and beautiful by public spirit.

Nobody knows just how to appreciate a spring except the person who discovers it, reclaims it, and makes it do his bidding. No bit of his own ingenuity pleases the householder quite as much as his spring, his piping, his reservoir, and his little hydraulic ram, yet one of the last springs I visited was in a New England pasture. Its only protection was a sort of fence of poles to keep the cattle out. To approach it you had to leap from hillock to hillock, in constant danger of losing your balance and sinking in a deep mud hole. The spring bubbled up clear as crystal in a most unromantic hole in the ground; its overflow simply spread out on the ground between the hummocks. It didn't look thrifty to me. Two days' work would have laid a basin rim of small stones about that spring with a piece of tile for an overflow pipe, and a shallow channel might have been dug to carry the surplus to the edge of the slope where another basin for the cattle might have been made, or to a trough.

The water of a spring ought to be analyzed by a chemist before it is used for drinking. Nobody knows what contamination is possible to a spring whose sources are mystery. Campers ought to be particularly careful in this, especially if their camp is near settlements.

The first step in reclaiming a spring is to dig out a basin. The chances are that the one made by the water is too shallow for practical purposes. Compute the number of gallons you want in reserve and take out enough cubic feet of soil to make a basin of that capacity. Decide next what to do with the surplus. Your basin is not designed to hold the spring's daily output. If the spring is in a ravine, nothing is simpler than to lay a tile drain from the basin down to the stream bed. By damming the stream you can make a pond for waterfowl, for trout raising, or for a swimming hole: but that is another story.

The basin should have a protecting rim. For a number of reasons this should be solid and permanent. You are sure to want to sit on it and watch the water, for one thing. Then, too, you want a protection against surface water. All sorts of decaying animal and vegetable matter must be kept out of the spring, so cover it tightly.

#### MAKING A SWIMMING POOL

In a country where wooded brooks are plentiful there is absolutely no good reason why boys shouldn't have a swimming pool. It needn't cost a thousand dollars, either. Every outdoor club ought to have one as a special feature. The same dam that holds back the water for the skating pond may serve in summer to make the swimming hole. It is really fun to build a dam. Your father or the other boy's father will know how. You can dig out the stream at low water, and make the pool deep enough for diving.

High banks make the place more private; trees and underbrush serve the same purpose. But if the banks are not high naturally, and the trees have been cut away you have no idea how quickly you can make a natural screen. Willows love the margin of streams and they grow tremendously. A frame of poles covered with wild cucumber or morning glory will make a good screen the first season while the permanent trees and shrubs are growing. You don't need to swim all your spare time, so you can give some time to making the pool more secluded. Move a few big bushes from the woods in winter. They will never know the difference if you transplant them while their roots are frozen in a big ball of earth.

Let me make a suggestion to you. You believe everybody ought to know how to swim, don't you? That includes your father, of course, who taught you. Does it include your sisters and the other boys' sisters? "Everybody" is

a big word, now you think of it. Why it includes even your mother! Do mothers know anything about swimming? Some of them do, already, only they never get a chance to keep in practice; but they like it. It is precisely as natural for girls and mothers to enjoy the water as it is for boys and fathers. Just be generous and let it be understood that a certain day in the week is ladies' day, and turn the pool over to them. Their bathing suits may not be in the latest fashion, but you won't be there to criticize nor to see how well they really swim.

#### A HOME-MADE SKATING POND

The family who own a tennis court and enjoy no skating in the winter have their own want of ingenuity to blame, if they live in the Jack Frost belt. Any level piece of ground, even the grass plot in the back yard, can be skated on.

You need first to set a six-inch board on edge all round the level plot. This board should be three inches in the ground and three inches out.

As winter approaches, rig a trough from the pump to the pond-to-be or have the hose where it can be attached to the spigot at a moment's notice. Wait for a hard freeze. When it comes, and the ground is like rock, give the word "all hands to the pumps." Let on enough water to cover the surface, then let it freeze. If you get a smooth surface the first go you are luckier than most boys. Cover the first coat with a second and that with a third layer until you have smooth ice.

Then skate. On cold nights spray the worn places if you use a hose, or run on another half-inch of water.

A good skating pond can be made by boys with a little ingenuity, which in this case means engineering ability, by damming a brook until it floods a naturally flat area above its own level. Or by damming the outlet of a pond before dry weather comes on and holding the water at a higher level than it would naturally have. It is perfectly astonishing what a small dam will do, if cleverly placed. Study the work of beavers if you know of any. You can get pointers from mill-dams built by your great-grandfathers, if there are any in your vicinity. In one of the books for boys, mentioned in the book list, are practical suggestions about building dams.

Sometimes boys think nature has not done as much for them as for boys who have a natural swimming pool, a skating pond, or a trout brook. Maybe

if you helped her out a little, nature would do her part in your case, too.

### THE STORY OF RECLAIMING A SPRING

When I was fourteen years old my father bought his property in Ithaca, N. Y., on which we live. That part of it on which there is now a fine spring was considered worthless. Through this property ran a well-wooded glen, the upper end of which was very wet and swampy. This condition was due to several small springs emerging from the ground at the head of the glen. All of these springs joined and flowed down through the glen, forming a fairly large stream. This stream flowed continually throughout summer and winter, without change of volume.

The first step in the reclaiming of this spring was to collect all the water through tile drains into a large, concrete reservoir. This reservoir, which was four feet wide, four feet high, and twelve feet long, was constructed about two feet under ground. An open spring basin was connected with this reservoir by a two and one-half inch iron pipe. This basin was made of rough stones laid in cement, and the back side of it arched over a foot or more, forming a partial roof. On the open side is a concrete seat where one can conveniently sit and get a drink. My father and I did all the work except part of the ditch digging. From this basin was laid a one and a quarter-inch iron pipe which carried the water down the glen a distance of about sixty feet to a hydraulic ram. This ram is always running, and is made to go by the constant pressure of the water from the spring basin. The water is forced through a half-inch iron pipe to a large tank in the attic of the house situated on the hill above. The tank, which holds about five hundred gallons, supplies the house with pure, cold water for all purposes. As the water is always flowing into the tank it is provided with an inch and a half overflow pipe, which carries the surplus water back into the glen. Thus, through a series of pipes and a ram, the water is conveyed from the reservoir throughout the house. By building a small dam farther down, we made a fair-sized pond on which to domesticate some wild fowl.

The ground drained by concentrating the springs was well adapted because of its fertility for the growing of shrubbery and flowers of many sorts. In the wetter places, ferns and pink and yellow lady slippers were planted, and in the dryer area shrubbery, such as the red bud and azalea. Thus, what was once a mud hole was transformed into a useful piece of ground.

JOHN NEEDHAM

### A BACK YARD SWIMMING POOL

Somewhere and somehow our boys came into possession of the idea that they could make a swimming pool. I think the original suggestion came from *Country Life in America*, wherein was described, with beautiful pictures, a swimming pool that cost five thousand dollars or six thousand dollars. The boys had land a-plenty, water, too, and a will to work if they were shown what to do. With the decision made that a swimming pool must be had, a council was held to decide on ways and means. The oldest boy, aged thirteen, stoutly maintained that he could do the entire work himself, while the youngest, aged four, was equally confident that the job was entirely within his capacity. It was finally agreed that I should stake out the ground and furnish the material, and the boys would do the work. With some slight modifications this plan was followed throughout. It was decided to make the pool twenty-five feet long, ten feet wide, and four feet deep. The ground was thereupon staked off and the boys fell to with a will removing the earth.

It was hard digging, but the youngsters stuck to the work and finished within a week. Earth to the depth of three feet was removed, and by piling this around the entire margin of the excavation the level was raised about one and one half feet for a distance of eight feet on all sides. This plan avoided the necessity of hauling away the earth, gave the desired depth, and provided a flat surface eight feet wide all around the pool.

The rough digging being finished, the sides of the excavation were trimmed with a spade to an angle of about forty-five degrees. Rough two by four-inch studding was then cut into lengths of four and one half feet and placed four feet apart all around the banks. Where each piece of studding was set, the earth was removed, so that the timber was made flush with the soil. The end of each piece of timber was also sunk in the earth at the bottom of the pit for about three inches, in order that it might be held firmly against the bank. Rough pine boards, free from cracks and knot holes, were then nailed to the timbers at the top only. These boards were twelve inches wide, and thus formed a border or rim all around the upper portion of the pit, one foot in width. At right angles to the twelve-inch rough boards others of the same size were nailed, the last projecting out on the level ground, thus forming a

boardwalk around the excavation. The main object of these boards was to keep the waves from washing the banks and to give a clean place upon which to stand or sit while not actually in the water.

The boards being up, there was still left about three feet of the sides, and the entire bottom of the excavation, without covering of any kind. It was decided to cover the sides and bottom with cement, plastering this material directly upon the earth. The cement was mixed with sand, one part cement and two parts of sand, and was spread on with a mason's trowel. Two and a half barrels of cement and about four barrels of sand were used. Toward the last, pure cement was applied as a thin wash to the entire surface.

The cementing was a pretty tough job, but with the help of an old coloured man the work was finally done in a thorough manner, and the pit was then as tight as a jug. It was allowed to dry for two days; then the water was turned in. The water was supplied from the service pipe of our home near by, and as it is furnished by meter, we had no qualms as to the quantity used. The pool holds about eight thousand gallons and requires from twelve to fifteen hours to fill it through a three-quarter inch pipe.

The entire cost of the work, not counting the boys' time, was as follows:

12 boards, $1 \times 12 \times 16$	\$2.25
8 pieces rough pine, $2 \times 4 \times 16$	1.05
$2\frac{1}{2}$ barrels cement at \$1.50 per barrel	3.75
	<hr/>
Total	\$7.05

The pool was located in the shade of some willows on ground slightly higher than the adjacent territory. Every few days some of the water was siphoned off through a piece of hose and fresh water run in. Once a week, however, about a handful of copper sulphate was tied up in a piece of cheese cloth and thrown into the pool, where it was whipped up and down in the general fun until all the copper was dissolved. The copper kept the water absolutely pure and sweet throughout the entire season, and not a sign of algæ appeared.

The pool was a source of constant delight, not only to our youngsters, but to those of our neighbours. All but the four-year-old learned to swim, and by the end of the season even he could make some preliminary moves in that

direction. The moral of the story is that if you have some youngsters, a backyard and a city water pipe you do not need to go to the seashore for fun. Give the boys a chance to make a swimming pool and they will enjoy it all the more if it is the result of their handiwork.

BEVERLY T. GALLOWAY

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## VII

### KEEPING BEES

I PICKED up a number of the *Bee-Keeper's Review* one day and my eye caught this surprising headline:

#### "A BOY'S BUSINESS WORTH \$1000"

I opened my eyes and read on in astonishment about a boy who started with no more capital than any boy could get together, and, without sacrificing his school or college plans, built up a bee business which he sold for one thousand dollars. In the meantime his bees had not only paid their own board but his as well. If one boy can make a success like that, other boys can. So can girls, for bee-keeping is a form of outdoor work which seems admirably suited to sensible, nature-loving girls.

#### HOW TO BEGIN

There are a good many ways to begin this like any other business, but there is probably a *best* way for each person. Fortunately one does not have to begin on a large scale. In my opinion the only way to learn how to keep bees right is to keep them. Experienced bee-keepers advise young people to visit a practical apiary and watch the owner among his bees, taking note of what he does and says. Offer your services if he needs help, asking him to explain what he is doing and what for. Stay a few days or a week if he will keep you and learn all you can. One young woman spent a summer vacation on a farm where twenty or thirty colonies of bees were kept, and helped whenever anything was to be done with the bees. When she went home she took a colony of bees with her, and now she is manager of her own apiary with a larger income than the average teacher and ten times the leisure.

For beginners the cheaper bees are satisfactory. Later, nothing will be too good. A stand of bees can be bought for two dollars or three dollars, but a colony of choice Italians in a modern hive with tested queen may come as high as fifteen dollars. Better have them to sell than to buy at that price.

There are cheaper ways of getting them than buying them. If a runaway swarm which no owner claims, alights in your yard the bees may be yours by right of discovery and if you hive them successfully, by right of possession. This method though practised by some has not the sanction of the golden rule, and is not here recommended. What fun it would be, though, to secure a runaway swarm and make the visitors comfortable in a temporary hive. You would probably find they belonged in the apiary nearest you and ten to one the owner would just as soon you kept them unless they were a very choice kind. He will be so pleased that you were able to hive them that he will offer you something substantial for your work. He may give you the bees, and your bee-keeping will begin "by accident" as did the life-work of the famous veteran apiarist, Mr. A. I. Root.

Make a small beginning. Many successful bee-keepers had less than twenty dollars to begin with. One colony is a start. It is astonishing how quickly bees begin to "pay their way" and this test ought to be applied in all your ventures. Keep a strict account of all your expenditures in supplies, and credit the bees with all the honey you take off and with the new swarms. If I say this often, it is because it must be repeated to fix its importance in the mind. If you make good interest on your money you know it is safely invested. If, however, you charge up your time against the bees you must credit them with the fun you have, the outdoor exercise you get in caring for them and the consequent freedom from doctor bills.

#### **THE BEST PLACE FOR BEES**

You will read of keeping bees on a city roof, in a suburban attic, and on boats; but the most natural place for them is in the village or country, where fields of clover, groves of basswood, and patches of buckwheat abound. An orchard or large garden is incomplete without a few hives. The young bee-keeper with these advantages is to be congratulated; the conditions are ideal. All he needs is a liking for bees and spunk.

Before you get the first colony decide where your apiary is to be located. Even one hive must have a place and you must plan for increase. An orchard is a fine place, and the hives should be at least fifty feet from the street or road, because bees do not recognize the laws of the open road and turn neither to the right nor to the left. If necessary to put them next the street or close to a neighbour's garden, there should be tall bushes, a hedge,

or a high fence to protect the passers-by. Otherwise your venture into bee culture may make you "bad friends" with the neighbours and even carry you before the justice of the peace.

In very hot weather some shade is necessary for beehives, but too much shade may result in failure. The morning sun and the late afternoon sun are good for bees, but the heat of the mid-day sun may cause the comb to melt and bring disaster to bees young and old. As moving the active colonies is not always safe, it pays to make a plan in the beginning for the whole number you expect to have. This is a case where it is justifiable to "count your chickens before they are hatched." It will not take much imagination to draw a plan on paper locating the principal objects in and near the apiary-to-be, and to sketch in the location of the ten, fifteen, or twenty hives you are likely to have five years from now. If you have no large, deciduous trees to offer ideal shade you needn't give up the idea of keeping bees. With the modern ventilated covers, bees are successfully kept out in the sun, if protected from wind and storms. A grape arbour affords good protection. It should run from east to west. Any trellis with quick growing vines like hops, Virginia creeper, or grapes, will serve well. Grapes give best return as they bear fruit and their blossoms supply honey in season. Where no natural shade is possible a shade board or air-spaced cover supplies the lack. A shade board can be made of any old box material. Lay a couple of sticks across the top of the hive to rest the shade board on and to let the air circulate.

Wind is worse for bees than too much sun. Bless the pioneers of the windy country if, by reason of their forethought, you have a real evergreen windbreak on your place. If you have not this ideal windbreak, a building will serve, or your hedge or high board fence should be on the windy side.

If you start, as many have, with one or two colonies let them face the south or east and leave space enough between the hives to run a lawn mower. As your number increases, your original plan may be changed, but it always pays to make the plan.

Try to consider, in the arrangement of the hives, not only convenience but beauty. If a board fence is necessary, train vines to cover its bare ugliness; a fringe of low shrubs will help make it beautiful. As your apiary grows, experience will teach you how to group the hives to get the best results.

Twenty hives grouped in fives under the north side of four big, spreading apple trees would be the ideal I would set for myself if the orchard was ready for occupancy. If I began at the age of fourteen years, I could easily reach this ideal in six years and keep my other duties up, too. By that time I should know whether I wanted to be a bee-keeper or not. A great many people find that the chicken business combines well with some other business or profession. It is surprising that more people do not consider bee-keeping in the same way. Barring accidents, bees are far easier to handle, cleaner, and they board themselves. You can leave them over Sunday without any qualms of conscience and without arranging with somebody to feed and water them. The bees will not get out and scratch up your garden or your neighbour's, but they will do work in the garden that is too fine for your hands to tackle, and your crops will be bigger because of their visits. Chicken owners always sleep with one ear open, expecting night prowlers to appear and carry off their best stock. But who ever heard of a burglar alarm on a beehive? There are honey thieves, but they are not common.

Beehives look best on a carpet of grass, but if you have to be away during much of the summer wide rough boards should be placed in front of the entrance to the hives to keep the grass down. A bee is likely to come home heavily laden and pretty well fagged out with a long flight. If she should settle in a tangle of grass she would be likely to give up the struggle and fail to answer to roll call the next morning. Keep the grass short in front of the hives, then, if you have to cut it with shears, which is not as dangerous as it sounds, once you get used to it. This is best done on cold or wet days when few bees are going in and out. Salt, ashes, or gravel may be sprinkled close up to the hives to kill the grass.

#### **BUYING BEES**

Even the people with bees to sell advise beginners to buy from some one in their neighbourhood. It is not safe, though, to move bees less than a mile and a half as they are likely to return to their old location. Buy from an up-to-date apiary if you can, and get standard hives; the old box hives are not worth anything; neither are fancy hives of complicated structure. The entrance to the hive should be closed with wire cloth after the bees all get home in the early evening. If closed in the middle of the day you are cheated. In warm weather the cover should be taken off; in its place should be put the super over which wire-cloth has been tacked. Strips of wood can

be nailed on top of this to which the cover can be fastened. By this arrangement ventilation is secured. We once lost a colony shipped by express without any provision for the circulation of air. Night is the best time to move the bees, though it can be done in the daytime; a cold day is best. Remove the wire cloth the first night after placing in permanent location.

Spring is the best season to buy your first colony. The price may be higher but the risk is less. Get a strong colony that has wintered well, which contains, on the average, twenty-five thousand to thirty-five thousand worker bees.

It would be well just here for the beginner to get acquainted with the opinions of the best bee-keepers about the kinds of bees. There are varieties among bees as well as among hens, pigeons, dogs, and horses. Americans like to be "hail, fellow, well met" with all their live stock, and although even the best tempered bee might resent a cordial slap on the flank, there are bee-lovers who tell of stroking their little winged friends with a grass stem. It requires real sympathy to succeed with bees just as it does with chickens or cows. No one can work long with them without becoming intensely interested. Most people learn to love them and find absorbing occupation in studying their ways.

Two races of hive bees are common here, though none are native: German, or black, and Italian. All the books and magazines as well as bee-lovers unhesitatingly recommend the latter as the more good-tempered, being at the same time hardy, prolific, and industrious. Good hybrids, that is, a mixture of black and Italian blood, may do almost as well as pure stock, but pure-bred queens are a necessity to keep the grade up. When you hear of people who gather bees by handfuls into aprons or baskets you may be sure that those concerned are all thoroughbreds.

If there are no bees for sale near by, the best plan is to order from a dealer in the spring what is known as a nucleus. This is a very small colony, about a quart of bees (three thousand two hundred), should be accompanied by a tested queen, and housed in a modern hive with three frames of comb. The queen sets to work laying eggs in the cells, new frames should be added as needed, and if pollen and nectar are plentiful the hive will soon be full of

busy young workers. By fall the frames should be stored with the honey needed for the winter.

Your first expense after securing a colony will not be for "mixed grain" or "middlings," but for a smoker, a bee veil and gloves, extra hives for your swarms, honey sections, and other supplies. Don't buy everything that looks useful or is highly recommended by the salesman. Maybe he never saw a bee. Sometimes an old spoon or other cheap utensil can be made into a more useful tool than the one he wants fifty cents for.

The following list includes the supplies you are pretty sure to need the first year:

One colony of bees, in an up-to-date though simply constructed hive. On the whole, the ten-frame hive seems to me to have advantages over a smaller one. A deep telescope cover gives room for two supers on top at once. The only advantage in the chaff hives seems to be that winter protection is not needed for bees housed in them. The obvious disadvantage is their greater cost, size, and weight. Single walled hives are so easily made weatherproof, (see Wintering) that the expense of the chaff hive is not necessary.

Three extra hives.

Two supers; four super covers.

Two to five hundred section boxes for comb honey. You will not need very many of these the first year, but they come cheaper in larger lots.

One smoker. Of the several kinds offered, you may safely choose the one that you have seen used successfully.

One pair bee gloves; one bee veil.

One pound brood foundation, for the new swarms to begin on.

Two pounds thin super-foundation for starters in the honey sections.

One foundation fastener. One experienced bee-keeper tells me that he likes the "Dewey" best. Others prefer the "Daisy."

One Porter bee escape.

One bee brush.

One queen and drone trap. The new Alley trap is made with bars instead of perforated zinc, and works better.

A bee-keeper's guide. (See list of books in the appendix.)

Complete directions for putting together the hives, etc., should accompany the filled order, and the novice should work with one eye on the printed page. A good book on bee-keeping should be included in the beginner's order. Those recommended in the book list in the appendix are all good books for beginners.

#### BEES AS WAGE EARNERS

Average American boys and girls are a pretty sensible crowd and they don't expect to get much for nothing. If they make money they like to see "for value received" written on it. They may get enthusiastic over the work they undertake, but there is a difference between enthusiasm and gush. Enthusiasm helps you do the hard part of your job. Gush only makes you ridiculous. Is there anything worth doing that doesn't take time and work? The honey-producing business is no exception. But the people who keep bees like their job. "Yes," they say, "it takes thought and energy and some hard work, but it is *such fun*." The "little people" are so interesting that you forget that it is work. Compared to "butter money," "egg money," and "fruit money," the women of the household regard "honey money" as "easy."

How much can you count on your bees earning? General statements will give you some idea. You may do better or not so well as the average. A good colony ought to turn out thirty or forty pounds of comb honey a year beside what they need for winter, which is fifteen or twenty-five pounds if wintered in a cellar, twenty-five or thirty-five pounds if wintered outdoors.

The best market for honey is the home market, and the price is the best. You get the commission man's profit and the retailer's profit as well as the grower's. The last honey I bought was twenty-five cents a pound. If I bought your thirty pounds at that price you can see for yourself what you would get per hive. The new swarms add to your assets and you are out nothing except for supplies. Compare this with the expense of going into chicken or squab raising. The following is quoted from a good authority: "Two dollars a year clear profit per hive is the very lowest estimate and twenty to thirty hives infringe very little on one's time. This many colonies may easily be managed by a woman or by the younger members of the family."

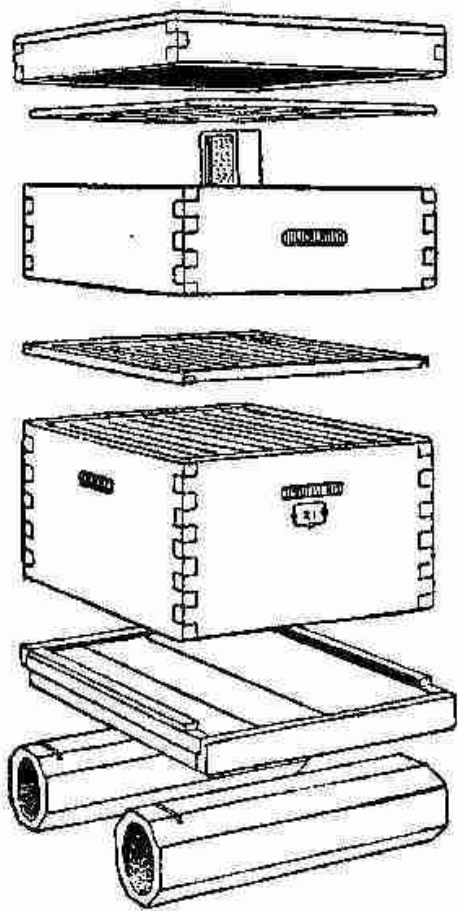
The United States has to import two and a half million pounds of honey annually, and a half million pounds of beeswax. Will not our bees work just as cheaply as those in foreign countries? Let us have more bee-keepers.

### HIVES

Little flat-topped white houses varying in height, standing under the trees in back yards are not an unfamiliar sight to most of us. We say as we pass on the road, "Those people keep bees," and our mouths begin to water. But what do the hives look like inside? They are not mere hollow boxes. Wild bees are content with a hollow tree, but modern domesticated bees require a special kind of furniture.

The first eaters of honey were simply robbers of the wild bees. When man began to domesticate bees, and that was so long ago that we cannot stop to count the centuries, there came to be two sides to the bargain. In return for a share in their stores he kept them in clean quarters, provided abundant pasture, protected them from their enemies and from the weather. The old-fashioned hives were very picturesque affairs; you see them in pictures, and when you travel in Europe you may see them still in use. Those skeps do not encourage doing much with the bees or knowing what is going on in the dark hive. I wonder how the folks ever got any honey to eat. The modern bee-keeper wants to open his hive for a good many reasons. He not only wants honey when the bees have an over-supply, but he wants to know what is doing. He wants to know if his expensive queen is doing her duty; he wants to know if too many young queens are being developed; he wants to know if any diseases or other enemies are present. He therefore must have a hive that permits frequent and minute inspection of its interior.

"But," said one boy, "I don't intend to open my hives and get stung all over." Now who expects to get stung all over? There's no denying that bees sometimes sting, cats often scratch, dogs sometimes bite, goats butt, cows hook, horses kick, and so on. Some method of self-defence is their right, and I doubt if we should find bees so interesting if they did not carry concealed weapons. We certainly respect their rights as we might not if they were defenceless. A bee sting is uncomfortable while it lasts, but people afraid of bees get very little sympathy from me. Rest assured that you will open your hives often and the less said about being stung the better.



**Modern hive, showing parts  
in their correct order**

If possible examine at a dealer's or at some apiary an empty hive. Learn the uses and names of the parts. The bottom board represents the foundation, the brood chamber is the living room, and the supers are the attic store rooms. The flat cover is the rain-proof roof. The hive must be a good home for the bees and easily handled by the operator. The bottom board should not rest directly on the ground because of dampness, which rots the wood and is not good for the bees. Some use hive stands, others set the hives on a platform, supported by wooden blocks or on tiles as illustrated here.

Beehives, like cottages nowadays, must have all the modern conveniences, and up-to-date furniture. In the brood chamber there are movable frames into which the bees build the combs where the young are reared. With the introduction of these movable frames by Langstroth, fifty years ago, a new era in bee culture began. The furniture of the second-story rooms

consists of rows of little section boxes, empty at first, but ready to be stored with comb honey. When nectar is plentiful and the brood-chambers are full to overflowing with honey, the workers are quick to take the hint and begin to store their surplus in the section boxes.

You will notice that there is just one entrance to the hive. This front door is sacred to the occupants. When going among his hives, the bee-keeper who knows his place keeps to the rear. If you respect their privacy to this extent, the bees will come out in front, rise, and sail off above your head without taking the slightest notice of you.

**WHAT GOES ON IN THE BROOD CHAMBER?**

Bees are the most public-spirited of creatures. They devote their time to the service of their colony. Their industries are all directed towards one end: the increase of the number of bees in the world. When the hive gets too full of bees, the colony divides and a "swarm" is the result. Thus two colonies are established where there was but one, and the number of individuals goes on increasing twice as fast.

The honey bee, like its wild cousin the bumble bee, passes through four changes of form during its development. These are the *egg*, the *larva*, the *pupa*, and the *adult*. The queen is no ruler, but she is the mother-bee, and upon her depends the future of the bee colony. Dealers in bees rear some of her young before selling each queen, in order to be sure that she has mated with a pure-blooded drone. These are called tested queens. Their progeny can be depended upon to possess the good qualities of both parents. If the eggs of fine Italian queens develop into nervous, lazy, black-coated, and black-tempered workers, you may safely say, "They take after their father's family." The egg-laying begins in the spring and at the height of honey harvest the queen bee may lay as many as three thousand eggs every day. She hurries over the open comb inserting her body into the empty cells, and leaves an egg stuck fast at the bottom of each.

The worker bees grow from egg to maturity in small, hexagonal, or worker cells. Three or four days in the egg, six days as a footless grub or larva floating serenely in a tiny well of liquid food supplied her by the nurse bees, twelve days wrapped in a silk coverlet of her own spinning, the young worker bee passes through her four stages of growth. At the end of her three weeks some inner impulse tells her to be up and doing, and she obeys the stern call. She cuts a hole in the cap of her cell, sheds her skin for the last time (she did this five or six times during the larval or growing stage), and comes forth. It takes her about one day to dry her "feathers," adjust herself to her environment, and "get busy." She finds many little open wells of unsealed honey, and as nobody pays any attention to her she drinks her fill. A round of duties await her, and she goes at them without being told how. She must do nursing, comb-building, cell-capping, and general housework, and all without the least training. After about a week of this, the young worker goes out to play, and then to work. She is young, inexperienced, and self-conceited, and tries to call attention to herself like any vain young miss. When she brings in her first load of pollen she fairly swaggers with

importance. Mr. Root says, "Her first load of pollen is just what the first pair of pants is to a boy baby."

When a bee is a month old, she is in the prime of life. Three or four months of hard work in summer means old age for the workers, but in the bee colony there is no such thing as an old ladies' home. With their wings worn to stumps, their once velvety backs rubbed shiny, they may be seen creeping away from the hive to die, having given their very lives in willing and faithful service of the commonwealth.

Of the unexplained wonders of the development of queens and drones, the mystery of the laying workers, and the other many and varied activities of the hive, we cannot tell much in detail here. Your own book on bee-keeping and larger books of reference will be mines of information. But there are undiscovered North Poles in the bee world, and the young bee-keepers of to-day may be the Greeleys and the Pearys and the Shackletons of this new-old science.

#### SWARMING

Did you ever wonder why bees swarm? They have no regular dates for doing things. Although they have been known to swarm in May, and even in April, you are not likely to get a swarm before June. Early swarms are the most valuable, therefore you should be ready, for bees are like time and tide. Have the hive fitted with frames and keep it in a cool place. Bees swarm to increase the number of colonies. The date of swarming depends on local conditions and nobody can tell but the bees themselves, and they won't, what these conditions are exactly. If there are too many bees, too much honey stored, thousands of workers hatching daily, many young queens ready to emerge, the bees are likely to swarm. The bee-keeper is on the lookout after he knows the signs and can guess pretty shrewdly whether the swarm will be out in a few days or later. He gets his apparatus together and his hives ready. Bees often "hang out" on the outside of the hive, and we used to think that was a "sure sign," but it often fails.

It is the old queen that leaves the hive, but the bees that go out with her are a mixture of young and old ones. No one knows how the decision is made as to who shall go and who shall stay behind, but there is never any indecision in the community that we can reckon with.

Some hot Sunday you will be roused from your book by the excited cry: "The bees! Look, there they go! The air's full of them. They're swarming. I'll bet they get away. No, they're settling." Meantime, if you are the boy who owns the bees, you are getting ready to hive your first swarm.

It's no joke, for thrills will be chasing up your spine, and if you didn't have so much to do you would be as excited as the rest. But success may depend on your keeping cool. You have probably already instructed the family in modern methods so that no one will be raising a din by beating an old wash boiler, etc. If you have a garden hose handy, let some one play a fine spray on the whirling bees. Nothing brings them to time more quickly. When the bees have settled, place the hive conveniently near them, with a sheet or hive cover in front. Cut the branch on which the bees are clustered and shake them off into or in front of the hive. If well disposed they will go in promptly.

If high trees and no shrubbery is the rule in the vicinity of your hives, you will probably need your long-handled swarm-catcher. Or you will very soon begin the practice of clipping the wings of your queens. When the clipped queen brings out a swarm she hops about near the hive. She may climb into a shrub if one is near by. Why not provide her with a still more convenient forked stick as some bee-keepers do? She climbs up this, calls her family together, and you do the rest. You may prefer to capture the queen in your little queen trap, and place her at the entrance to a new hive which you should place on the stand where the old hive was. The bees will return to their old location when they discover that the queen is not with them. The new hive will receive them and the queen when released will go in with her family. If the bees refuse to stay in the new hive, it may be because the hive is too hot. Prop up both hive and cover to allow extra ventilation.

#### MAKING APPARATUS

While I do not advise any amateur bee-keeper to try to construct his own hives and frames, I do think it is a fine idea to begin right away to study how to improve the appliances now in use. You will have to discard many of your own ideas as useless when you come to try to apply them to practical use. There are lots of patented appliances for sale that make an experienced bee-keeper smile. He undoubtedly knows a clever boy at home who can rig up a home-made contraption that will cost nothing at all, and

do the work better than the expensive tool. A boy that keeps bees will find a knowledge of tools and wood-working of great advantage to him, and a girl's deft fingers will know how to put materials together that a professional would never think of.

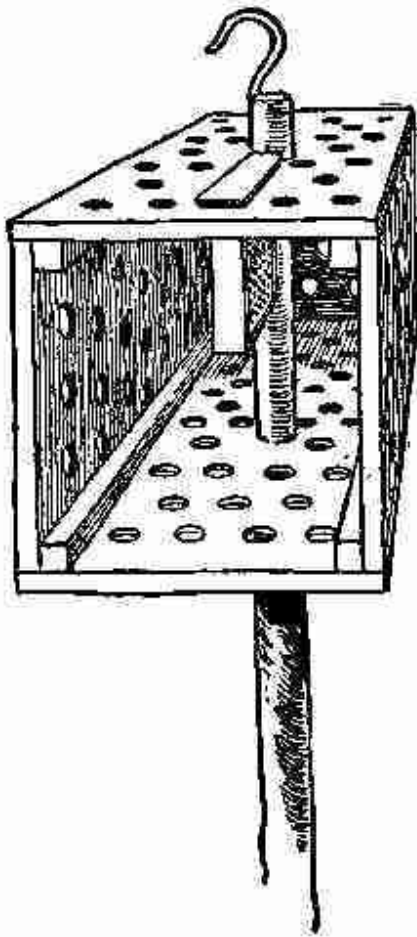
In this connection I will here describe a swarm-catcher, devised by a practical bee-keeper many years ago and recommended by an expert in Apiculture of the United States Department of Agriculture. The construction is so simple that I believe I could make one myself! Though home-made, it is interesting to see how thoroughly scientific are the essential features of this device, all based on a knowledge of bee instincts.

This description is adapted from an article by Dr. B. N. Gates in one of the annual reports of the Maryland Bee-Keepers' Association. The accompanying drawing was made from a picture of the swarm-catcher in the same report. The apparatus consists of a box with one end open and supported on a pole. The materials required are nails, a large wire hook, some thin boards, and two or three poles of different lengths. A saw, a bit and brace, and a hammer are the only tools required for making it.

It is bee nature to try to get into some small hole. To take advantage of this instinct the five sides of the swarm-catcher are perforated with holes about one half an inch in diameter. While the framework of the box should be light, it should also be strong and the materials good so that the swarm-catcher will last for years.

A convenient size has been found to be eight by eight by sixteen. A hole to fit the size of the poles should be bored in the centre of the top and one at the bottom. The big wire hook should be screwed into the top far enough from the centre so that it will not be interfered with by the projecting end of the pole. A slot should be cut lengthwise of the top, sufficiently large to allow a frame of honey-comb to be put in so that it hangs down inside to attract the bees. This honey bait is essential to the successful working of the swarm-catcher. You can devise other ways of suspending it to the top inside of the box. It is thought that a coat of green paint on the outside and one of black on the inside induces the bees to enter the box more readily.

A swarm-catcher like this cuts out all the loss of time and danger of losing a valuable swarm of bees while preparations to hive them are going on. And you can practically catch a swarm anywhere with this device. If they light



**Swarm-catcher that works like magic. Any handy boy can make it**

on a stone wall, a tree trunk, or on the ground, you simply brush a pint or so of them into the box, stick the sharp lower end of the pole into the ground near by, and go off and leave them to go in at their leisure. A whiff or so of smoke is needed when you first go up before beginning to wield the brush.

For swarms hanging in the ordinary way from limbs of trees or vines, while the bees are clustering, take a frame from one of the hives and hang it in the swarm-catcher. It is best to take a comb containing developing brood and some honey. This forms a well-nigh irresistible lure for the swarming bees. One look at the pendant mass of bees will tell you what length of pole you need in the box. Put on your veil and gloves and hoist the box up into the tree. Put the open end of the box up against the mass of bees and get as many of them into it or onto it as possible. Catch the branch with the hook on the box and give it a vigorous shaking. This unsettles the rest of the bees and they will be attracted instinctively to follow the rest

into the box where the brood cells are. Once the bees are safely clustered in and on the box there is no rush about hiving them. They are safe to be left hanging by the hook within ten feet or so of their original clustering place or with the pole stuck in the ground near by. They are secure there for hours, even for days, but one usually has time to hive them the same day. The swarm should not be left in the hot sun.

Hiving is done in the usual way. After the hive is prepared with combs or foundation, shake the bees from the swarm-catcher either into or in front of the hive. With large swarms it is advisable to prop the hive body up slightly

from the bottom board to enlarge the entrance. The "marching in" is a wonderful sight.

An established colony of bees cannot be moved five feet without causing them confusion. Before the newly hived bees have had time to locate themselves and set to work at honey gathering, the hive should be moved to its permanent location. It is not safe to delay longer than twilight of the day they are hived. When once they get a location fixed they return to it and are lost.

If they refuse to be reconciled in a new hive, put in a frame of young brood from some other hive and try them again. They seldom desert an obvious duty like the caring for young.

#### **OPENING THE HIVE**

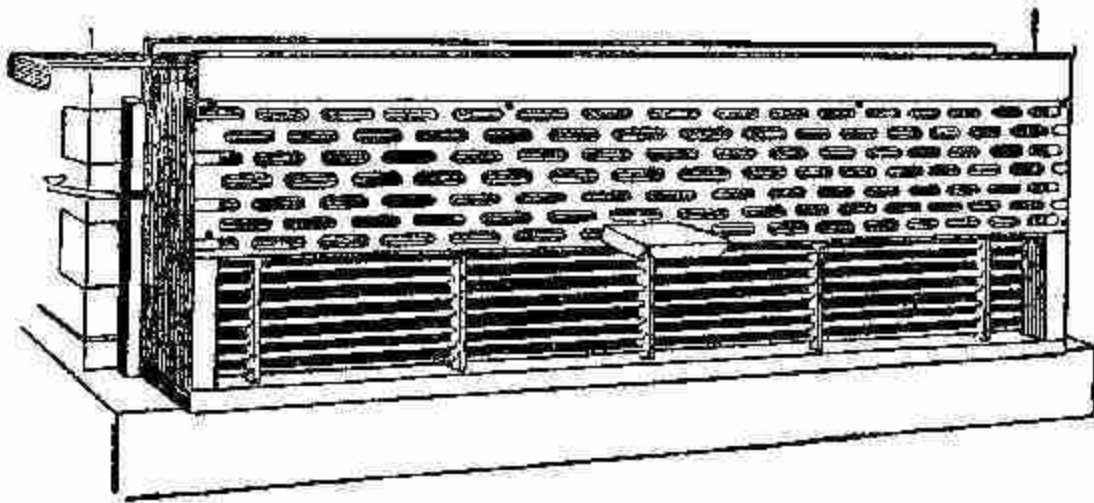
The modern art of bee-keeping was made possible by the invention of the hive with movable frames. Some of the many reasons for opening the hive are:

1. To take off honey.
2. To see if enough honey has been stored for winter.
3. To find the queen.
4. To introduce a new queen.
5. To examine the brood.

Before opening the hive know just what you are going to look for. Get the smoker well going; shavings, punk, excelsior, or chips crowded in make a good smudge; you want much smoke and little fire. Put on your bee veil. For a greeting, blow a little smoke in at the entrance of the hive you are going to open. Loosen the cover which you will find to be glued tight with propolis by the bees. A dull putty knife or screw-driver is a good tool for this job. As fast as you unseal the cracks, blow smoke into them. At this juncture it is well to close the hive for a few minutes to give the bees time to "think it over." The better the grade of bees the less smoke is required. Take your time. Keep your nerve steady and the smoker handy. Loosen the frames and take them out one by one. In order to see what is going on in the frames you must clear off the bees. Do this in such a way that you will not

endanger the queen if she should be on the frame. Poke the bees off so that they fall bewildered back into the hive. Set the frame down against the outside of the hive and take out another.

There are cells of three sizes in the brood combs. Queen cells are large, standing out from the surface of the comb quite prominently. The drone and worker closely resemble one another, but the drone cells are the larger. Honey is stored in both drone and worker cells. If you wish to destroy the queen cells to prevent swarming you will find it a ticklish job, even with a sharp, slender knife, not to ruin a lot of comb.



**Drone and queen trap at hive entrance**

It is often important to locate the queen. If you wish to clip her wings, find her you must. She is usually near the middle of the hive, surrounded by her court, a rosette of workers. She is quite different in shape from the workers. It is well to study her picture before going to look for her. A queen's wings are not much to cut, but you will need a steady nerve if you do it free hand. Many devices are to be had to make the operation less difficult and to insure safety to the rest of the queen. The danger is all to her, for although she is armed she will not sting you. She reserves her sting for some rival in her own class.

Harvesting any crop has interesting features, but nothing has the peculiar charm of taking off honey. Loosen the cover, puff in a little smoke, lift the

cover, then the whole super off. Put on a new super and replace the cover. Have your bee brush ready and as you lift the fitted sections out of the super, brush the bees that cling to them down to the entrance to the hive. This is the old way and is fraught with dangers. Moreover, the bees may regard one robbery as sufficient excuse for another. Robbery is a serious matter in the apiary. The modern way is to use the Porter bee-escape. This device obviates all the difficulties and once you have "got the hang of it," you will have no further trouble getting honey from your hives.

#### **STINGS: PREVENTION AND CURE**

The bee mittens, the veil, and the smoker are all preventive measures. A good deal depends on the way you behave when working with bees. If you are nervous and anxious you probably will act that way and the bees have a way of understanding and are likely to find you.

Remove the sting by a scraping motion with a knife blade or some hive tool you happen to have handy. If you use the thumb and finger you squeeze the tiny bulb at the outer end of the sting, and inject the poison into your blood.

Experts have little or no faith in cures which are rubbed on. They underestimate the comfort one gets "doing something" for a spot that hurts so mighty bad. So go ahead and put on alcohol or baking soda or ammonia; you can't do a bit of harm that way. In the meantime nature is busy neutralizing the acid the bee punished you with.

Mrs. Comstock, in "How to Keep Bees," gives these maxims for opening the hive:

Have the smoker ready to give forth a good volume of smoke.

Use the smoker to scare the bees rather than to punish them.

Do not stand in front of the hive lest the bees passing out and in take umbrage.

Be careful not to drop any implements with which you are working; take hold of all things firmly.

Move steadily and not nervously.

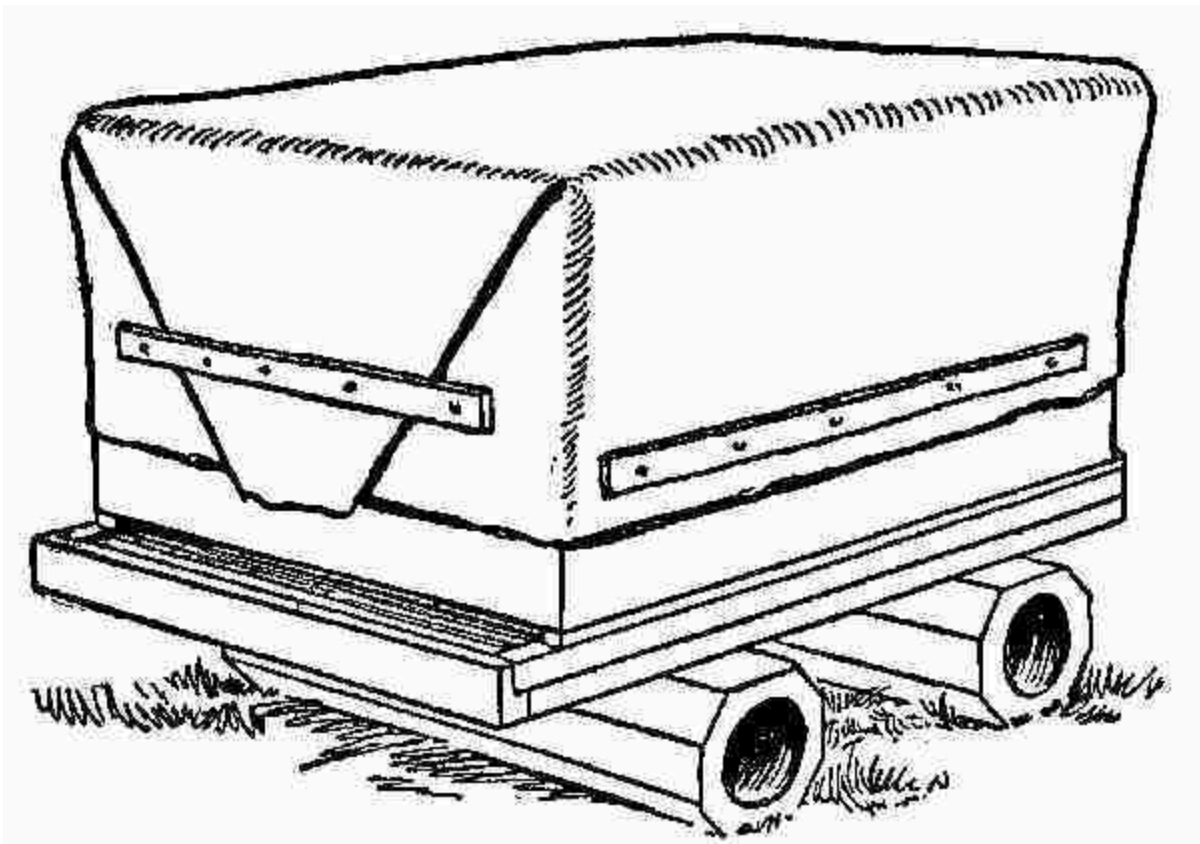
Do not run if frightened, for the bees understand what running away means as well as you do.

If the bees attack you, move slowly away, smoking them off as you go.

If a bee annoys you by her threatening attitude for some time, kill her ruthlessly.

#### WINTERING

Before buying your hives you must decide where your bees are to winter. If you have a suitable shelter you can use the ordinary hives; but if your bees are to winter outside, you may decide that you want the great chaff-packed, double hives. As the summer wanes every hive must be examined to make sure that the colony is strong and that the supply of honey is not short. If the season has been a bad one for flowers, or if the region provides few blossoming fields it may be necessary to feed the bees. Special directions are needed and any bee book will supply them. A strong swarm, supplied with twenty-five pounds to thirty-five pounds of honey, will winter without serious loss in a chaff hive. Other protection than that afforded by a good windbreak is unnecessary. In our furnace-heated houses no part of the cellar is cool enough all the time for the bees. The temperature should not go above forty-eight degrees Fahr., nor below forty degrees; forty-three degrees is considered just right. Sudden changes are bad for bees.



**Beehive covered with newspapers and waterproof paper for wintering outdoors**

Many experienced bee-keepers winter their colonies successfully outdoors with home-made protection. The ordinary hives, with the covers on but with the supers off, of course, are put into winter quarters in this way: Fold seven or eight thicknesses of newspaper over the top of the cover and sides. Make a neat job of this as if you intended to send the box by mail. Use a few tacks if needed. Over this fold a large piece of tar or other waterproof paper. There is a right way to fold the ends of this outer wrapper, and a wrong way. The illustration shows the right way. If the paper is brought down from the top first and round the ends from the sides over that (the wrong way), pockets will be formed which hold snow and water. Nail thin pieces of wood on to hold the folds securely. The entrance to the hive should not be closed as bees come out more or less on warm days in winter. Be sure that the entrance is always free from dead bees.

Another way to protect hives from the cold when wintering outside is to construct a packing case three and a half inches bigger in all dimensions than the hive. Set one of these down over each hive and pack the space between hive and case with any kind of dry packing material, such as shavings, sawdust, cork chips, dry leaves. Any of these materials used wet would do more harm than good. Some sort of shelf or projection should be so placed over the entrance as to keep it open as with other forms of winter protection.

### FEEDING

In the spring, bees need water. If the tree blossoms are late in coming out, sirup is often fed to the bees to give them a start. Patented feeding devices are not necessary. A flat tin pan works admirably. The best sirup for all purposes is plain granulated sugar and water, made cold. Stir in all the sugar that the water will hold. Fill the feeding pan with excelsior first, then sirup, and place it in the super. Little ladders leading up to the top of the pan will help the bees get at the sirup.

Feeding is also practised in the fall if the amount of stored honey is short. The feeding of honey is likely to start the bees to robbing. Under no circumstances should "market" honey be fed to bees. Diseases are transmitted by this practice.

#### PLANTS THAT FURNISH HONEY OR POLLEN OR BOTH

gill-over-the-ground	elm	}
shadbush	maple	}
tulip tree	dandelion	} spring.
willow	hawthorn	}
grape	red bud	}
sorrel	fruit trees	}
clovers (cultivated)	fig-wort	}
alfalfa	locust	}
wild sweet clover	basswood	}
raspberry	catnip	} summer.
bee-balm	horse mint	}
blueberry	mustard	}

chestnut	sage	}
corn	sumach	}
buckwheat	smartweed	}
spider flower	milk-weed	}
sunflowers	golden-rod	} fall.
fireweed	aster	}
	rape	}

### THE PRODUCTS OF THE HIVE

Besides honey, bees make use of wax to construct combs, bee-bread for larvæ food, and propolis for glue. If you think the bees gather honey from the flowers you are greatly mistaken. Nobody knows yet quite how honey is made. Chemists say that it has in it water, grape sugar, a little formic acid, some mineral matter, albuminoids, and essential oils. But this list leaves us little the wiser. No chemist has been able to combine these materials into honey. The nectar gathered by bees passes directly into a receptacle, the honey-sack or honey-stomach, which is used for that purpose only. It does not go the same road as the bee's food. The notion that bees swallow the nectar and then unswallow it is as erroneous as it is unappetizing. The flavour, body, and colour of honey depend on the source of the nectar, the age, the amount of chemical change wrought by the bees, and the completeness of the ripening process which goes on in the hive before the cells are capped. Honey is a very wholesome sweet, far more easily digested than cane or grape sugar.

If the making of honey is mysterious, what can we say of wax production? In the height of the honey season we can watch the bees making wax through a glass-sided hive. Mrs. Comstock says: "A certain number of self-elected citizens gorge themselves with honey and hang up in chains or curtains, each bee clinging by her front feet to the hind feet of the one above her, like Japanese acrobats; and there they remain sometimes for two days until the wax scales appear pushed out from every pocket." Sometimes a honey-and pollen-laden bee will come home from pasture with flakes of wax exuding from the wax plates on her abdomen. But this happens only when wax is needed for comb making. At other times no amount of honey

gorging will produce a scrap of wax. Does this not hint at mystery and something higher than mere intelligence?

You would think in such a perfectly organized community there would be something like specialization. Such appears not to be the case. All the workers seem to do all the different kinds of things. Let us say a bee goes out and gets a load of honey the first thing in the morning. When she comes in she goes to the comb to deposit her honey, then to the brood cells where she combs the pollen off her legs into a cell where it is stored to feed the young bees later. Perhaps she sees in passing some cells which need capping, does that, then away to gorge herself with honey and make wax, then builds her own or her neighbour's wax onto the comb. If the day is hot it may occur to her and a thousand others to construct a living fan and keep the air stirring inside the hive by waving their wings. In a system like this there is no resting, no play, no shirking, no specializing. There is always work to do and always somebody doing it with a will in the perfect socialism.

Many boys and girls of these days are fortunate in having had at school an observation hive. No bee-keeper will be long without one if he has any curiosity about what is going on in the dark hive, or if he is ambitious to solve some of the mysteries. An ordinary hive can be made into a good observation hive by putting a pane of glass in the sides and top. There should be hinged doors to fit tightly over the glass. A two-frame hive devised by Prof. V. L. Kellogg has both sides of glass so that the whole domestic economy of the bee family can readily be observed.

#### **DISEASES AND ENEMIES**

You will not be in the bee business long before you learn that bees have diseases and enemies. In fact, it is better to face that fact at the beginning and learn how to recognize and combat the troubles. Carelessness along this line is inexcusable and will surely cause failure. Several states have official inspectors whose business it is to know bee diseases and methods of controlling them. He is required to inspect apiaries where diseases are suspected, and the best thing to do is to interest him in your work and get all the help from him you can. An ounce of prevention will save a pound of cure, every time.

If there is a Bee-Keepers' Association in your county, by all means join it and help make it a live, active organization. The United States Department of Agriculture can give you much needed information as to who the men are in your locality who are officers in the associations and official inspectors.

### **MARKETING HONEY**

The best honey market is the home market as I have said. You may have to work up a demand in your neighbourhood and there are many ways to do this which ingenious boys and girls will devise. Most of us, if we can afford to use honey at all, know it only as a "spread" for hot biscuits or griddle cakes. But not every one knows that honey is a very much more wholesome sweet than cane sugar. Many people cannot eat sugar at all, but find honey does not cause indigestion. If you could persuade your neighbours to buy your honey for their children instead of candy, "all-day-suckers" coloured with cheap dyes, and sirups made of nobody knows what, you would be doing something worth while.

Honey is used in cooking too, in many ways. Get your mother or sister interested in trying some receipts in which honey takes the place of sugar. If you make a success of this you can get other people to making honey cakes, thus creating a demand for your product.

One enterprising chap made a great success by first going from house to house and giving away samples of his honey. He also left a self-addressed postal card with prices and order blank printed on one side, and nine out of ten of the people he called on sent orders. It seemed a pity to waste a good postal card and everybody likes to help a bright boy along; and beside they wanted the honey! It might be well to have a little pamphlet telling about your honey and of the many uses it may be put to, with a receipt for honey cake, perhaps. You will get a reputation, if you try, for pure products, neat packages and courteous dealings. As your output increases from year to year your market will grow, until you, like the boy we mentioned at the beginning of this chapter, have a business worth at least a thousand dollars.

### **MY EXPERIENCE WITH HONEY BEES**

It was just by chance that I ever got started in keeping bees. There were several boys about my size in the neighbourhood at my home and we used to go swimming and play ball together. One fine spring day a few of us

were walking down the road toward the swimming pool when we found a swarm of bees on a fence post. One of the fellows knew how to hive the swarm, so we got a box from the store and watched while he got the bees into it. It was the first time that I had seen a swarm hived and the performance proved very interesting to me.

I bought that swarm in the old box for seventy-five cents, very well satisfied with the bargain, for of course the box would be full of honey in a short time!

The colony was placed upon a bench in the front yard. One night the old bull got out and upset the bench. The bees were ready to sting anything next day. I bundled up until I was sting proof and then got them straightened up. The combs were broken which gave the bees a setback from which they did not recover. I did not get any honey from them and they died out in the winter.

An old bee-keeper who lived near us gave me two swarms the next spring. One of them left the hive and flew to the woods and the other was weak and died. It began to seem as though bees were hard to keep. I got a book called "A B C of Bee Culture," and read it. I soon learned that bees should be kept in movable frame hives so they could be easily handled.

I had no bees now, but, although we were laughed at, my father and I entered into a partnership. He furnished the hives and implements and I furnished the bees and labour. We were to divide profits equally. We bought two hives, a smoker, and a bee veil. I caught one swarm in the woods and bought another. They were both late swarms and died in the winter.

Success was still far off and things did not look very bright, but I had learned how not to do lots of things. The two hives we had were not the best, so we sold them and bought five of a different kind for the next spring. The outlay was large and no profits, but I was determined to succeed.

In the spring I caught a swarm early in the season and it made a few pounds of surplus honey which we used at home. During the latter part of August my chum and I were out squirrel hunting and he found a swarm that had built combs on the limb of a large tree. We got it into a hive and I bought his share of the swarm. This colony needed feeding, so I fed it on sugar and

water. Both colonies lived through the winter and made a strong start in the spring. Each gave a swarm and I caught both.

The book and the old bee-keeper taught me that Italian bees were better than the wild bees, so I invested in two Italian queens which I got by mail from a queen breeder. I killed the old queens in two of the colonies and introduced the new ones. They did some good work that summer and lived through the winter. The next spring I had two colonies of black or wild bees and two of Italians. The blacks together made about twenty pounds of surplus honey, while the two Italians made nearly two hundred pounds. This showed me that there was a great difference in bees. Each colony swarmed once, making eight in all.

We had now made a success and the business was on a good footing even after four years of failure. That last honey crop was worth about thirty dollars, and the bees and hives were worth about forty-five dollars. We were encouraged.

That fall I was sixteen years old and had decided to go to college. The president of the agricultural college in this state offered me a chance to work my way through college by taking charge of the bees on the college farm. I gladly accepted it and sold my bees at home.

Life at college was very different from home life, but the bees always furnished a source of pleasure and recreation during my spare moments on week days and on Saturdays. In the summer months I either worked with the government bee-men or for the college.

The bees have not only given me lots of pleasure, but they have made it possible for me to pay my entire tuition and expenses for five years at college. Besides studying and attending to my bees, I have had time for much other fun, and this year I made the 'varsity football team and played in every game.

Some people think that the honey is not worth the stings, but my advice is to get a colony and try your hand.

SYDNEY S. STABBLER

**HOW I EARNED TWO HUNDRED DOLLARS**

I had helped with the bees more or less all my life, so that I already knew how to handle them when my high school course was broken into by illness and I had an enforced vacation of one year and a half. I was able at this time to devote to the bees one full season, that is, from April through July.

My father allowed me the use of bees, hives, combs, etc., for queen rearing. The queens I sold for seventy-five cents and one dollar each, according to the grade. To my father I furnished one hundred queens at the reduced price of fifty cents each as rent for the bees, hives, etc. I had about ninety nuclei of two frames each. During the swarming season I used a good many natural cells from the better colonies. Later I used artificial, dipped cells which I made myself. In the latter case I took larvæ from the very best queens in the apiary and placed the cells in queenless colonies to be developed, or sometimes in colonies which were superseding their queens. When the cells were nearly ready to hatch they were placed in the nuclei where the young queens remained until they commenced laying, when they were ready for sale.

Altogether I made a little over one hundred dollars that season. I was then eighteen years old and determined to go to college. Two years later I began my studies at the University of California, working for my board in a private family and drawing from the one hundred dollars for incidentals. Clothing I had received at home and had made myself for the most part.

The San Francisco earthquake occurred on the eighteenth of April, in the spring of my freshman year, and college was closed immediately, so that I was able to enter again into the queen rearing business. That season I sent out advertising cards to the members of the California Bee-Keepers' Association and sold nearly all my queens to them. The financial result was nearly the same as for the former season.

So in all I made about two hundred dollars, which paid for the incidentals during three years of my college career which is as far as I have gone. By "incidentals" I mean books, paper, and such necessities, also subscriptions to the college daily paper, class and association dues, tickets to college jinks, theatricals, games, etc. I also spent a good deal for tickets to concerts, plays, etc., as that was my first opportunity to hear the great musicians and actors and I considered that a part of my education.

FLORA MCINTYRE

## PROFITS OF BEE-KEEPING

I have been asked to tell something of my early experiences as a bee-keeper, for boys and girls who may become interested in this very fascinating, and, I may say at the same time, profitable, pursuit.

I think it may be said of bee-keeping as sailors say of seafaring—once a bee-keeper always a bee-keeper.

I should like to tell you in a few words what can be expected from a dozen and a half hives of bees with an average of one and one half days a week spent in the apiary. I believe really, though, that when I began keeping bees it was not because I expected to make much money. The whole story of the bee life, as read from different books which I secured after becoming interested, was so wonderful and fascinating that I could hardly wait until spring so that I might study the two hives acquired through the winter. That first spring and summer there were only those old box hives, which could not be opened for inside study, and all observations had to be confined to watching the bees from the outside. The next summer some modern hives that could be taken apart and every nook and corner laid open to observation were bought. In the fall I was very fortunate in securing eighteen colonies of bees at an auction sale, paying therefor only fifty cents a colony, much to my satisfaction and my neighbours' amusement. Most of the hives were frame, but of an undesirable sort of frame. The next summer these colonies were transferred to up-to-date hives. That summer, and for the next succeeding six summers, these colonies did not fail to yield on an average about seventy dollars' worth of honey and wax. Counting out winter losses the number of colonies per year would average twelve, the number of pounds of honey about three hundred and seventy-five, worth twenty cents a pound. The bees received only a small part of my time each day.

Later, when a student at the Ohio State University, as manager of the apiary there, about the same results were obtained, so that an average of about five dollars a hive is a conservative estimate. If one begins in a small way, in a few years he should be able to manage one hundred colonies. But it should be remembered that the yield per hive may decrease somewhat as the number of colonies increases, because of the danger of launching in the business on a large scale. The best insurance against loss is a thorough

study and understanding of all the details by the practice of bee-keeping on a small scale for a term of years first.

I may say that the income from the bees aided not a little in helping me through college, and I may say, also, without exaggeration that this interest in bees by one enthusiastic student helped in no small degree toward the inauguration of a course in bee-keeping at our own Ohio State University. To make the story complete I think I should add that the writer of this article is at present engaged as assistant in apiculture, doing experimental work in apiculture in the government apiaries at Washington, D. C.

There is opportunity for those who wish to take up some problem relating to apiculture as a subject of investigation, and the agricultural colleges and experiment stations will no doubt in the future give more and more attention to the investigation of problems related to this interesting and profitable pursuit.

ARTHUR H. MCCRAY

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## VIII

### RAISING SILKWORMS

**A**LTHOUGH silkworms are not actually reared in the open air, there is so much outdoor work and moderate exercise connected with their care that the subject may properly be included in a book on outdoor work.

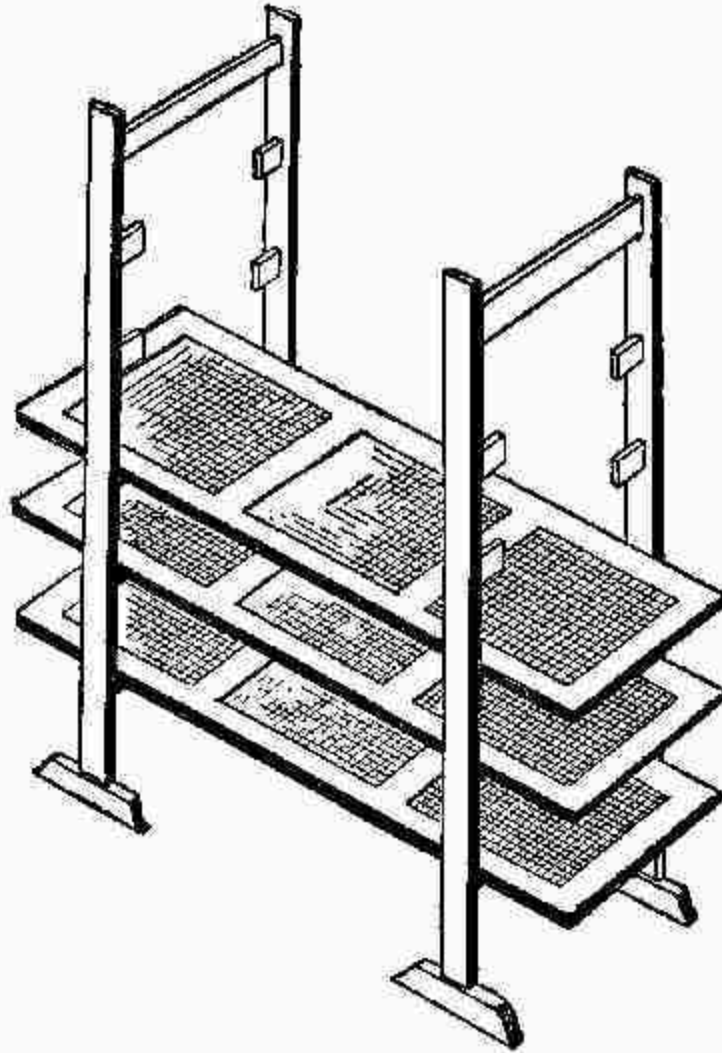
The best food for silkworms is the leaf of the white mulberry. If you have already a hedge of this or several trees you can begin at once. If not, several years must elapse while you raise your preliminary crop of mulberry trees from seeds or cuttings. It is useless to buy silkworm eggs if you have not the wherewithal to feed your infant caterpillars. You may not think of going into silkworm rearing in a commercial way but only as an interesting bit of nature study. Why not make up some neat attractive cases, each containing a little collection illustrating the four stages of the growth of this insect? Heat a few eggs to destroy life, then glue them to a card; preserve a caterpillar in a vial of alcohol; glue a cocoon to a card; pin and spread two of the moths, a male and a female, and pin them into the box. From such a box school children will get a far more definite idea of insect metamorphosis than they will ever get from a book on zoölogy. Such little collections ought to sell well in schools where nature study, zoölogy, or agriculture is taught.

The mulberry silkworm makes the best silk, although it is by no means the only silk-spinning insect. Every now and then we read of some one who is experimenting with the silk of our American or giant silkworms, the *Promethea* or the *Cecropia*, or with the silk spun by spiders. But none as yet compares with *Bombyx mori* in either quantity or quality of its product or in ease of rearing or in reeling of the silk.

The adult moth lays between three and seven hundred eggs during the first three days after she emerges from her cocoon. In a week or ten days she dies, her work finished. Moths in the wild state are at some pains to deposit their eggs on the favourite food plant of their young, but in the case of

*Bombyx mori* this instinct has been lost in the countless years of domestication. The eggs, when laid, are moist with a sort of glue which secures them to the surface upon which they are deposited. The winter is passed in the egg stage. A cool, dry place is safest for them, where no sudden changes of temperature are possible. A steady temperature of thirty-five degrees is ideal, and they must be enclosed in something that is mouse proof, though not air-tight. A perforated tin box is right for this purpose. Silkworm eggs for study may be obtained from dealers in miscellaneous insects, birds, animals, etc.

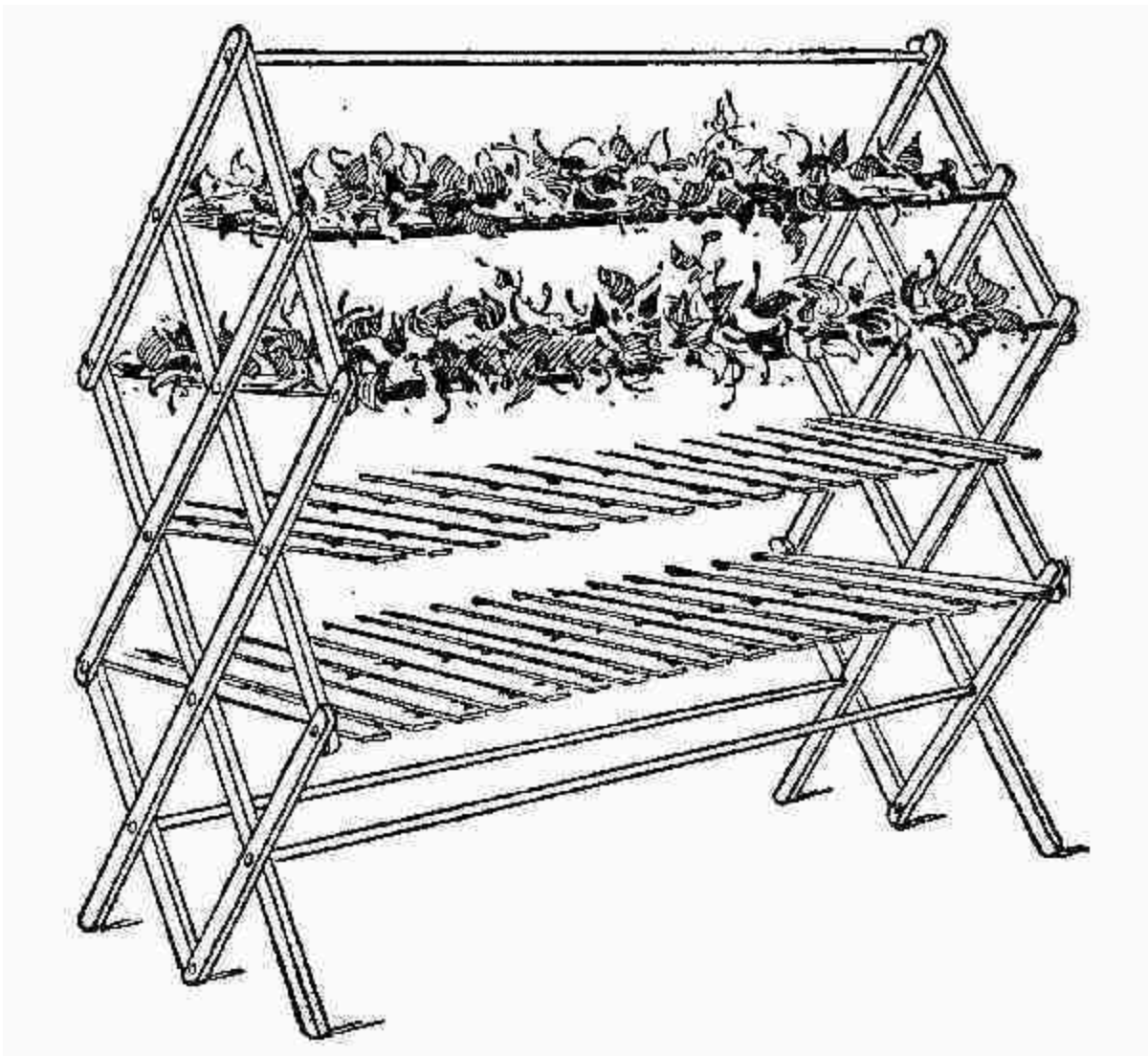
As spring approaches you must watch the mulberry leaves and make your preparations. Any room in which temperature and ventilation can be regulated will serve for rearing silkworms. You should have some racks made of lattice work, and shelves, open to the air, on which to place them. I have seen a clothes-horse, with racks resting upon the rungs, used for this. A supply of cheap wrapping paper or newspapers should be on hand to put on the shelves, and some coarse netting, the use of which will be described later. Do not make the mistake of getting too many eggs. An ounce does not seem like very much, but the well-grown worms from an ounce of eggs ought to have at least seventy-five square yards of shelf space. They will require during the first six days only eleven pounds of leaves, six meals a day, but during the eight days just before spinning they will require over half a ton of food. Imagine lugging in two hundred weight of fresh mulberry leaves five times a day to feed these ravenous things so dependent upon you!



**Movable frame and light shelves for feeding silkworms**

Warmth and moisture are required for hatching the eggs. As the spring advances and the mulberry shows signs of putting forth its leaves, the silkworm eggs should be spread thinly on sheets of paper on the shelves in a temperature of about fifty-five degrees Fahr. The temperature should be increased after three or four days and gradually raised to seventy-three degrees Fahr. Sprinkle the floor to make the air moist, but do not wet the eggs. At this temperature hatching will take place after about ten days' time. Watch the eggs. When they begin to whiten you must get to work, as the first worms will soon be out. Take two thicknesses of coarse tulle or bobinet cut the size of the racks. Chop some young, tender mulberry leaves very

fine. Scatter a thin layer of these bits over the cloth and lightly lay it over the hatching eggs. No sooner do the young silkworms become aware of the presence of their favourite vegetable than they make their way to it, coming up through the holes of the bobinet as easily as "rolling off a log." They are tiny creatures. Eight of them laid end to end would hardly measure an inch. As hatching usually takes place in the morning, by ten o'clock the worms will all have crawled through the netting to the leaves on the upper layer of the net. This can now be transferred to the rearing shelf. The netting should be kept well stretched, as the worms may be injured if buried down amongst the leaf bits. All through life silkworms must be handled with extreme care. If necessary to lift any individual from one shelf to another it should be done with tenderest touch. Rough treatment is fatal.



**A clothes-horse fitted with racks for feeding silkworms**

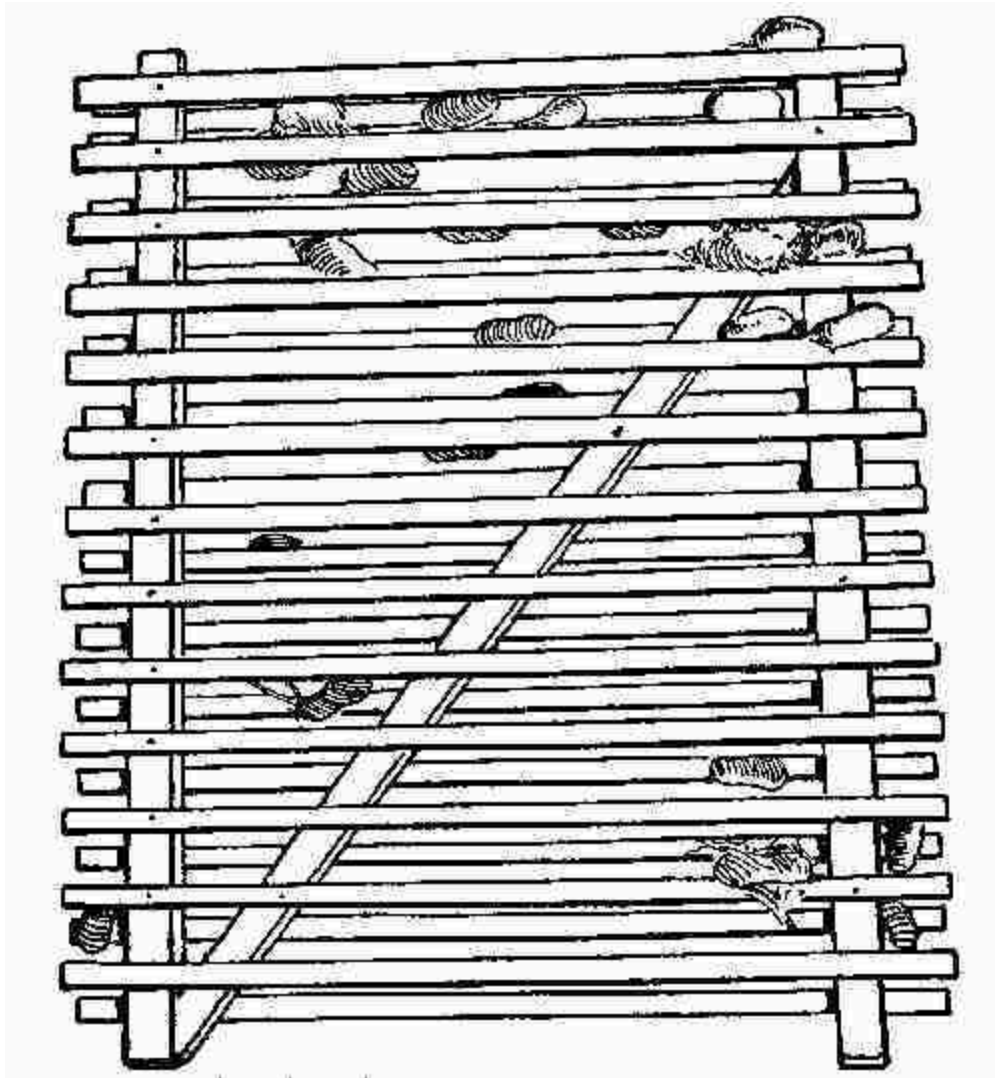
For young worms the newly opened leaves are the best. As they grow older their tastes change and the more mature leaves may be given. A quantity of leaves may be gathered at one time and kept fresh. The leaves themselves should never be put into water. Prepare the food by removing the foliage you intend to feed from the stems. Then chop or cut it into fine shreds. Six times a day a small quantity of the prepared leaf should be sprinkled lightly over the netting.

Like other caterpillars, silkworms shed their skins at certain intervals. The six-day period between hatching and the first moult is called "the first age." On the fourth day it is best to change the beds, as the droppings from the

worms and the litter of uneaten leaves are not healthy for the moulting caterpillars. Spread fresh leaves on nets and place over the worms in the evening. By morning all will be ready for the clean shelf and doubled space. As the sixth day approaches, the worms lose appetite and cease to move about. Finally the skin whitens, the head seems to grow larger, and each little creature pulls himself out of his old skin and finds himself clad in a new suit. I imagine he must feel very much as a boy does when on the first really warm day in April his mother allows him to shed his winter underwear, get his hair cut short, and wear his summer blouse and knickers.

The young worm, however, does not feel very lively at first. No food should be given for several hours. When signs of waking are evident, food should be given and the worms transferred to clean shelves by means of the nets. On the third day they should be changed to fresh papers. Four meals a day are needed by the caterpillars at this time. The second age is shorter than the first, being only four or five days. The skin now changes in colour from gray to yellowish white. After the second moult their food need not be cut much, but they require a lot of it, as they should double their size during the third age, which lasts six or seven days. If the weather is pretty warm their development is faster. They should never be crowded nor allowed to go hungry. Always change to clean shelves when the dead leaves and excrement become the least offensive. This odour, which you can escape by leaving the room, may be deadly to your pets. They are helpless to escape it, and are entirely at your mercy.

During the fourth age, *i. e.*, after the third moult, give more space and feed small branches with leaves on. Always remove every berry from the mulberry branches or the worms will eat them and be made sick. Their appetites are enormous, their growth rapid. Change the beds four times during this period of nine days.



**A rack or ladder for silkworms to spin on**

After the fourth moult the worms pass into the last age. Five or six days of voracious feeding brings them near that most dramatic event in their lives—the cocoon spinning. For three days, now, instead of eating steadily they wander aimlessly about, as if seeking they know not what; they wag their heads; they behave in an altogether restless and uncertain way. Is it some mortal ailment or mere "weakness of intellect?" You are expecting this and have prepared for it beforehand. They will not need to search long for a place to mount and spin in safety and security their cocoon of shining silvery silk. Farmers' Bulletin, No. 165, recommends the use of small, clean, leafless brush tied together into bundles and fastened between the shelves in rows a foot or so apart. Some use a sort of rack or ladder of

narrow strips of wood which should be placed upright on the shelf where the worms can easily find it. They spin between the slats. Any worms which seem not to be ready to spin with the others should be fed until they, too, feel the impulse to travel.

As the process of spinning takes some hours, there will be no difficulty in observing it from start to finish. You are entitled to this exhibition, for, without your constant care and feeding, these creatures would not have been able to develop. The dull, inactive silkworm has acquired wonderful agility, and without practice is able to weave himself into his sleeping bag with astonishing celerity, reeling out his twelve hundred or sixteen hundred yards of silk in one continuous thread. There are no knots or kinks in it. It is inaccurate as well as rather silly to refer to the cocoon as a shroud or burial casket, as some do. The creature inside is just as much alive as ever it was.

The cocoons with the live pupæ inside are called green cocoons. To prepare them for market they are usually subjected to heat either in the oven or by steaming. No water should touch the cocoons, neither should the oven be hot enough to brown them. After heating they should be dried in the sun or other heat. Open one when you think they may be dry; if they are, the pupæ inside can be rubbed into powder with the fingers. A good price per pound is paid for dried cocoons, but it takes five hundred or more to weigh a pound.

If you have never seen a moth emerge from its cocoon you should keep several of your cocoons. In eighteen or twenty days the moth comes out, usually in early morning. Invite your friends to have a look, too. Must the moth break the threads in getting out, or is the cocoon woven in a manner to provide a gateway when it shall be needed? How does the creature get out anyway, and what is it like when it first arrives in the open? Wonderful happenings must have been going on inside to make a winged moth out of that naked caterpillar. Something left in the cocoon rattles when you shake it. Examine the dried ball and you will recognize in it the cast-off clothes, hat, coat, socks, and boots that he had on when he shut himself in. There, too, is the brown shell he wore as a pupa. You may think you know these things by reading about them, but you do not, really. Hearsay is not the real thing in any realm of life, least of all in the realm of nature.

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## IX

# MAKING COLLECTIONS

### PLANTS

COLLECTING plants has always been an important feature of practical scientific work. Great sums of money and many years of time have been spent in searching through little-explored countries for new plants. Agents of many governments, representatives of great nursery companies of this and other countries are all the time looking, looking, often at the cost of the greatest hardship, for new plants. Why is this? Not as you will readily conclude, merely to add new specimens to museum collections, nor merely to find and name a new species, though some collectors are in the field for these purely scientific reasons. But our Department of Agriculture is on the lookout for new plants from foreign parts which will be commercially valuable to us. Our enterprising nurserymen are after the same game. At the present time very great interest is being taken in plants from western China, a vast and little-explored region. Strangely enough, the plants from that far away country seem to be peculiarly fitted to thrive here, and while the government and the nurserymen are telling the people about these new plants, the botanists are trying to discover the reasons why Asiatic plants fit our conditions better than the plants of Europe seem to.

The making of collections of plants, then, is a big, important work, and well worth the while of any boy or girl. If you would read stories of exciting adventures, narrow escapes, thrilling encounters amid romantic surroundings, read some of the accounts of scientific explorations. The collectors of plants and insects in the Philippines, Central Asia, little-known islands of the far East, and such "wild nations," must needs be men of valour, and to know any one of them is a liberal education.

Making a collection of plants is probably not the best way to arouse an interest in outdoor life. Indeed it was made such a deadly dull business for

me that my early interest was entirely "nipped in the bud" and lay dormant many, many years. Collecting is one of the recognized and useful ways of introducing ourselves to our neighbours of the vegetable kingdom. Living in a plant-infested world as we are elected to do, eating plants, wearing their products, utilizing them in all our arts, buying and selling them daily, unable to get through an hour of the day without being constantly reminded of our entire dependence upon the members of the vegetable kingdom, what is more natural than that we should wish to know them? To know their names is not the end and aim of plant study. The name is a convenient handle for a plant. It enables you to talk about the plant to others without the necessity of a lengthy description. It enables you to read understandingly what other students have said about the plant in books. It is only the beginning, like the introduction to a stranger. To make of a stranger a friend, you must know something of his family, of his relation to the rest of the world, how he lives, gets a living, how he makes use of his faculties, what are his peculiarities, his habits, his environment, in fact all about him. In discovering the name of a plant by use of a botanical key you learn a few but not all of these things.

As with some people so with some plants, the more you know of them the less you think of them; the less you wish to have to do with them. Take poison ivy for an example. Knowing its characteristics you pass it by without touching it. You observe it from afar off, so as to be able to warn others of its whereabouts. On the other hand, if you had only known well the giant puff-ball you so wantonly crushed under your heel, you might have enjoyed a delicious supper of creamed mushrooms.

Making a collection of plants is an extremely simple job. The materials needed are not expensive nor hard to get. Here is a list of what is required for a beginner's collection:

- (1) A dozen or so newspapers.
- (2) Driers, two or three dozen, 12 × 18 inches.
- (3) Two boards, 12 × 18 inches.
- (4) A stone of twenty to thirty pounds weight.
- (5) Mounting paper.
- (6) Genus covers.

Cut the newspapers into half sheets. Each specimen is to be placed in a folded piece of this. The driers may be cheap blotting paper or pieces of carpet felt, cut to the desired size.

Arrange a specimen just as it was taken from the ground, inside of one of the half pages of newspaper. While it is not desirable to put too much time on the arrangement of each specimen, it is as well to place it in a natural position and in such a way that the leaves will not lie all over each other and the flowers be crowded so that the appearance will be awkward. But do not overdo this: if a flower droops naturally, do not make it stick upright. With one of the boards as a foundation build your pile of pressing plants up as follows: Lay on two or more driers, then a folded newspaper holding a specimen, then a drier or two. (If the specimen is a juicy thing, several blotters are needed between it and the next one.) Now another specimen, a drier, a specimen, etc., until you are through with the day's collecting, or until the pile begins to topple. Finish with a drier, then put on the other board, and weight it with your big stone.

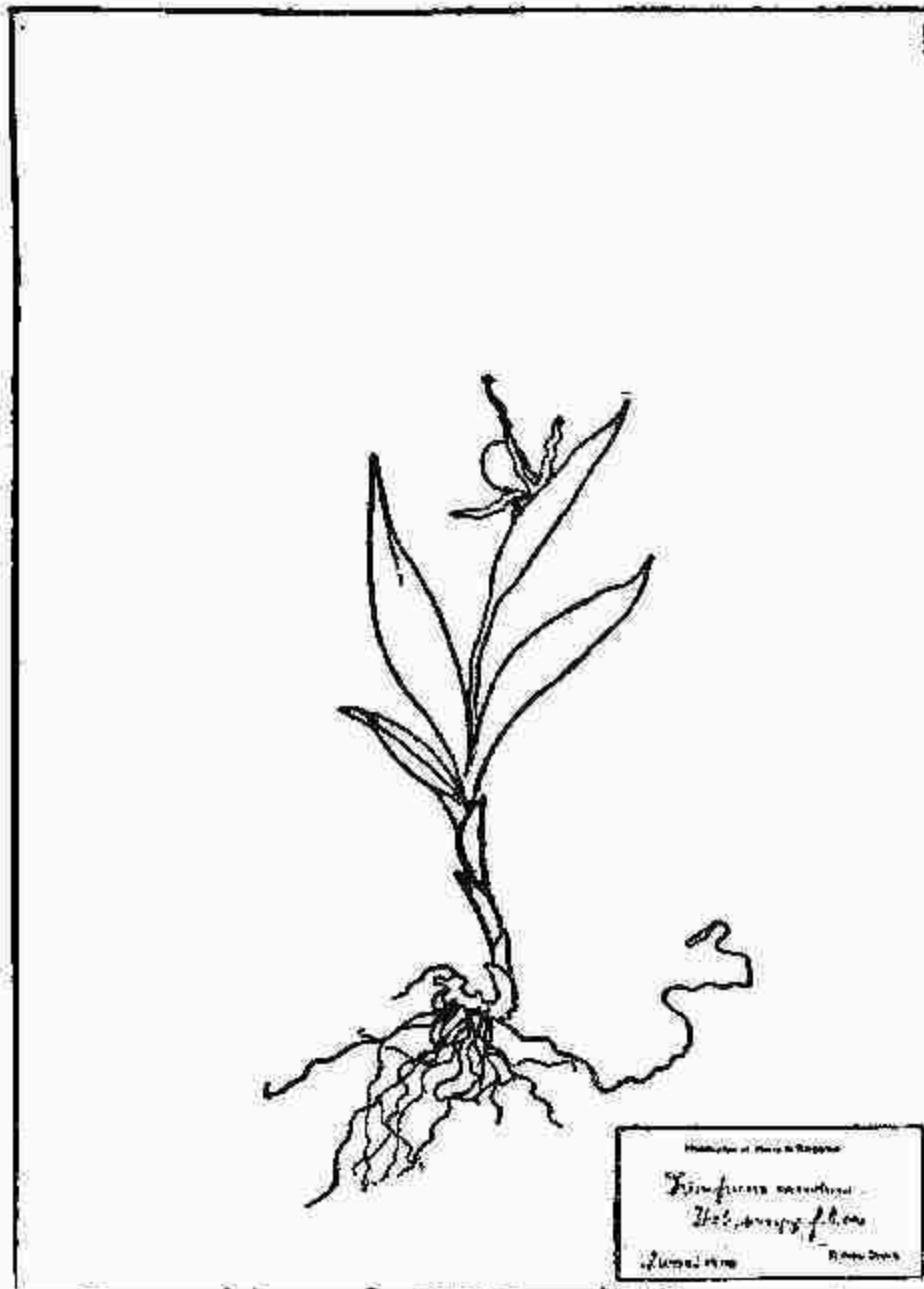
The driers must be changed every day. Do not disturb the specimens, but lift each folded newspaper from the old to the new pile, building up with fresh driers as before. In a week or ten days most plants will be thoroughly dry. If at all moist they are likely to mould after being mounted and your work will be spoiled. A dried specimen is brittle and needs careful handling.

Mounting paper, to be standard and uniform, should be white, plain paper of a very heavy quality. It costs a cent a sheet, size eleven and one half by sixteen and one fourth inches. No other size would be acceptable if you wish at some later time to donate your collection to the local museum or to sell it to some school.

There are several ways of fastening specimens to the sheet. Some like to use little strips of gummed paper or court-plaster, but old-fashioned glue is about the most satisfactory stuff. It is mussy to work with till you get your hand in, but it holds the plants fast to the sheet, and "that's the intintion." It is best to keep the specimens in the newspaper wrappers until you have a lot ready to mount. Then with a pot of glue, a dry cloth, a damp one, and a small brush you are ready for business. Lift the specimen from the newspaper and lay it first on the mounting sheet to get some idea beforehand of how you will place it. You may have to prune it some to get it

all on, but this is not likely as your drying sheets are the same size as your mounting paper. Having decided at what angle to place it, lay the specimen back on the newspaper upside down. With your brush wet, but not dripping, with glue, brush the stems, buds, leaves, and flowers lightly over the back. Lift it again, turning it over as you transfer it to the white sheet. With a light pressure make the parts fast and lay the sheet aside for the glue to dry.

Small specimens should occupy a place just a little below the centre of the sheet, and if more than one specimen is required to show all parts they may be arranged on the sheet as their various shapes and sizes look best.



**Plants should be mounted on paper  $16\frac{1}{4} \times 11\frac{1}{2}$  inches**

A few facts should accompany each plant to refresh your memory of that specimen when you come to study it later. These facts should have been recorded by you in whatever way you like and referred to the specimen by a number while in the press. Finally each mounted specimen should have its label, bearing the name of the plant, the collector's name, the date collected,

locality, and any useful information regarding it. Glue the label into the lower right-hand corner, which should always be reserved for that purpose.

These loose sheets, covered with mounted specimens, must not be allowed to lie in a shelf or drawer unprotected. Each group of them should be put into a folded sheet of manilla paper. Such a holder is called a "genus cover." Its size, folded, is eleven and three fourths by sixteen and one half inches.

This word "genus" suggests that in time the collector is going to be able so to classify his specimens that each genus cover may contain only plants so closely related one to another that they are of the same botanical genus. The beginner need not be seriously disturbed if there are many plants in his collection that he does not know the names of yet. The collection is for study or it is worth nothing. Knowing plants is more important than knowing names. You cannot handle plants much and observe them in their places without noticing how different they are. Then you begin to see that some are more like than others. This is the beginning of classification. You need not know even the common names of the plants to do this, although you will know some, of course. Professor Bailey says: "Learn first to classify plants; names will follow. Look for resemblances, and group plants round some well-known kind. Look for sunflower-like plants, lily-like, rose-like, mint-like, mustard-like, pea-like, carrot-like plants. These great groups are families."

After you have handled your common plants a good deal you will be surprised to find how easily you can guess at one's family, and guess right.

When you have reached this stage in your collecting you will feel that you need some book to guide you and act as a check on your studies. All the books mentioned in the lists in this book are useful for beginners. If you find a book which pretends to take the place of the plants themselves, you would better throw your money away than buy it. Instead of helping it will hinder your progress. You will find in beginners' botanies what is known as a "key." Now, a key is obviously to unlock something with. If you had a door key which turned with difficulty, or fitted the lock imperfectly you would be sure to have it repaired or get a more modern one. Some of the old botanical keys seem to be rusty and it is difficult to use them. Choose the key that works most easily.

In making a key for classifying plants one begins by dividing the whole vegetable kingdom into two big departments, thus:

A. Plants which never have flowers.

AA. Plants which do have flowers.

As your specimens are all of the flowering kind we shall for the present forget all about the others and begin to divide our big group AA into smaller groups. This is how it is done:

AA. Flowering plants.

B. Flowers not showy, seeds in cones (usually), leaves needle—or scale-like, evergreen (usually).

BB. Flowers showy, seeds not in cones, leaves of various shapes, deciduous (usually).

You will see that in dividing a group it is important that A is just the opposite of AA, and B is just the opposite of BB, and that the place to look for BB is just the same distance over from the margin of the page as B although it may not be on the same page, if there are a great many divisions under B. These little things make the key easier to use than the old-fashioned ones were. Some people still use botanical keys as mental gymnastics but I do not believe in that. After all you are studying plants not keys.

You will want to go back to the group we called A, for to the non-flowering plants belong the lovely ferns which must certainly grace your collection. This is a delightful group to study and it is possible with a reasonable amount of persistence and by exchanging with fern collectors in other parts of the country to get a very nearly if not quite, complete collection of native forms. Only one hundred and sixty-five of the four thousand species of ferns are native to the United States. Such a collection should be very valuable.

Some boys and girls lose interest in collecting plants after the first season, especially if they have done well the first year and secured most of the species in their locality. If the opportunity to collect elsewhere does not come the next spring there can be nothing more interesting than to try to get the same things you already have, but in some other stage of their growth.

For example: most collections will have several kinds of violets, blue, white and yellow, in all the beauty of their flowering. But whoever thought of getting one that showed the seed pods? What is a violet's seed pod like anyhow? Is the seed pod of the white one like that of the yellow? Are the seed pods of one plant all alike? When do the pods open and how? How do the seeds germinate and when? These and other questions are waiting to be answered by every plant in your collection. Would it not be fine to know the pure white trillium in midsummer when it has grown a leaf nearly a foot across and has a red fleshy seed case thrust up where it will be conspicuous? Some plants are far more showy in fruit than in flower and you will begin to see why these and other things are true as you carry on your studies throughout the year.

Many a teacher of botany is forced to depend upon pictures when she wishes to teach children to discriminate between two kinds of leaves, kinds of roots, kinds of stems, kinds of inflorescence. What a boon to those teachers would be a collection put up to illustrate the lessons as they came along! I wonder if there is not a market for such collections in schools where no herbariums are made or kept.

For little children, making blue prints is delightful occupation. I knew a child of four who learned to recognize the leaves of most of the common trees one spring by means of this work, and she did every bit of it alone. A small printing frame, blue print paper of the required size, and plenty of water is all that is required. A child soon learns to use good judgment in printing, exposing the frame just long enough to get a fine blue. The outline of the leaf comes out distinctly in white against a blue background. The prints should be thoroughly washed and may be dried on panes of glass.

The blue prints of leaves and of flowers do not show anything but the outlines, of course. Leaf prints of other kinds are made which bring out the veining as well. The outfit for this work is simple. Two print rollers, a pane of glass, and a tube of printers' ink, sheets of paper to print upon, and leaves. Put a small quantity of the ink on the clean glass, and work it into a thin film over the surface. Lay a leaf upon this film of ink and go over it with the inky roller. Transfer the leaf to a sheet of paper and cover with a second sheet. One whirl of the clean roller ought to give you the desired print. It is surprising how delicate and true these are and how perfectly they show the characteristic margin, indentations, venation, and even something

of the texture of each leaf. A little practice makes one able to make impressions which are like leaf shadows, so delicate and lace-like can these prints be made. It is an excellent way of fixing the leaf forms in the memory, as well as in the note-book.

In making a collection of plants the same "rules of the game" should hold good as in collecting insects and other natural objects. Take only what you need. Do not uproot and leave to die the near neighbours of the specimens you select. The taking of rare specimens is discouraged. I shall never forget the look of indignation our dear old professor gave an ambitious youth who had uprooted for his paltry collection every plant of a species of rare fern which the professor had been trying for years to re-establish in its old location. After all is said and done, a live plant is better than a dead one. This is all a part of the great spirit of conservation that has so taken possession of our people of late years. Out of these little acts of preserving our resources will grow a more beautiful America and a better appreciation of all things beautiful.

#### COLLECTING SEA-WEEDS

Every child ought to be familiar with that musical poem of Percival's beginning:

"Deep in the sea is a coral grove,  
Where the purple mullet and goldfish rove."

And then when the child grows bigger he should have an opportunity to go out in a glass-bottomed boat, at Santa Catalina Island or elsewhere, and see for himself that those "yellow and scarlet tufts of ocean," "bending like corn on the upland lea," are not pictures from a poet's dream, but beautiful realities.

Sea-weeds are exquisite things and few people can resist the temptation to collect them when spending a vacation at the beach. When going on a collecting trip for these it is well to take a net and two pails, one small enough to hold the smaller things and carried inside the larger. A heavy knife may be useful, too. The best time is after the spring-tides, because at the lowest ebb of the water one may find forms of great beauty and brighter colours than elsewhere. The rocks, the rubbish left by the tide, the pools, the piles, the sea-wall, the surface of the waves themselves, are all good places

to look for sea-weeds. They are fewer on sandy beaches than elsewhere. They vary in size from great, coarse, leathery rock-weeds to those so delicate as hardly to be seen at all.

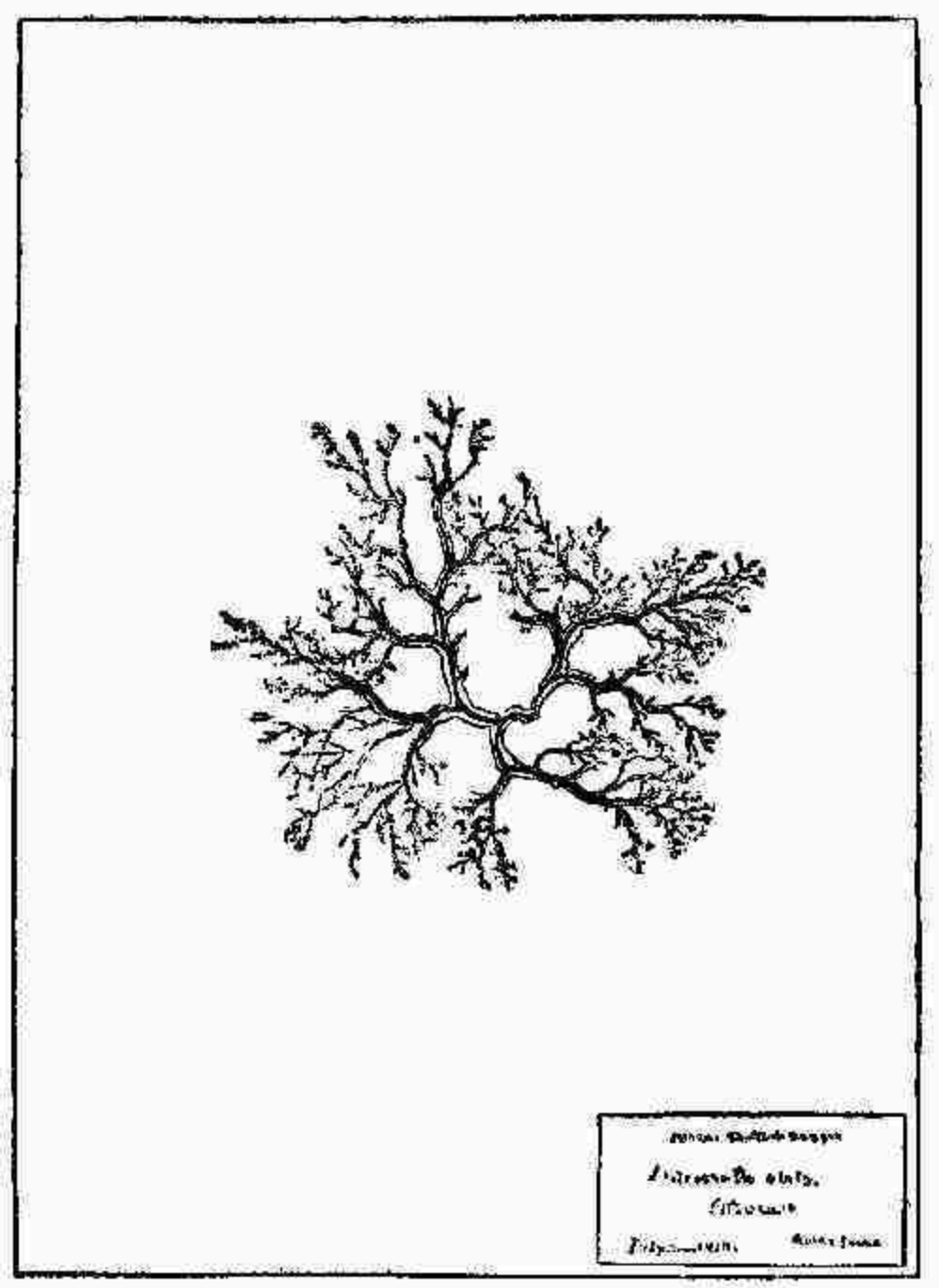
Sea-weeds are real plants, belonging to that great group of non-flowering plants mentioned before. They are called algæ. They do not have true stems and leaves, neither do they feed by means of roots. Many of them are so shaped that they appear to have stems, roots, and leaves, but as these parts do not do the work of true stems, roots, and leaves they are not classed as such. The root-like parts of a sea weed are usually simply hold-fasts, which anchor the plant to the rocks. Algæ which live in sea-water get their nourishment from the water which washes their entire surface.

When collecting algæ, every specimen which is intended for immediate mounting should be kept continuously in sea-water. This is what the pails are for. Every part of the plant should be taken, as the attachment to the rocks is as valuable as the rest. The knife is useful here, or a staff with a metal point, for scraping the weeds off the rocks.

The natural element of the sea plant is sea-water. Do not put your specimens into fresh water even to wash or rinse them, as they will lose some of their beauty. Unless dried soon after gathering they will decay and fade. In collecting, try and get plants of various sizes even though they look alike. The larger ones may be in the fruiting stage. Do your mounting out of doors if possible, where you can have all the basins of sea-water you want and need not be careful about spilling.

If your collection of sea weeds is for a regular herbarium you should by all means have mounting paper of the standard size and quality; heavy white, unruled paper, of a quality which will stand wetting without being spoiled, eleven and one half by sixteen and one fourth inches. If you are merely making a few souvenirs of your summer at the shore, your own taste is the only thing to be considered. You will require genus covers, labels, etc., just as for flowering plants. For the work of mounting you will want plenty of driers, some pieces of muslin the same size, sheets of standard size mounting paper as described above, a heavy needle fitted into a wooden handle, a pair of forceps, scissors, two smooth boards, and weights. For complete enjoyment of the work you will surely have a little magnifying

glass, for your pressed specimens will never be as beautiful as the fresh ones.



Sea weed mounted on paper of standard size

With several shallow dishes of sea-water within easy reach of your hands, and your pails of specimens floating in sea-water, you are ready to begin. Select your first specimen and lift it with care from the water. Dip it up and down gently in clean water. Every bit of matter that does not belong strictly to that plant must come off, and all the sand or other dirt. Let it spread out naturally in the water and with your scissors prune it to suit your purpose. Some grow in such a bunch that they will not show well on the paper, others may have to be trimmed to get them onto the page. Do not, of course, trim them down to look alike but preserve their peculiarities and characteristics. The great charm in a collection of this kind is in its variety. When the plant is absolutely clean, float it in a dish of clean water. This last dish should be a broad one for now you are to slip your sheet of mounting paper right into the water and get the plant onto it, floating it out in a natural attitude. This takes a knack, you may be sure, but the knack can be acquired with practice. If you can provide yourself with a pane of glass to lay the sheet upon when you take it from the water you will have the best conditions. Some people get along very well with a shallow plate. Some of the delicate parts will be certain to cling together as you lift them out of the water, but you can remedy that by dipping a few drops of water onto them and with your needle you can arrange them as you wish. Take your time. This is not a job for a person in a hurried mood. Examine and admire each piece as you work at it. Make it yours for all time, although you may sell it the following day and never see it again. Lay one of your driers on the lower board, put a mounted specimen all wet as it is, on this, then spread over the sheet a piece of muslin, lay on another drier, mount another seaweed, cover it with cloth and so on you may build up your pile. Top it with a drier, put on the second board, and your weight, of ten pounds or so. Coarse, thick algæ should not be pressed in the same pile with the fine ones as they would make the pressure uneven. Blotters and cloths must be changed every day at first, dried in the sun to be ready for the next day. After two or three days the cloths may be taken off, and the plants left in press at least a week longer, changing driers every day. If you can set aside a regular time each day for this job, it is not so likely to be forgotten. Moulding specimens are very disappointing.

After one has made a little collection of sea-weeds all the stories about the wonders of the deep will take on a reality. You will want to read all you can find about the Sargasso Sea, which sounds like a fairy story. Maybe you

have a specimen of this sea-weed in your collection, maybe you have been fortunate enough to sail through that "vast acreage of vegetation as large as the continent of Europe, lying southwest of the Azores!" Do you wonder that the first navigators, sailing uncharted seas, were alarmed by this vast expanse and thought of course there were concealed shallows beneath the feathery fronds of this gulf weed? You must read, too, of some of the giants of the sea-weed tribe; the "devil's apron," the "sea-otter's cabbage," with its air-vessel as big as a hogshead, and its stalk a slender cord hundreds of feet in length. These are all algæ, and so are the microscopic plants which produce that wonderful phosphorescence on the surface of the ocean. There are still unsolved mysteries about these plants and there is always a chance that the boys and girls who collect sea-weeds to-day on the beach may in the years to come read some of the secrets now hidden from all eyes. It is well worth while to keep such a big thought in mind even while doing the simple and easy work of mounting specimens.

#### COLLECTING SHELLS

Of all the kinds of collections of natural objects that I have seen, there is none that has quite so much beauty, in itself, as a collection of shells. How easily they can be displayed in a cabinet for our friends to enjoy, too, and they are never attacked, so far as I know, by what we call museum pests, those destructive little creatures which make life a burden to the owners of collections of insects, plants, stuffed birds, and the like. Perhaps the products of the sea possess an especial charm to the "landlubber," but most people admire shells and love to handle them and to wonder where they came from and what kind of creatures built them.

Did any one ever visit the shore and come home without a pocket bulging with shells? Or a big handful tied up in a grimy handkerchief? Probably that is the way most of the great collections in the country were begun. You can begin one this summer or any time that you visit a beach, and add to it daily if you are spending the summer on the shore. As your collection and your interest grow, you can exchange specimens common on your coast with collectors who live on the other oceans and the Gulf. Remember that every shell is rare until you get it in your cabinet and what is common as the sand on your coast may be a rarity in other parts of the world.

You will probably begin your collection by picking up empty shells of various sizes, colours and shapes. Sometimes you will find a pair still held together by the tough tendon that worked the hinge when the bivalve that built the shell was alive and going about his affairs. Many of these will be worn by their daily encounter with the tide, and some will be pierced with small round holes too neatly ground to have been made by accident. These holes give you a hint as to why this shell is empty for they are the work of a band of little pirates which live by boring into their neighbours and sucking their life-blood. Many of the dead shells are those of animals which live far out at sea or in the deep water and have been washed ashore when the tide was high. Search along the shore where the water has drifted a line of seawrack. It looks like rubbish at first glance but it is almost sure to hold many small shells you will want, some even from far-off coasts.

The collector will not long be satisfied to gather only such shells as he finds on the beach. His eyes are opened. What seemed to him at first a flat, smooth surface of sand strewn with bits of rubbish and a few shells, most of them not worth picking up, has awakened into life. Every pool has become as a village, its inhabitants engaged in a variety of occupations. The smooth sand is inhabited. The centre of population is down at the low-water line. The rocks, the bridge piers, the wharf piles, and the sea-walls are seen to be covered with living things. Now collecting begins in good earnest.

On the sandy beach one needs a net, a sieve, and a shovel. The best costume for such work is the same as that worn when bathing. You will need to be in the water part of the time and will not wish to be hampered by anxiety as to clothing. The best time to go is the time you can go, of course, but you are more likely to find a great variety of things at the very lowest tide. You have heard of planting "by the moon" and you are right in supposing that the moon has little influence on potatoes and cabbages. But to go collecting on the sea-shore "by the moon" is quite reasonable. When the moon is full and when it is new they have what are called spring tides at which times the ebb is lower than ordinarily. After a storm is a fine time to look for things which have been dragged by the force of the water from their anchorage in the depths, and tossed ashore.

When you arrive on the sand all will appear to be quiet. Your best plan is to sit still and wait for some signs of life. In a moment some clam may send a jet of water into the air near you. If you are quick enough with your shovel

you may catch the joker, but he has had more practice in the game than you and will probably elude you. Watch for bubbles and jets of water and dig frantically. You will be able to work up speed after a few trials and land your "fish." After some practice you will be able to unearth many living things you little suspected of being there. Crabs of various kinds are common and sea-worms of rainbow colours and curious forms. Creatures in snail-like shells, little and big, are common in the sand of our coast. As you shovel away try to have presence of mind enough to throw the sand into your sieve. Take this to the water's edge and wash it. You will in this way get many small things which you otherwise would not see.

Do not discard anything about which you have an unanswered question. Many of the mollusks leave egg cases on the sand or these are washed in by the tides. They are no less wonderful than the shells, for they are chapters in the same story. The egg-cases of the whelk are common. Those of the skate are called "devil's pocket-books" by natives.

Muddy shores have their own special forms, while rocky coasts differ from all the rest. Some creatures, like the hermit crab, are abundant everywhere. You can read the story of this fellow in any book on shells. Take some of the stories about him with a grain of salt. He may not be as bad as he is painted for much of the gossip about him has never been proven. His affairs need investigation.

The creatures which build the shells are for the most part soft bodied and can not be preserved except in some liquid like alcohol or formalin. These would be difficult to transport but will be of greatest value if you are studying the structure of the mollusks. If you wish to preserve the shells only, you should take great care to free every part from any animal matter that adheres to them. Boiling the shell will usually accomplish this.

Labels should be used and record made of the locality, date, collector's name, and other interesting data. Every naturalist of any experience has the note-book habit. Many a collector who trusts to his memory finds himself sadly at a loss when he comes to work with his specimens and especially when he wants to write about them. If his note-book tells him the story he will be able to make his account accurate as well as interesting.

#### COLLECTING INSECTS

The two principal reasons for making insect collections are first, to study, second, to sell. The beginner's outfit will be the same whichever reason is his. Time was when any one carrying an insect net was looked on with a sort of pitying suspicion. He or she was thought to be the victim of a mild form of lunacy, which might or might not take violent shape. All that is past now that insect study has grown so important and popular. It is quite safe to conclude that the hundreds of trained scientists employed by the government to investigate the problems involving insect life all started their studies by making a collection.

Probably the easiest kind of collection to make is one of plants. Once you see them, their fate is sealed. Escape is impossible. But collecting wild plants about your own door yard and in the woods is tame work compared to insect capturing. Your eye marks a butterfly or a dragon fly for your own, but you have him yet to reckon with and his wings may carry him far beyond your reach.

The outfit necessary to an insect collector is simple and inexpensive. For general collecting, and that is the best for a beginner, you need:

1. A net.
2. A killing bottle.
3. Insect pins.
4. Insect boxes.

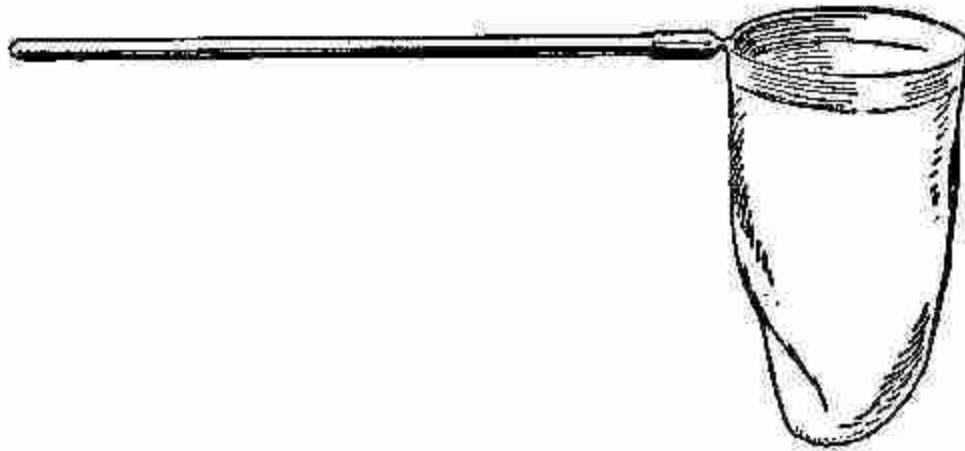
While you can add to your collection almost every day in the year when once "you have the fever," the best time to begin is summer. More insects are in evidence then, and their active flight, their beautiful colours, and wonderful variety of form all help arouse the interest. As the collection grows you will find that many insects can be captured without a net, but as you will want every new butterfly, moth, dragon fly, and grasshopper that comes into your line of vision you must certainly have a net the first thing.

The materials needed for a net are these:

1. A smooth, light, but strong handle about three feet in length. (An old broom handle will answer.)
2. A strip of tin, four inches wide, and long enough to fit around the handle. (Why not use a piece of a tin can if you have strong shears?)

3. Three and a half feet of heavy wire. (No. 3 galvanized is the thing.)
4. A piece of cheese cloth, three fourths of a yard. (Get a good grade to stand a season's wear.)

Almost every boy knows a tinsmith and when it comes to putting these materials together, the services of a skilled workman are very valuable. If pocket money is scarce, there are any number of jobs a boy can do for the tinsmith in exchange for his help in making the net. That piece of wire is to form the ring which holds the cheese cloth bag; the ring must be fastened securely into the end of the handle. Bend the wire into a circle a foot in diameter, then bend back three inches of both ends and force them into the end of the handle, a hole for the purpose first having been made by burning or boring. Bend the tin round the handle at the net end to keep it from splitting when in use, and tack it on tight.



**Insect net**

If you know how to sew you are more fortunate than most of the boys I know, although why should not a boy learn to use a sewing machine? The bag ought to be sewed on the machine. You must first lay the finished edge or selvedge around the wire to make sure that it goes around and has a little extra for the seam. Pin the cloth together where it meets around the wire, then lay it on a table, double. Cut the bag, rounding the bottom neatly. Cheese cloth is the worst stuff to ravel, and if you sew the bag with a single seam you will soon be sorry. Pin the cloth so that the two edges are exactly

together and sew a seam about a quarter of an inch wide all the way round. Now turn the bag inside out and fold it so that the seam you just made will be right on the edge. Sew another seam, three eighths of an inch deep this time. The ragged edge of the goods will now be inside of this second seam and can not fray out and make a nuisance of itself. If all this is worse than Dutch to you, take the bag to your sister. She is not so much cleverer than you but the chances are that if you ask her to sew you a French seam, she will make it just as I have described. Sew the finished bag onto the wire with heavy double thread and your net is ready for use.

Materials to make a killing bottle: 1. A wide-mouthed bottle. (I advise every collector to have two bottles, one to carry in the pocket all the time, the other for special trips for large things. For the first a small olive oil bottle, a test tube, or any convenient sized bottle with a mouth nearly or quite as large as the body of the bottle. A fruit jar, pint size, does well for the very large things.)

2. A cork which fits the bottle tightly, and is an inch long. A cork any shorter than this is an aggravation as it is so unhandy.

3. A lump of cyanide of potassium as big as a hickory nut for the small bottle, two or a little more for the big bottle. Yes, cyanide is a deadly poison, and the druggist will not sell it to you and your father will not let you buy it. But if you convince your mother that she can trust you to use a cyanide bottle as it is intended to be used, her objections will melt away. Just as likely as not she and your father, too, and your teacher, and maybe the druggist all made insect collections when they were your age and one or the other will make your cyanide bottles for you following these directions:

4. A teacup full of plaster of Paris.

Handle the cyanide with a couple of sticks or drop the lumps from the paper into the bottles so as not to touch them with your fingers, mix a little of the plaster of Paris and water till it is like a thin paste and pour enough in on the lumps of cyanide to entirely cover them. Put in on top of this all the dry plaster of Paris the water will take up. Let the bottle stand open for an hour or so, then wipe it out with a rag, which may be burned afterward. Put in the cork and your killing bottle is ready to do its share toward making a collection for you. Don't forget to label your bottles "poison," and always be

careful not to inhale the fumes. The smell of the breath of the bottle will be enough to remind you.

It was a Japanese student, who, when he found one of his pinned moths had come to life and beaten its wings to pieces in the box, said: "It ought-a be dead. He in cy'ni' bot'l' a' night." I should not wish to be quite so stoical. His bot'l' was probably an old one, which did its work too slowly.

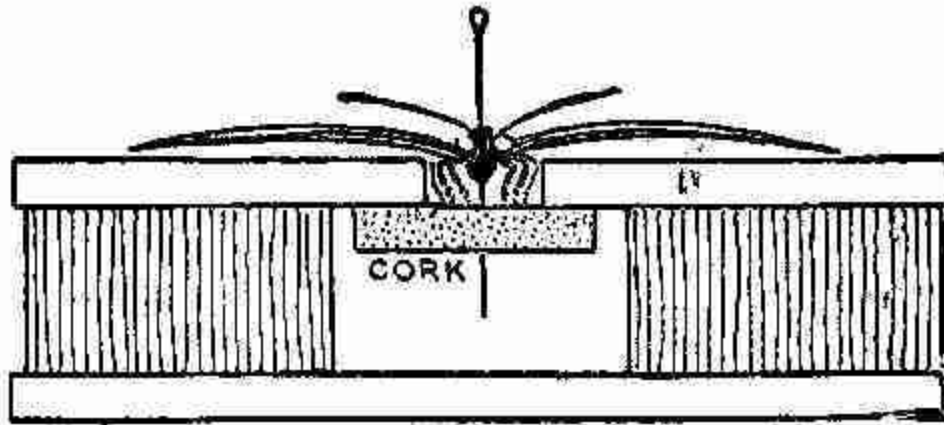


**Killing bottle**

#### **MOUNTING INSECTS**

The first insects I ever saw in a collection were a sorry sight. Beautiful as the specimens had been, they were all spoiled by the collector. The moths were all out of shape, wings half folded, the pins used were short common pins, and every specimen was disfigured with masses of verdigris, they were pinned into rough boxes in higgledy-piggledy fashion, and showed every sign of neglect and careless handling. My interest in insect collecting did not date from that hour but from a look I had at a friend's cabinet years later.

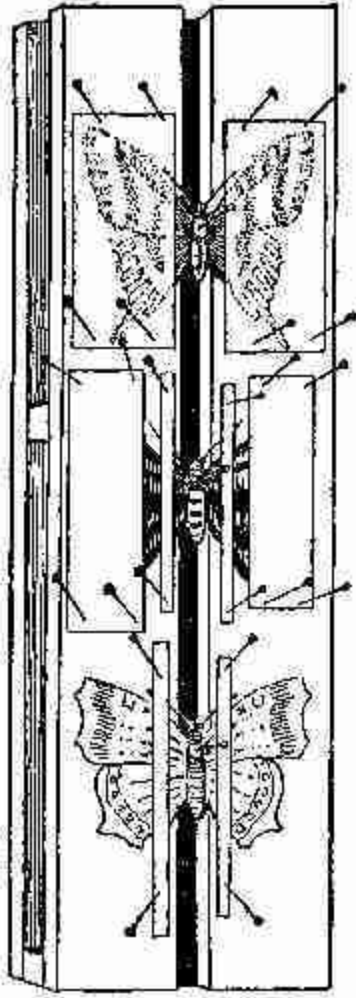
The first mistake a beginner makes is to use common pins. Really, before you begin to collect, you ought to send away for a supply of German insect pins. These can be bought from dealers in entomological supplies and a hundred each of Nos. 3 and 5 will cost thirty cents. With them your collection may be salable, and you may exchange your duplicates with other collectors, while if you use common pins your specimens will have no commercial value, and will soon be spoiled, by the corroding of the pins.



**Cross-section of spreading-board, showing construction**

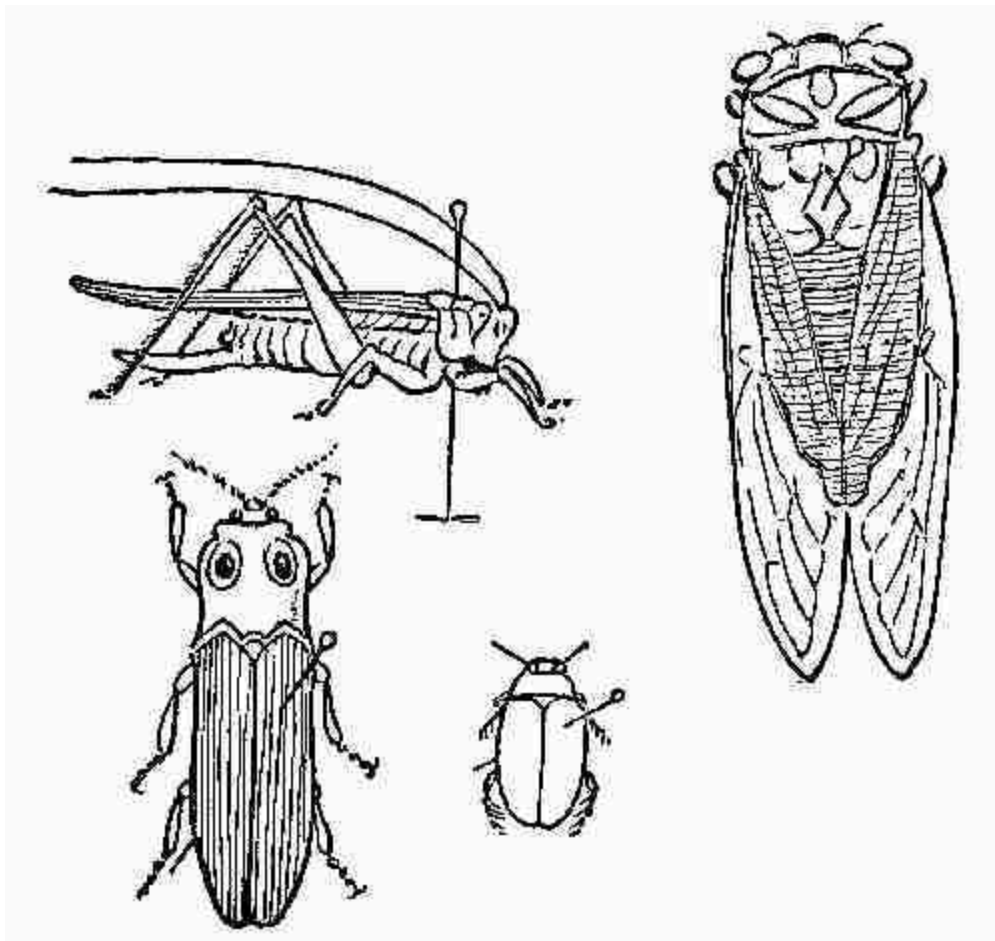
The first insect you get will probably be a butterfly, or a moth, for these showy ones are all you are able to see. Later the smaller ones will attract your attention. Therefore you will not be able to mount your first specimen properly without a spreading-board. The drawing of one which appears on this page will tell you more about how to make as well as how to use it than any amount of description. If you can earn seventy-five cents more easily than by making a set of three of these in assorted sizes, you can buy for that amount an adjustable one which will serve you for all winged insects of all sizes.

I will suppose that you have captured your first butterfly. Do get a good sized one first as it will be easier to learn on that than on a small one. An hour in a freshly made cyanide jar is long enough to insure a painless death. If any one calls you a cruel boy at this time, assure the person that butterflies are very short-lived and that this one would have been eaten by a bird within an hour or two anyhow. The cyanide is the least painful form of dying for the butterfly. Its work is probably done, already. You can prove that you do not kill insects for the fun of seeing them die, by putting the bottle back in your pocket where they can die in private, and by never killing any unless you need them for your collection. A few duplicates for exchange is also legitimate. It does not injure a specimen to leave it in the jar over night. If you cannot spread it immediately, do not take it from the jar, as when dried they cannot be spread, as they are very brittle.



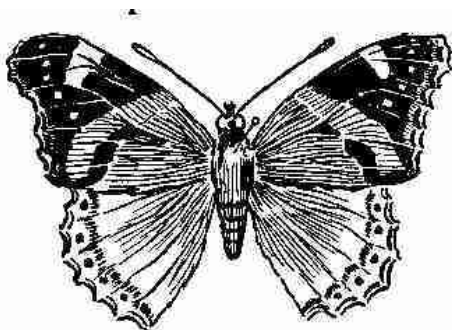
**Spreading-board, in  
use**

If you never looked at a butterfly before, you will look at this one. You will note that it has four broad wings attached to a rounded body. The portion of the body to which the wings are fastened is called the thorax. For a medium-sized insect, a No. 3 pin should be taken. The butterfly should be pinned through the thorax, half way between the front wings. Direct the pin so that it will come out in the middle on the under side of the thorax. One fourth of the pin's length should remain above the insect. This may seem a small matter but insects unevenly pinned look badly, and it spoils their salability. You will want some black-headed pins for use on the spreading-board. Common pins hurt the fingers, insect pins are too flexible and expensive. Pin strips of paper on to hold the wings in place. With the picture of butterflies on a spreading-board as a model, you will, after some experience, get so that you can do this well. It is no job for an impatient person, though. Leave the butterfly on the board until it is thoroughly dry, which takes three days. Put the board where the air can have free circulation around it, but not the mice.



**Showing how to pin common insects**

The only insects that are not pinned through the middle of the thorax are the beetles, those hard-shelled creatures like June bugs (which ought to be called May beetles), and potato bugs (which are also beetles). If you put a pin through the centre of a beetle's thorax, it spreads the wings out in an unnatural way. So collectors agree to pin them through the right wing-cover.

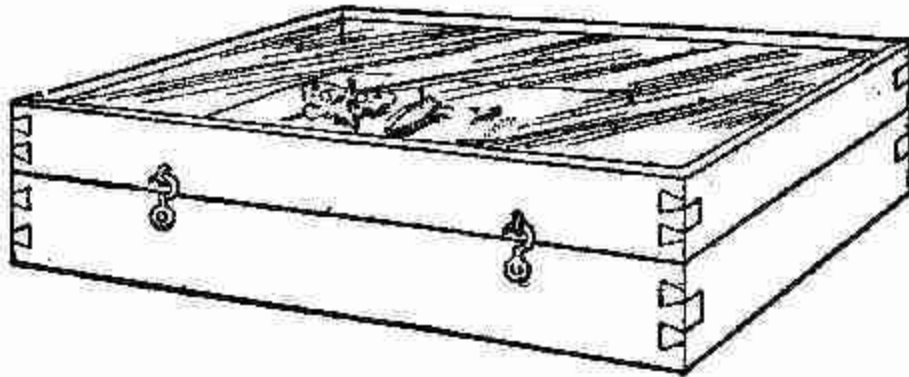


Your next requirement will be boxes to put the specimens in. Many a fine collection has been begun in ordinary cigar boxes. At first you will probably try to pin the insects right into the bottom of the box. After you have spoiled two or three of your rarest ones, bent a dozen or so expensive pins, you will conclude that the

**Pin butterflies through the thorax, between the front pair of wings**

wood is too hard and does not hold the pins well. Be warned in time to save yourself this bother. The boxes should be lined with a thin layer of some material

which, though soft enough to push a pin into easily, must at the same time be elastic and firm enough to hold the pins. Cork, linoleum, and slices of pith are all used. You may have noticed, though, if you have been to a large, up-to-date museum, that the specimens of insects are all pinned into solid blocks of wood. Many an hour I have spent pinning specimens into blocks in their permanent places in a great museum collection. It is hard work and has to be done with a tool. When once fastened on a block the insect is supposed to be a fixture; when it moves the block goes along. But the material you use in your boxes ought to be soft enough to make shifting of specimens easy. For example, at first you will get a great assortment. A butterfly to-day, a beetle or two to-morrow, a pair of moths the next day, some crickets, a dragon fly, a cicada, a waterbug, and so on. Take everything unless you already have it. That is the only way to collect. If you say, "Oh, I'll get a better one to-morrow," the chances are that the season will go by and you will not get that variety at all.



**Glass-topped insect case**

**CLASSIFICATION**

Your first box full will be a varied assortment. When you have all you can conveniently pin into three boxes without crowding, you will want to arrange them. If you have begun to study science you will know what

"classify" means. Every school is made up of classes. So with insects. You will know by the looks of the insects that certain ones belong together. A good way to start is to put all the butterflies and moths into one box. You may not know what you have done, but you have simply separated the members of the order *Lepidoptera* from all the others. Look over those that are left and you will see that some, like the blundering June bug, have their wings so placed that a straight line appears down the middle of the back. These belong together, regardless of their colour, size, shape, habits, or other considerations. They belong to the order *Coleoptera*. Grasshoppers, katydids, and crickets belong to another group and can be pinned together. All the flies have two wings, and belong in a group apart from all the four-winged ones. The dragon flies go together. You will have representatives of other orders, less easy to distinguish, but by the time your collection has grown to this extent you will be ready for some beginner's book on entomology, which will make further classification simple enough. As you shift your specimens from one box to another observe a certain regularity of arrangement. The heads should all point in one direction. When pinning a group all of which are about one size, set the pins all in line, in military fashion. How much better they look! This neat, formal arrangement of the specimens adds greatly to your satisfaction and enjoyment of your collection. Avoid crowding and breakage. A dried specimen is almost everlasting, but at the same time it is the most fragile thing you can imagine.

As your collection grows in size, value, and interest, you will certainly want wooden cases. Perhaps your manual training teacher will be willing to let you build a box under his direction. A cabinet-maker can make them at one dollar or less, apiece, of well-seasoned basswood.

Before you have been collecting long, you will have learned by observation quite a lot about insects and their ways. You will know that some localities are very poor collecting ground, that other places yield an abundant variety; that the best time for butterflies is in a sunny forenoon; while moths are abroad in the early twilight and later. You will see that dragon flies are fond of flying about over streams or ponds and you may wonder why as you try in vain to net a fine one without getting your feet wet. Other insects are frankly aquatic and you can get them only by dipping your net in. It is well to have a second net if you expect to do much water collecting as the cloth

is hard to smooth out after a wetting. As a majority of insects are vegetarian you will naturally seek among plants for specimens. If the winged forms are not eating the foliage you may discover that they are laying eggs on the leaves of the food plant on which their young must develop. If you live in town you will find it worth while to carry your bottle with you when you go out in the evening. Nocturnal insects of all kinds are attracted to electric lights, many of them to their death, as you will see. A candle in your open window will attract some valuable additions to your collection and also some you will sleep better without. Some collectors care nothing for a specimen unless it is rare. A better way is to regard them all as rare until you secure a specimen for your box, and of equal value towards building up a complete collection.

#### A LIFE HISTORY COLLECTION

You can not collect insects very long before you begin to see a lot of things you never noticed before. You see leaves cut or eaten in strange forms, or you find a cluster of tiny eggs on a leaf, or several leaves sewed or stuck together with strands of silk. Perhaps you find strange abnormal growths on certain plants, swellings on their stems, leaves transformed into balls, or pod-like or cone-like affairs which do not look natural. These things are sure to arouse your curiosity. Sometimes the answer to your question is right there. Cut open a swollen golden-rod stalk and you will find the culprit which caused the plant to grow that way. But how did the footless, helpless grub get there and when? You break down the mud-dauber wasp's nest from among the rafters of some building. What is that yellowish object that rolls from among the ruined adobe walls? Look! It is a spider. What business has a spider in the wasp's nest, if it is her nest? Spiders have none too good a reputation, but this spider does not act very spry. Seems to be alive, yet not alive.

The secret of the relation between the spiders and the wasps you can read in many a book. You might even guess at it, but there was no guess work about the observer who first studied out this secret. He did not get his knowledge from books. He patiently watched the mud-dauber going about her house building. He knew that her painstaking labour could have but one meaning. She was building not a home for herself, but for her children.

The wasp's children are not little wasps, yet they are none the less young wasps for being footless, colourless, wingless, stingless grubs. They are eggs at first of course, just as all insects are. When the mother wasp has one cell of her apartment house finished she concerns herself immediately with stocking the larder. Knowing the tastes of her yet unborn young, she leaves for a time the mud hole, and visits the haunts of certain spiders. Finding one to her liking, she captures it. Not appreciating the fact that the law forbids the use of preservatives in meats, she injects a drop of some wonder-working fluid into the spider and preserves the creature, not only fresh but alive, though paralyzed. Upon the inert body she places an egg, then seals the cell, well assured in her mind that when the grub hatches it will find the food just as she left it and just enough to nourish the young one to maturity.

Before your first season of collecting is past you will find yourself bringing home as specimens many insects which you will see are not fully grown. Little grasshoppers, scarcely bigger than a fly yet possessed of such strength of leg that they can hurl themselves into the air for a distance equal to twenty times their own length. How do you know that they are young grasshoppers and not fully grown ones of some tiny race? Look at one closely and you will see a look of youth about him that is unmistakable. He is fuzzy, his head is too big for him, his legs out of all proportion to the rest of him. Then, too, he has no wings, just little buds where the wings will be some day. By these tokens you will know him for a baby. You can find them in all sizes and can have a series to show the stages of growth. This is one of the first steps in the making of a "Life History Collection," far more valuable to the naturalist than a collection containing only mature insects.

Generally speaking, all adult insects have wings, and all winged insects are adults. There are exceptions to this, but they will take their places when the time comes. The young of the insects belonging to certain orders resemble their parents enough so as to be placed where they belong at a glance. This is true of the grasshoppers, katydids, and crickets, of the true bugs which include the squash-bugs, the chinch-bug, the stink-bug and others. Of most of the other orders this is not true. The young do not look at all like the adults. In many cases as, for example, the dragon fly and the mosquito, they are fitted in the immature stages to a life in the water. They must, on this account, have organs for swimming, for aquatic breathing, and for getting a living in the water. The forms of these young insects are just as varied as

those of the adults, but they do not resemble the winged ones in the least. The life history collection must contain specimens of the immature forms of insect life as well as adults if it is to be most useful and complete.

Some orders of insects, as for example the moths, butterflies, beetles, flies, bees, wasps, ants, and others pass through four distinct changes of form. They always follow the same order. Every generation, beginning with the egg, passes next to the larva (called caterpillar or incorrectly worm, or grub, or maggot), on to the pupa, then to the adult. The egg of an insect is often a most beautiful object. With a hand lens, which every collector will surely need, one can see its delicate colouring, its pearl-like shell, its curiously carved or sculptured surface. To get some idea of the great variety in form, colour, shape, and markings of insects' eggs, ask at your library for a book on butterflies, with coloured plates, and the chances are that you will be surprised.

The second or larval stage of the insect's life is the eating, growing stage. During this stage the young bee, butterfly, ant, or moth moults several times. In this process the entire old skin is shed, an operation well worth seeing. Under the old coat a new one has formed, which being larger, accommodates itself to the insect's increased size. The larval stage is in the case of many insects the active time when, if they are vegetable feeders, they injure crops.

When the larva has completed its growth it changes into a pupa. Some insects pass this third stage inside of silken cases they spin about themselves, others, after shedding the larval skin, find themselves each clad in a sort of horny coat of mail. We call these chrysalides. Some larvæ creep away into the ground, there to shed their old coats and rest inside of the pupa cases which nature provides. Each one follows the fashion of his own family and is in no danger of being mistaken for any one else.

Out of the pupa, whether it be cocoon, chrysalis, or just plain pupa case, comes the adult. The main business of adult insects is to reproduce their kind. After the eggs are laid there is little excuse for their living. In the case of a great many kinds of insects death follows soon after. There are some noted exceptions to this rule as for instance the wasps which build with so much skill and patience the homes in which to rear their young, the ants and the bees, both social and solitary, which carry on such a complicated home

life. Of these highly "civilized" insects only a word can be spoken here. From the chapter on "Bee-Keeping" and from other books you may learn of the wonders they perform. We must return now to our life history collection.

How the subject opens as we add specimens of cocoons and pupa cases to the collection! To get a complete series illustrating the life, let us say, of one of our common butterflies, the monarch or milk-weed butterfly, you should visit the clusters of milk-weed along the roadside or anywhere, in the forenoon of a sunny July or August day. A few butterflies are probably flitting about in rather casual fashion. Watch them light on the leaves, mark the leaf with your eye and hurry to the spot. Search well. The tiny speck of pale yellow may be a drop of milk but if it stands up on the leaf it is likely to be a butterfly's egg. Your lens will tell you. Having made sure of one you will find others.

You may find a young caterpillar lunching on the leaf. If just out of the egg it is a dull lead colour, but when half grown a young monarch is striped with rings of greenish yellow and black. Though handsome as to colour scheme, this caterpillar has manners unbecoming a plain citizen, let alone a monarch. Touch its back with a grass stem and see what happens.

If time permits you should visit your clump of milk-weed daily or better still take home the eggs and the young caterpillars. Keep the food plant fresh in a jar of water and get more when needed. As you want a specimen of the egg-shell for your collection, you must be on the spot when the young caterpillars come out. They sometimes eat the shell the first thing. It is a delicate operation to glue a thing as frail as this shell onto a dried milk-weed leaf, and you may have to content yourself with making a sketch of it on a small square of drawing paper. Pin the leaf or the drawing in the box. It is not easy to keep specimens of caterpillars. There is a method of preparing the inflated skins, but as the process is a difficult as well as a ghastly one, you can wait till you go to college to learn it. For the milk-weed caterpillar I suggest instead, a coloured drawing. When your caterpillars are full-sized they will transform into chrysalides. It is worth sitting up all night to see a sight like this. When a caterpillar spins a little mat of silk and suspends itself by a tail-hook, you will know that the performance is about to begin. The chrysalis is a lovely light green with spots of gold upon it. All this beauty was hidden under the skin of the caterpillar. With an egg, a

caterpillar, a chrysalis, and an adult you have all four stages of the monarch's life represented.

#### INSECT HOMES

Nothing in the insect world interests me more than their homes. The collector sees many of these in his rounds, and begins to consider how he can complete his series by adding samples of them as specimens to his collection. I was lucky enough to find, when on a collecting trip one day, a curious structure made of mud on a weed stem. It was declared by the professor to be an ants' "cow-shed." Knowing that the museum specimen was in a bad state of repair I readily offered my find to replace it. The professor refused the gift, but offered me what he thought it was worth. I accepted and bought a pair of shoes with the money, which shows that these things have a market value.

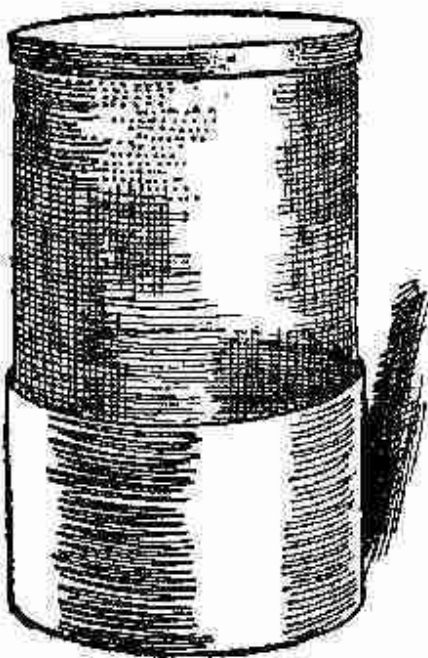
It is well to press a specimen of the favourite food plant of a species of insect and make it a part of the collection. But dried butterflies, fastened in utterly unnatural attitudes upon dried plants they would scorn to eat in life, framed or put under glass globes on the parlour table do not appeal to the naturalist. They are "fakes" pure and simple.

There will be a few among the many who begin to make collections of various kinds who will keep at it. I know one young man who sold his stamp collection for enough to take him on his first trip abroad. Six hundred dollars was the sum realized, I believe. Those of you who have read Mrs. Gene Stratton-Porter's story "The Girl of the Limberlost" remember that "the girl" sold Indian relics and insects enough to send herself to high school and start a college fund. She made up little life history collections to illustrate the talks she gave as special teacher of nature study in the grades in a city school system.

The Limberlost girl had an offer of three hundred dollars for a complete collection of the butterflies and moths of the United States. She had a wonderful collecting ground in and about the big swamp, and she had enough duplicates to exchange with other collectors for things she could not get at home. In order to have perfect specimens, both male and female, she made breeding cages and reared the moths and butterflies. She dug in the earth about the tree roots and other "likely" places for pupæ, she searched the shrubs and vines and trees for hanging cocoons, she brought in

innumerable eggs, caterpillars, and chrysalides and the story of her successes and failures fills many delightful pages. It all rings so true that you can't help hoping that you may see her insect collection some day, and hear her tell how she brought this butterfly up "by hand," how she had to wait a year to get a male to complete one series, how narrowly she escaped the quicksands in a wild chase she had for another, and other details of her occupation.

#### REARING INSECTS



**Bandbox breeding-cage for insects**

Breeding insects is easy. Look at the home-made breeding-cage illustrated on this page. Materials needed: One round or oval hat box, a strip of wire screen, two and a half feet wide or so and long enough to fit around the inside of the box and lap three inches. Either sew the screen together in the form of a cylinder or fasten it every six inches with paper fasteners. (Any way to keep it together good and tight.) Push the screen down inside the box till it touches the bottom, put the lid on and you are ready for business. If the screen is too wide you will have trouble in reaching to the bottom of the box which you will have to do sometimes, for one reason or another. Into breeding-cages made on this general plan you can put all sorts of material while waiting developments, and

get many additions to your collection that you would otherwise miss entirely.

Some surprising facts are often discovered by accident. A breeding-cage containing a female *Cecropia*, one of our largest and most beautiful moths, was accidentally left near an open window over night. The next morning between twenty and thirty moths of that species were found fluttering about the cage. They had evidently been attracted from some distance, but found their way to their imprisoned sister unerringly.

Collectors have many ways of capturing night flying moths. One way is known as "sugaring." This consists of daubing a sticky, sweet preparation on the trunks of trees and visiting the baits later in the evening with cyanide jars and capturing the specimens which are attracted by the odour to the feast set for them. It is unsportsmanlike and entirely unnecessary to put any poisonous substance in the bait and this practice should be darkly frowned upon.

The best places for sugaring are these: a strip of woodland edging a stream, the rim of the woods adjoining an open field or pasture, old roadways through woods of beech, oak, chestnut, or any mixed growth, wooded slopes in city parks where there is some protecting undergrowth, anywhere about the old groves surrounding country homes. Windy or wet nights are not the best for sugaring, neither are moonlight nights. The ideal night for this is the evening after a hot, sticky day in late summer, the sky overcast and dark but not foggy. You will need a lantern to work by. Keep calm. Quick, nervous movements frighten away more moths than the light.

The following is the unspeakable concoction recommended by one collector as "the best ever" for baiting moths:

Four pounds darkest sugar.

One quart New Orleans molasses.

One pint stale beer or ale. (This should have been allowed to stand uncorked in a warm place for a week, before using it.)

Mix all together and heat gradually. Boil till about as thick as varnish, which takes about five minutes. When cool add four ounces of Jamaica rum. Cork loosely and keep in a cool place. The strong odour of this mixture pervades the air for a long distance, and proves attractive to the olfactories of moths though none of us would care to have it about.

A good evening's work at sugaring ought to furnish moths enough to keep you busy spreading all the next forenoon. A night in the cyanide jar will do them no injury. It is well to have a pair of light pincers to take specimens out with. If all are emptied out at once some will dry too much before you are ready to spread them. Every time they are handled they lose part of the scales and become slightly defective. If practical, put the very large

specimens into the jar hinder end first. This will make it easier to get them out head first.

It is almost inevitable that the inveterate collector of insects shall become a naturalist. By constant watching, he discovers how insects live, and how they affect plants. He will witness many a tragedy. He will find that there are among them thieves and robbers, pirates, cannibals, assassins, scavengers, and disease carriers. He will witness many acts of heroic self-denial, some feats of strength, endurance tests, and acrobatic turns. He will admire the ingenious architecture and wonder at the never ending variety of forms, colours, and markings they exhibit. Many questions will come up in the course of his studies. He may seek the books in vain for information on some of the commonest insects of the garden. Entomology is a new science. Boys and girls who begin the study by collecting their first insect to-day may, before they stop, discover some important fact to add to the sum of human knowledge and make the world a better place to live in.

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# X

## ODD JOBS

### KINDLING WOOD

CUTTING kindling wood was ever a boy's job. Most set tasks have little to them but drudgery. But cutting kindling used to be interesting. What is there about it? The struggle to master a stubborn stick, the danger that a slip may bring the axe down elsewhere than on the stick, or that a careless blow may cause the stick to rebound, leap into the air, and give the chopper a whack on the head? Scarcely a boy but can show a hatchet's scar on the foot and I know a girl who will always carry one in the place where most people carry a corn.

The problem of a source of kindling supply on the farm is never one to be reckoned with. There are always old fences going to pieces, old buildings being torn down, and the problem is rather how to store the supply where it can be had when needed. In town things are different. The fences, if any, are iron, the buildings are few and kept in repair because they cost so much to build. There are practically no loose boards lying around and kindling has to be bought outright. The ex-farmer always resents this as an uncalled-for expense. But kindling is a necessity wherever fires are to be made. No patent article quite fills the bill.



Photograph by Helen W. Cooke

### **An Odd Job That is Never Out of Date**

Why should grown men monopolize the kindling business? Because there is good money in it? But any boy can go into this business, if he has any spunk. The capital required is very small. If your credit is good you can borrow a hatchet. The chances are that spunk will supply the wood. It may be rotting in somebody's wood lot waiting till the right boy comes along.

Boys in the South are lucky. They can get fat pine which is in great demand both North and South. Some say the supply has given out, but who believes

such tales? The demand for this will never be less than now and there is no substitute for fat pine.

Collecting driftwood is another occupation for boys, sea-coast boys, this time. A kind of substitute for this is being sold. It is a mixture of chemicals and does very well for toy fireplaces in city apartments. But the real thing will always bring a fancy price.

It is the common practice of American lumbermen to regard no part of the tree as valuable, but the trunk. All the rest is rubbish and the expense of trimming off the branches reduces the amount of profit on every log. Some day when our young foresters get enough experience to see all round the great subject they are working at, they will think out ways of disposing economically of the tops and branches of the cut trees. This is one of the big problems of forestry for these reasons: (1) The huge amount of this refuse wood chokes out the young growth and the forest cannot renew itself as it would naturally. (2) The brush dries quickly and whenever a small fire gets started there is fresh food for it everywhere. (3) The brush prevents the fighters from making their way to the threatened district. They have to fight the brush piles before they get to the fire.

This refuse wood might be put to a number of uses, e. g., for pulp wood, thus saving the trunks for lumber; for fuel, nothing makes better fires than the smaller limbs; for kindling, the branches which are too small to use for stove wood make splendid kindling, particularly for fireplaces.

Some of us think gathering faggots too slow and laborious. But we needn't make work of it. When I see men, women and children poking over the masses of evil-smelling rubbish on the mammoth dump-heaps that deface the landscape near some of our great cities, or going from house to house collecting old iron or rubber or newspapers, or picking over the slag along the railways for chance lumps of coal, I wish that there were some way of getting them away into the woods where firewood is rotting and doing harm besides, a waste that works both ways, you see.

There is no excuse for the poor people of a village near woods suffering for fuel. They needn't steal. Let them get permission from the owner to clean up his wood lot. It will be good for the wood lot and the owner knows it if he is an intelligent man. The boys and girls are much safer gathering faggots in the woods than coal along the tracks.

Faggots for kindlings bring a fair price, too, and I recommend it as a way of earning money out of your father's wood lot if he has one. In some villages in Germany the people have the right to break off in the forest all the branches that they can reach when standing on the ground. In those forests there is never any loss of life, nor lumber, by fires, no choking out of young growth by brush piles. You could walk through the forest there and see in every direction miles and miles of clean trunked trees of varying ages, but no underbrush, no rubbish, no decaying logs, no diseased wood.

Maybe those thrifty German people made mistakes when their country was as young as ours. But they found out the way to take care of their forests hundreds of years ago and we can learn how from them.

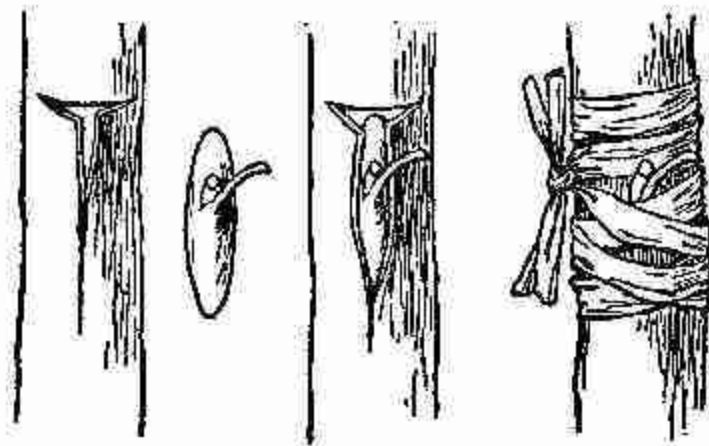
#### **CLEANING A CARRIAGE**

If you get home late at night after a drive in the mud the chances are that you will not clean the carriage till the next day. But if thin mud is allowed to dry on a varnished surface it will be sure to leave spots.

Water is the "first aid to the injured" in cleaning highly polished vehicles. Plenty of it should be flushed onto the varnish, the mud washed off by the force of the water rather than being rubbed off or scraped off. Keep your buggy out of the bright sunlight when not in use, especially when it is wet. Slow drying is better for the varnish.

A coarse sponge is a good thing to wash a carriage with; this should be thoroughly rinsed after each rub to free it from grit. Never use soap on varnish. It may be used on the metal parts of the carriage. Prepared chalk is the best for polishing the ornamental parts. For glass, clean water and a cloth or chamois skin are all you need.

#### **WORK IN THE ORCHARD**



### **Shield-budding**

Many are the light jobs in the orchard or fruit plantation, which fall to the boys. I know a boy who at thirteen was his father's expert budder. There are high school boys in localities where nurseries and orchards are plentiful who follow this as a trade, making good wages at it. It is a wonderful thing to do, a very neat job in handicraft, and while a book might tell how it is done, nobody could learn how to bud or graft without seeing it done and then trying, till the trick is learned. Boys also follow the grafter and tie in the bud or wax the graft.

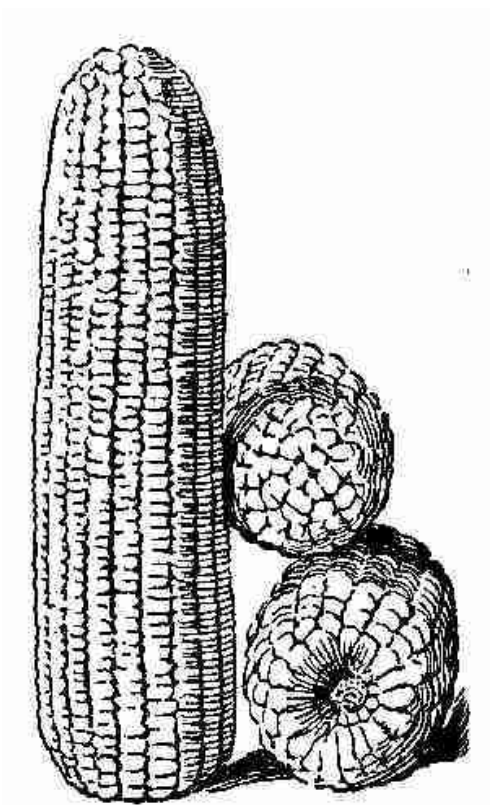
Boys are often employed in vineyards to follow the pruners and tie the vines to the trellis or wire with rags or raffia. They become very expert and tie an incredible number in a day. In fact many of the light jobs grow pretty heavy after eight or nine hours.

### **MAKING RUSTIC FURNITURE**

Collecting material for making rustic furniture is a pastime that is suggested by walks in the woods. Sometimes a bit of twisted branch may look like the arm of a settee or the leg of a tea-table. Procuring the first part suggests the quest for the other pieces and the fitting them together to make a natural looking, balanced, artistic piece. Rustic furniture to be good, should appear to have grown that way. There is too much of the kind that looks as if it were made to sell. The truth is that the more truly artistic it is the better price it will bring in the right market. Laurel wood is particularly adapted for rustic furniture.

## SELECTING SEED CORN

By a careful study of what experts have to say about the best corn for seed, and of the photographs of ears of prize corn, any young man of intelligence may learn to select from his father's field the best corn for seed. It may be that your father buys his seed corn from a seedsman. My experience is that seed corn bought in bulk contains a large number of poor grains. They probably shell the whole ear. The best farmers never plant grains from tips or butts of ears, since it costs just as much to plant and cultivate and harvest a runty corn stalk bearing a nubbin as it does a lusty, towering stalk with two good ears of corn on it.



**Prize seed corn**

Find out what a good ear of corn looks like. Make note of all the points to be encouraged. The habit of producing two good ears of corn is a good one to establish. Go through the field when the corn is ripe, before the huskers, and select the best ears, with all the points you have learned in mind. Take off the outer husks and draw the rest back, exposing the entire ear. When you have ten or a dozen ears braid the husks together, starting with three ears, adding one after another to the braid till all are secure. Fasten with strong twine and make a loop to hang the bunch by. Seed corn should hang for a few weeks in the open to cure, but should be taken inside before snow. You will have to use a good deal of ingenuity to keep chickens, rats, squirrels, and other thieves away from your seed corn.

When spring comes the corn should be shelled, and every imperfect grain should be discarded. By selecting the seed in this way, demanding of each ear that it shall be perfect, you find the crop will improve, if cultivation is good, the soil well enriched, and the season normal. Every time a farmer boy uses his mind first in connection with any kind of work, the quality of work improves and his interest in his

work increases. Selecting seed not only gives better corn but it helps make a better farmer.

### MAKING CIDER VINEGAR

Every good apple year there are thousands of bushels of apples that go to waste. It doesn't pay to pick and put them into barrels when the price of barrels is more than you can get for the apples. The farmer is the last man to learn how to make use of what ordinarily goes to waste. Nature is lavish always, but wastes nothing. The farmer has learned to be lavish and wasteful too. They say that every part of the pig is utilized in the packing house except the squeal. That is the principle which the farmer will have to live by if he would succeed. What can be done with those wasting apples? Let the boys have them to make into pure cider vinegar. Every one knows how vinegar has been adulterated, and now the law-makers have put their veto on the practice and a penalty to match the crime.

There is nothing very difficult about the physical part of vinegar making. Nature does the hard work but we can aid nature by providing the ideal conditions for making the product we want.

The best apples for making pure cider vinegar are clean, ripe apples. If you use green, dirty, decayed, or over-ripe apples, your vinegar will probably not meet the lawful tests and your time and work will be wasted. Green apples have not enough sugar in them. The same is true of over-ripe apples. "But there isn't much sugar in cider vinegar," you say. No, that is true, but without sugar in the cider you wouldn't get any vinegar. If you were a chemist you could find out just how much sugar was contained in the juice of your apples. Unless the cider has 85 per cent. of sugar it will not make vinegar good enough to satisfy the requirements of the law. However, plenty is found in cider made from sound, ripe apples, and he who makes cider out of anything else deserves to fail.

Expose any fruit juice to the air and it will change. We say, "Oh, that is fermented," and throw it away. But what is this ferment? Set a glass of fresh apple juice in the sun and watch it. In a few days you can actually see that some change is taking place. It is "working," as they say. The sugar is changing to alcohol; so the chemists tell us. What makes it do this? The chemists must answer again. They say that there are yeast plants in the apple juice. How did they get there? We did not put yeast in the apple juice.

No, but the air is full of the spores of wild yeast plants so the juice does not have to wait till we put in domesticated yeast from a little "silver" wrapper. As these yeast plants grow they cause the sugar in the juice to change to alcohol. There are lots of other wild spores in the air and in the dirt which collects on the apples if they are left out very long. Some of these spores may be of a kind that would delay the fermentation. For this, if for no better reason, we should wash our cider apples.

In a glass of cider set out in the sun it does not take long for the yeast plants to convert all the sugar to alcohol, because warmth hastens the work. In the barrel set in a cool cellar it takes longer, about six months.

But you have no vinegar yet. You have nothing but "hard" cider which isn't fit for anything. But in the barrel along with the yeast plants are lots of other bacteria, to be seen under the microscope. Among them is a kind that causes alcohol to change to acetic acid. Did you ever pour off the vinegar from a jug and find a mass of jelly-like substance stopping the mouth of the jug? They called it "mother" didn't they? This mother contains great numbers of acetic acid makers and if placed in your barrels will hasten the changes that fit the hard cider for use on the table.

The making of cider vinegar is almost all profit for there is very little outlay for materials and very little work is required. It does take some knowledge of what to do and when. A little study and experience makes success almost certain. A bulletin of the New York State Experiment Station at Geneva gives the following directions, somewhat abbreviated here, for making good cider vinegar at home:

"Use sound ripe apples, picked before they have become dirty or crushed. Observe ordinary precautions to secure cleanliness in grinding and pressing, and use no water. Let the juice stand a few days to settle, then draw off the clear liquid into barrels that have been cleansed and treated with steam or boiling water. Do not fill more than three fourths full. Put a loose plug of cotton into the bung hole. If kept at a temperature of fifty to forty-five degrees Fahr. the alcoholic fermentation will be complete in about six months. This time can be shortened to three months by keeping a temperature of sixty-five to seventy degrees in the storage room and by adding one cake of Fleischmann's compressed yeast dissolved in a little water, to every five gallons of juice. When the cider stops 'working' you

will know that the sugar has all been changed to alcohol. The clear liquid should now be drawn off, the barrels rinsed and filled again. To each barrel should now be added from two to four quarts of good vinegar containing some 'mother.' If kept at a temperature of sixty-five to seventy degrees Fahr. the vinegar may be ready for use in six months. If kept very cool it may be two years. When sour enough to be 'just right' the barrels should be filled as full as possible and tightly corked or the sourness may disappear."

#### MAKING GRAPE JUICE

Any girl with a little experience in canning fruit can make for home use and for sale a harmless and delectable beverage out of the surplus grapes. Every good grape year on the farm there comes the question of what to do with the grapes. A little jelly is made when the grapes are green but most people prefer currant jelly or blackberry or crab apple. Canned grapes are pronounced "no good" by all the family, and grape marmalade is full of "splinters of glass," though how they got there who can say?

The housekeeping magazines give receipts for preserving grapes but cold storage alone gives good results and few farms have cold storage plants. Those grapes hang there by the bushel and try as you may you do not get them all eaten fresh.

Grape juice is not wine. If you should try to make wine you would probably fail. But unfermented grape juice is easier to make than jelly and as it needs no sugar your investment is small. Grape juice has food value, as it contains more solid matter than milk, and is recommended as a drink for children and for invalids. In many European countries "grape cures" have long been popular. In the pure, unadulterated, unfermented juice of the grape we have a palatable, nourishing food and a refreshing drink in one. It is highly recommended as a preventive of some diseases, a cure for others, and as a restorative of general health.

So much for the product. Now how is it made? It is possible to make grape juice from start to finish in the open air. If the grapes grow on an arbour what more delightful occupation can you imagine than spending a day or two converting the perfect fruit into nectar? Idling in a hammock may appeal to some, but a row of shining fruit jars worth seventy-five cents apiece looks better to an enterprising girl than a finished novel.

You will need a table, a rocking chair, a large basket and scissors, granite pans and double boiler, an oil or gasolene stove, clean jelly bag and flannel filter, jars or bottles, corks, rubbers, etc.

When the grapes are just right to eat out of hand they are right for grape juice. Green or over-ripe grapes are not worth working over. Discard all unsound fruit, wash, and crush. Put into a freshly washed bag of coarse, strong muslin, tie securely and twist and squeeze it until the juice is all out. Two people can work to advantage at this job.

The juice should now be put into a stone jar set in a pan of water or heated in a double boiler. It is just at this point that most people make a mistake and destroy the fine flavour of the grape by boiling the juice. *It should never boil.* If you have a thermometer use it now. The object of heating this juice is to destroy the yeast spores and other organisms which have alighted on the grapes as they hung in the arbour and which are so small that they came right through the mesh of the muslin bag. A temperature of one hundred and eighty degrees to two hundred degrees Fahr. is high enough. Take the juice from the fire when the two hundred Fahr. is reached. A thermometer is not absolutely necessary. When the juice begins to steam it is getting close up to two hundred and twelve degrees Fahr., the boiling point, which you must avoid.

Making prime quality unfermented grape juice requires two forenoons. If you want your jars to be clear from top to bottom instead of muddy with sediment you will set the juice away in an enamelled or glass vessel until morning, when you will see why this precaution is necessary. With greatest care dip the clear liquid off and filter it. A flannel bag made in the shape of a cone with a stiff wire or wooden ring at the top to hold it open, is the best filter. Several thicknesses of flannel or felt are better than one. All the tiny particles of sediment will be caught in the woollen meshes and the juice will be pure. The last traces of settlings, will be removed and the liquid will be clear. The colour and flavour will depend on the kind of grape used.

Put the filtered juice into bottles or fruit jars that have been sterilized by boiling in water. Do not fill them quite full. Wiping is unnecessary. Fit a false bottom made of a thin board or slats into the bottom of the washboiler and set the jars of grape juice with rubbers and covers on but not screwed down in on this. Put water into the boiler till it comes up to the shoulders of

the jars. Heat now until the water is on the point of boiling, but do not let it boil. Remove jars from the water and screw down the covers. If bottles are used, clean, sterilized corks must be put in, while the juice is still in the hot water. If the corks are very tight further sealing is not required, but wax or paraffine is put over them by cautious persons to make assurance doubly sure.

Quart jars are probably most economical and will find a ready sale. Grape juice will ferment very soon after unsealing and should be used immediately. Even a small family will have no difficulty in consuming a quart if given the opportunity. Many delicious desserts can be made with this juice combined with sugar, eggs, gelatine, cream, lemons, and other fruits.

#### MAKING LEAF MOULD

Every year I see boys and girls raking leaves from the lawns and either piling them in the street or in the back yard and then burning them. Nobody likes an outdoor fire more than I do, whether it is a real camp fire, a little back yard faggot fire just enough to roast a few potatoes and onions and play gypsy, or a big blazing bonfire, almost dangerous and wholly splendid. What I don't like is a sickly, smouldering pile of leaves sending out a suffocating smudge, bursting with sudden flame at night and having to be put out after you had your slippers on and had begun a new book. Such a fire is a nuisance to you and to the neighbourhood and no satisfaction.

Burning leaves is like burning money. That is quite another way of looking at it. "Why, most people have to pay out money to get their leaves taken away," you say. True, but that is because we are such a lot of wasters. We are just beginning to learn to be economical, because we must. To make a long story short, turn your leaves into money by composting them.

For greenhouse work pure leaf mould is a necessity and the supply of the real article is never equal to the demand. Ask the florist in your town where he gets leaf mould and how much it costs him.

Making leaf mould is simple. All you have to do is to rake the leaves into a pile where they can lie still and rot. To make a really neat job and lose none of your work or leaves make a frame of boards a foot high or so and as large as you think your leaves will require. Set this frame in some part of

the yard where it will not look unsightly but as near the source of leaf supply as is permissible. If you have to carry the leaves by wheelbarrow you will see the force of this. Use a pony and cart for the job if you have them. A big box or barrel on a wheelbarrow is better than the wheelbarrow alone. Get a layer of leaves a foot deep, then tramp it. If water is handy, wetting them with a few pailfuls would make them pack well. Put on layer after layer of leaves if pure leaf mould is to be made.

Lay boards over the top to hold the leaves down or the autumn winds will scatter them for you. Forking over a few times will hasten the process of decay. A very small quantity of leaf mould for home use can be made in a store box or barrel. This should not be water tight. Let the leaves be exposed to all the elements; the rain, the air, freezing and thawing, help on the process of decay.

Leaves are a very valuable ingredient in the making of compost for the garden. I have from an expert gardener this receipt for his favourite

#### "GARDEN FRUIT CAKE"

Three parts selected leaves.

Three parts cow manure.

Two parts garden soil.

One part kitchen refuse and weeds.

One part pasture sod.

Compost these in alternating layers for one, two, or three years under cover. The result is a rich, brown, moist compound which, added to common garden soil at suitable times, is warranted to raise flowers and vegetables fit for the queen's table.

Now then, instead of burning your leaves, go out and gather all you can from the neighbour's yard as well as your own and make leaf mould. Combine the boys on the street into a "Leaf Mould Syndicate" and get the local florists interested in a home-made product.

#### MAKING LAVENDER STICKS

The weaving of lavender sticks has been described to me as "the harmless occupation of old-fashioned fingers." In these days when the revival of old-time industries is so often undertaken, it is well to learn from our aunts or

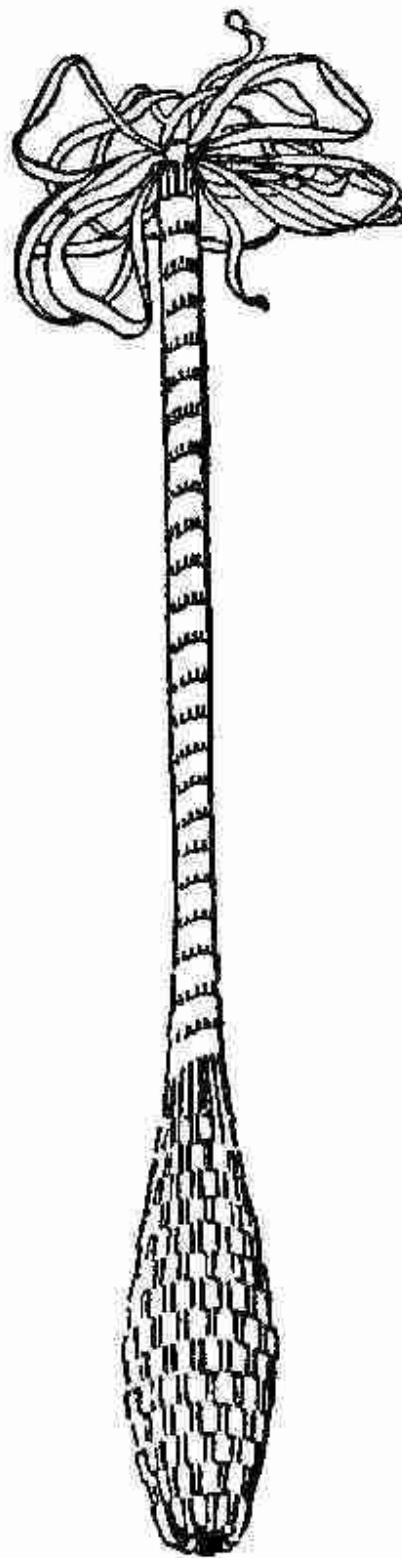
our great-aunts some of the fancy work that employed their elegant leisure when they were girls. The lavender stick is such a sweet and dainty object that I hope for it a renewed popularity. It is one of the always acceptable gifts the Pacific coast can send to the Atlantic where it is so hard to make lavender grow. I might say here that there is good reason to advise the growing of lavender in the light limestone soil of some of our Southern states. Immense quantities are used in the manufacture of lavender water and perfumery, and although the dried flowers are retailed as a preventive for clothes moths, I have grave doubts about that.

The best way to learn how to make lavender sticks is to have some dear old lady show you. Failing this you may try to follow these directions and the picture that goes with them. Late June is the best time, September the next best. The lavender must be in full flower. If too young the stems will cure limp. The finest odour passes with the going to seed. Cut the flower stalks in clear weather and before the heat of the day.

As some lavender sticks should be shorter and some longer to suit their various purposes, you should next sort the stalks into groups according to length. For a handkerchief box nine short ones would be right. To make a large "stick" for a linen closet shelf choose twenty-five of the longest, heaviest heads. Always have an odd number. Strip off the leaves, draw the stems down till the heads are all on a level, then tie them "gently but firmly, under their chins" with soft cotton yarn that will hold but not cut. Use plenty of string and leave very long ends. Build the thistle-like head into a shapely oval—but not with cotton, after the way of the Philistines. Plump it out with a little sheaf made of the heads that are too small to use, and add a few leaves to round it out. With those long string ends wind the head, now, and tie securely.

The next step is one where skill and care are necessary. Each stem is to be bent directly backward at a sharp angle and it will be a wonder if you do not break every other one. Crease each stem over your thumb-nail before turning it back over the head. When all are safely reversed, double one end of a bolt of lavender ribbon over one stalk, close to the top and begin to weave. The simplest weaving is the most artistic, under one stalk and over the next, passing round and round till the head is covered. At this point it is best to fasten the end of the ribbon, wind the stems with common string and begin on another till you have brought all to the same stage. Lay them all

away for a month to cure. You will find that the weaving will then have to be tightened about the head. Now wind the ribbon tightly round the handle and fasten it there. A tuft of loops at the end is a simple and old-timey finish. The less attempt at decoration the better. A lavender stick is a very acceptable gift for one who is fond of its perfume and can detect the aroma of homely sentiment that mingles with its sweetness.



**A lavender stick**

## DRYING CORN

In my girlhood the surplus sweet corn was not left to dry on the stalks. It does not make very good fodder. The best ears were marked and left to ripen for seed, but the surplus green corn was dried. The boys would bring in a bushel or so of ears in the husk. We prepared these as carefully as if for immediate use on the table. Every silk was removed. The ears were then put into boiling water a few at a time and left only five or six minutes, just long enough to "set" the milk. As soon as the corn had cooled sufficiently we began to cut it off, with thin, sharp knives. With the butt of the ear resting on the flattest big platter, one sliced from top to bottom. We had orders not to cut deep the first time—just to take off the tops of the grains. The next cut was thin, too, and came off in a slice which fell apart. We cut three slices, at least, before we came to the cob. By this means we obtained a final product far superior to that of the neighbours who made one cut suffice. When a platter was full, the corn was spread evenly and put out in the sun, on a long table and covered with netting to keep off flies. When partially dry we transferred it to a large cloth and continued the drying until every vestige of moisture was gone from it. It was then put into a loose muslin bag and hung up near the ceiling where mice and dampness could not get at it. I have eaten evaporated corn, and find it a poor substitute for the sun-dried article.

To prepare dried corn for the table wash well, soak over night, and then steam slowly on the back of the kitchen stove from morning till late afternoon, with salt to taste. By this time most of the water will have been absorbed or evaporated. The corn will be soft and all its native sweetness will be right there. Add a generous libation of cream, a lump of butter, a whisk of pepper, and you have a delectable dish.

## MAKING A TENNIS COURT

The largest item in all the estimates for making a tennis court is for labour. If a boys' club can supply this they can have a court without expense except for the wire netting and the necessary posts. A standard double court is seventy-eight feet by thirty-six. Choose a well-drained piece of ground; the more nearly level the better. Locate the courts with reference to the time of day when they will be most used and the direction of the sun's beams at that hour.

The first job is to get rid of the grass and weeds, root and branch. If a plough is used do not begin the levelling until every root is gone. Turning grass under is bad practice. Some kinds of grass can grow no matter which end is up. Next with rakes make the surface fairly level. *Level* is one of those adjectives that can not be compared. If a court is level it can't be any leveller, and to be right it must be done with a straight edge and a spirit level. If there is one boy in whom you all have confidence, it is a good plan to elect him boss of the job and follow his instructions. "Team work" is the right thing in this kind of a job, just as in games. When the court is level it must be rolled and rolled and rolled again, with the heaviest roller you can get.

A surface of ordinary dirt does not wear well. Some people prefer to spread on a layer of ashes, next three inches of sand, soil, and clay mixed.

Roll each layer thoroughly. For a top finish a very fine gravel is used on some courts, sand is used on others. You will probably use that which is most available. Clay is hard to work with, but when overlaid with fine sand makes a hard court on which the swiftest experts can play with enjoyment.

The care of the court should be taken week about, two boys working together. The roller should be used often, especially after a rain, and worn spots mended immediately before they get bigger.

Most clubs count in an expensive marker when estimating the cost of tennis. An ingenious boy can make one for nothing. A square varnish tin or olive oil can holding a gallon or more can easily be held by a framework upon a wheelbarrow or wheel hoe in such a way that the drip from two nail holes will fall upon the broad rim of the wheel. Fold a piece of paper into funnel shape, fill the can with thin whitewash and paint mixed and you are as well equipped as if you had spent five dollars for a marker.

If conditions favour a grass court the sod should be taken off and the ground beneath spaded, raked, and made level. Then the sod should be matched and laid accurately, then rolled, sprinkled, and rolled again; for three days at least the rolling and sprinkling should be repeated.

#### SHOVELLING SNOW

The boys of our neighbourhood made an abundance of pocket-money in the winter time by combining into a "Snow Shovellers Union." Most of the men

on our street take early trains and have very little time, and even less inclination to shovel snow. The boys are out early before the snow gets packed on the sidewalks. They work by the job or by the hour, whichever the employer prefers.

At first the boys expected the employers to furnish the tools. But that didn't work very well. To make work a pleasure one must have his tools right and an expert snow shoveller does not want to use a dilapidated spade on one job, a short-handled shovel here, and a long-handled one there. He wants snow shovelling tools and after a little experience he knows what he wants.

The tools can be made by the boys. Our boys made a most efficient plough for walks, out of cheap store boxes, and a scraper for steps that fit every corner accurately so that one scrape did the trick and no false motions to waste time and strength. For informal paths to chicken house, garden, etc., a shovel made of light barrel staves sawed in halves was found to be better than an expensive iron-bound shovel from the department store.

If there is a lame boy on your street take him into the Union too; although he can't keep up with you at the shovel, he can have a book, keep track of the time each boy can work, call at patrons' doors to arrange about their work, and these things are just as important as the actual shovelling.

#### MOWING LAWNS

In summer the Snow Shovellers Union can reform into the "Lawn Mowers and Irrigators, Limited." Every year I used to send my lawn mower to a "tinker" who charged me one dollar and twenty-five cents for *sharpening* it. I learned one day and it made me sad, that a lawn mower properly cared for keeps itself sharp. Any boy who is strong enough to run a lawn mower ought to be smart enough to take care of one. He needs to know how the machine is put together, what parts do the work and where the wear comes on the parts. The directions which come with a good machine are worth reading. The man who sells the mower may not be able to explain any part you don't understand. His business may be to sell, only. If you go into the hardware store and find the man who knows all about lawn mowers, he will be only too glad to show you how to run the machine so that it will do its work and last. It is to his interest to have you recommend his machine. Make yourself familiar with a machine in perfect working order. Your ears and your eyes ought to tell you when it is going wrong.

It is, above all, of greatest importance to know how to adjust a lawn mower. A wrench, a screw-driver, and an oil can should be your constant companions. Go over the machine before you begin and put it in shape. It is ten minutes well spent. Tighten screws, oil the parts that rub, adjust the knife to the kind and condition of the grass. When the job is done, look the mower over. If a screw is lost be sure to supply a new one before the next using; clean the machine and put it away in a dry place.

#### UTILIZING WOOD ASHES

Boys who have as part of their daily work the cleaning out of ashes would do well to stop and consider before they dump their pails. Coal ashes are as nearly worthless as anything I know of although they can be used in making a tennis court, and are even advised by some for a very stiff garden soil. A garden must be pretty bad off to be improved by coal ashes.

But there are thousands of cords of wood burned every year and wood ashes are very valuable. There is no fertilizer equal to them for certain purposes. Not only are they valuable at home, but they are an article of commerce, and have a market value. Who has a better right to the ashes than the boy who manages the ash pan?

Barrels are the most convenient receptacles to store ashes in. Cheap boxes come next. They should be tight and kept under cover. Leaching takes the value out of wood ashes.

#### PLANTING CROCUSES ON THE LAWN

Did you ever see crocuses, yellow, lavender, and white, scattered informally in the lawn, coming into blossom with the earliest springing grass. One fall we tried the experiment of poking a crocus bulb down in the hole where we took out a dandelion and the result was charming. There are philosophers who profess to a liking for dandelions in the lawn. Perhaps it is Hobson's choice with them, as with many, but although the dandelion flower is bright as gold the leaves are a real nuisance. They are coarse and rank and they resist the lawn-mower, and discourage the fine grasses. Except when in blossom they are a disfiguring feature. Crocuses are certainly more delicate in flower than dandelions and their leaves are more like grass. Moreover they die down early and are out of the way of the lawn mower. So instead of just digging out a dandelion or a thistle and leaving a bare hole, I

recommend that you poke in a crocus bulb next fall. Your reward will come in gold and purple.

### MAKING ICE

Lots of us get along without ice in winter because we cannot afford to buy it all the year round. We put things outside and they freeze, we keep them in the kitchen and they spoil. The butter is either too hard or too soft all the time.

Boys and girls like ice-cream the year round and yet many of us do without it in the winter time because the iceman does not come around. Sometimes you may have thought when you broke the ice in the watering trough that there was nearly enough to make a freezer of ice-cream.

Did it not occur to you that you could make home-made ice, supply the refrigerator in coldest weather, and make ice-cream whenever you want it? All you need is the cold weather and a heavy tin pail. Fill the pail with clean water some clear, cold night and stand it where it will get the greatest exposure. If the mercury is a little below zero it will freeze a coat of ice two or more inches thick on top and sides of the pail. Turn the pail upside down on a bench and turn enough hot water over it to loosen the pail; then take it off. The ice on the bottom will be thin. Break this and dip out all of the water, but about two inches. This will freeze very quickly in cold weather and you can put in more. Keep filling it up until your ice pail is solid. It is then ready for the refrigerator.

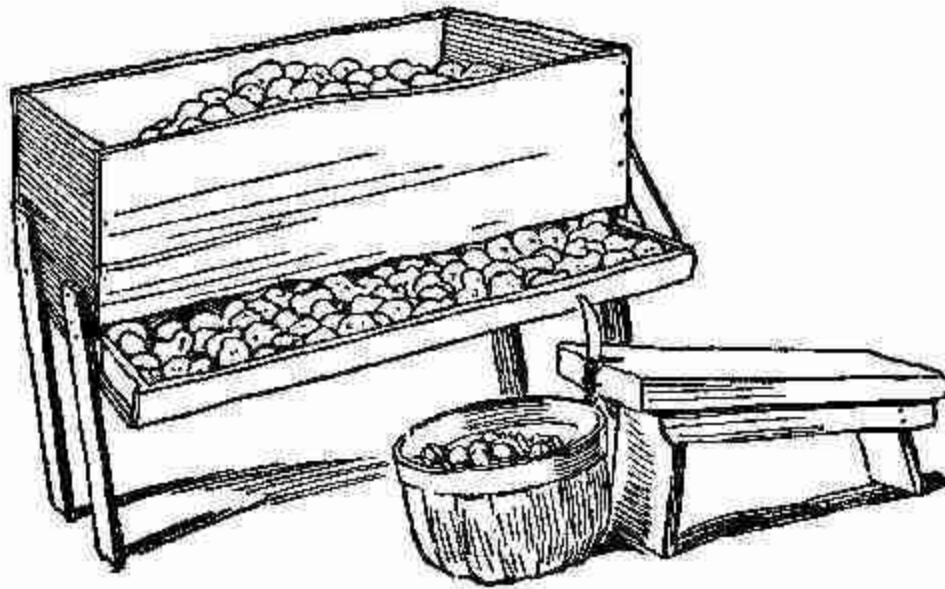
From making one block of ice in a heavy tin pail it is an easy step to making a winter supply to store in sawdust where the sun cannot melt it during a thaw and where you can get at it when needed. From this the logical conclusion is that a man and his boys could make a supply of ice for both summer and winter by following the same tactics.

How well I remember the hardships of the ice harvesters of my home neighbourhood. The ice had to be cut in the river three miles away, and hauled up a bad hill. If the roads were good the ice was bad as a rule. Good sleighing meant ice covered with snow. There was always anxiety for fear we should not get a supply, and often the houses were filled with thin cakes, for fear the cold weather was over for the year. Then the hauling and the

cutting in the bitter weather was bad for men and teams. The ice was river ice and we knew it was unsafe.

A writer in *Country Life* describes how he made his supply of home-made ice. He first had a tinner make heavy tin boxes of a size convenient to handle. He had them made an inch smaller at the bottom than at the top and the top was bound over a heavy wire. When the cold weather came the clean pans were filled from the well. The cakes were turned out of the pans next day and dipped and filled just as described above, as solid cakes formed. These were packed in the ice house for the summer's supply as fast as made. The cost was less in time and cash, than putting up "wild ice," even including the cost of pans, which can, of course, be used over and over, year after year.

#### **CUTTING SEED POTATOES**



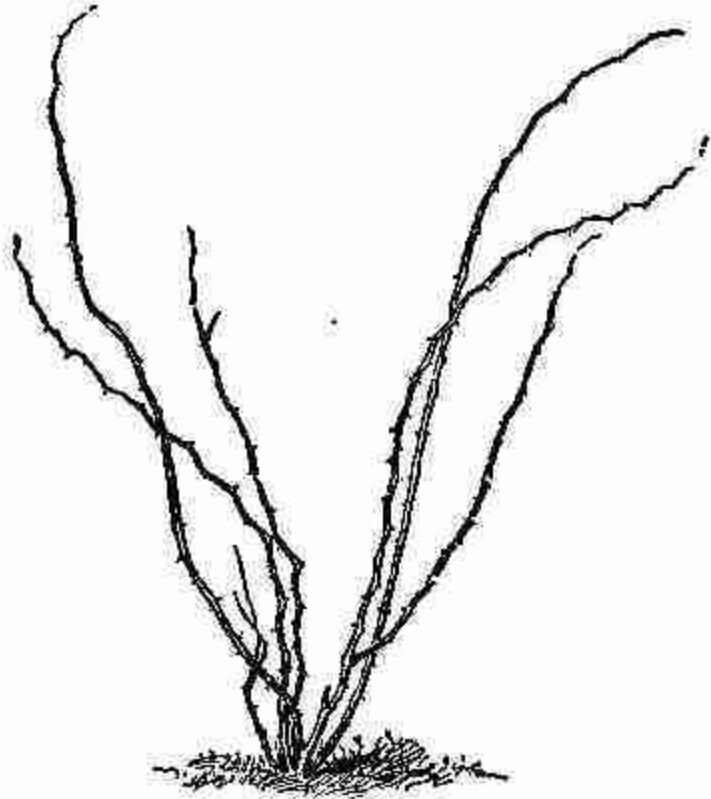
**For cutting seed potatoes**

Cutting seed potatoes is a job that most boys and girls dislike and no wonder. It takes so long, is so dirty, your thumb gets so scored and even cut seriously. But most fathers want the potatoes cut before planting and who is to do it but the boys and girls? Two ingenious boys invented a contraption which decreased the time and labour to a minimum and almost made the job a pleasure. This description of their potato cutter is adapted from *Farming* for April, nineteen hundred and seven. A dry goods box holding several bushels was fitted with four strong legs, just long enough to lift the box to a height convenient to sit by. At the bottom of one side of the box a board was removed to let the potatoes roll out on a shelf attached beneath the opening. The shelf should have a rim two or three inches high and there should be a crack where shelf and box come together to let the dust sift down. The knife is driven into the end of a short piece of plank and held with fence staples. The boy sits on the plank. The potato is pushed forward against the sharp blade and the pieces drop into the basket. A man can cut forty bushels of potatoes in a day with this outfit.

The work ought to be done out under a tree, and if the boys want to wear gloves to keep their hands clean and smooth for more delicate work, I

should encourage them to do so.

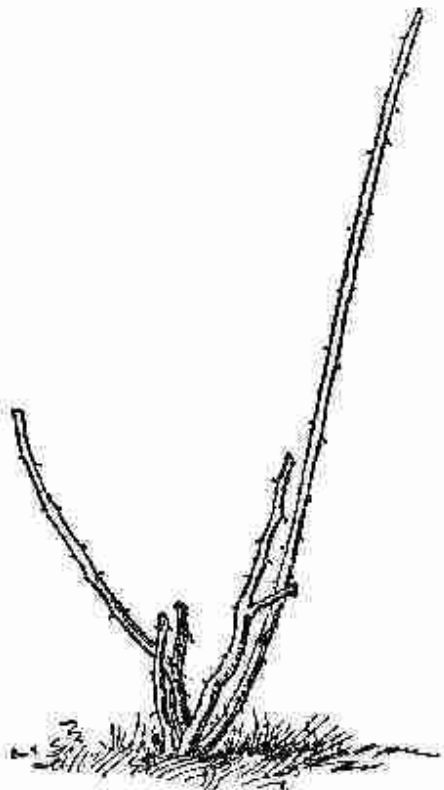
### PRUNING



**Rosebush before pruning**

When I see a lot of ignorant labourers put onto the job of pruning trees, my blood fairly boils. Their work, unless overseen by an expert, is pure butchery. Many a noble tree has been so mangled by saw and axe that it has become an easy prey to all sorts of diseases.

Pruning is work that requires intelligence. In orchard and door yard any one with the strength to wield a saw or shears can do the annual pruning. A woman can do it as I can testify, except occasionally where large limbs are to be handled. Such occasions seldom arise on a well-cared-for place. It is impossible to treat the whole subject of pruning in one short chapter, but there is nothing difficult to understand about the principles or practice. In ten minutes an expert grape pruner could show a pupil how to prune a



**Rosebush after pruning**

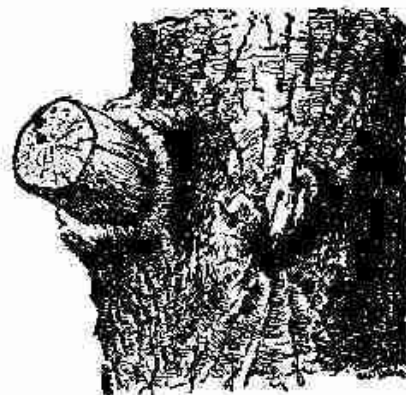
grape-vine so as to produce the best and largest crop. Each kind of shrub whether for fruit or flowers requires its special treatment. It takes experience to acquire judgment but the principles are easy to learn and to practise. You should go to a book on pruning to learn just how to prune the various kinds of shrubs, vines, and trees.

But if there is a limb to be cut off a tree in the door yard who is likely to be delegated to the job? Every boy ought to know how to do this right. You may be acquainted with the boy who sat on the limb and sawed between the tree and himself, but you will certainly not share his fate. When you use the pruning shears on the branches and twigs of a tree or shrub you are, so to speak, cutting its fingernails or hair: but when you go up with a saw you are performin



**The right way. The wound is healing**

g a far more serious operation. Do not forget that the life processes of the tree, the circulation of the blood, the assimilation of the food, the respiration, all go on right



**The wrong way. The stub prevents healing**

under the bark. The "heart" of the tree is a misnomer. That fresh moist layer which is uncovered by the skinning of a tree is the only part of the tree which is really actively alive and at work.

This layer, called the cambium, extends like a tight-fitting garment over the entire tree. Every tiny twig and spur is overlaid with it. If you ever had an "infected" finger from a scratch or pin prick or cut you have some idea of the danger the tree is exposed to when the cambium layer is laid bare and the wound neglected. Compare the two drawings on this page. Look at the trees in your yard. Are there some like No. 1 and others like No. 2? In No. 1 the pruner cut a branch off close up to the main trunk. The wound was dressed with thick paint to close the pores. All around the edge of the wound was the cut edge of the cambium layer. A roll of new tissue formed there, covering a part of the wound the first year. In a year or two more the roll became broad enough to close over the smooth base where the severed limb was. The wound is healed. But look at the long stubs of No. 2. That was the work of a "tree butcher." Already the stub has begun to rot and the injury has gone far into the tree, past cure. You have seen a fine board ruined by a knot hole? That knot hole was made by careless pruning. Have you seen beautiful "curly" places in fine woodwork? Those curls or "eyes" are made by the healing over of places where limbs came off. As the cambium adds layer after layer over it, the base of the old limb becomes more and more deeply buried in the wood.

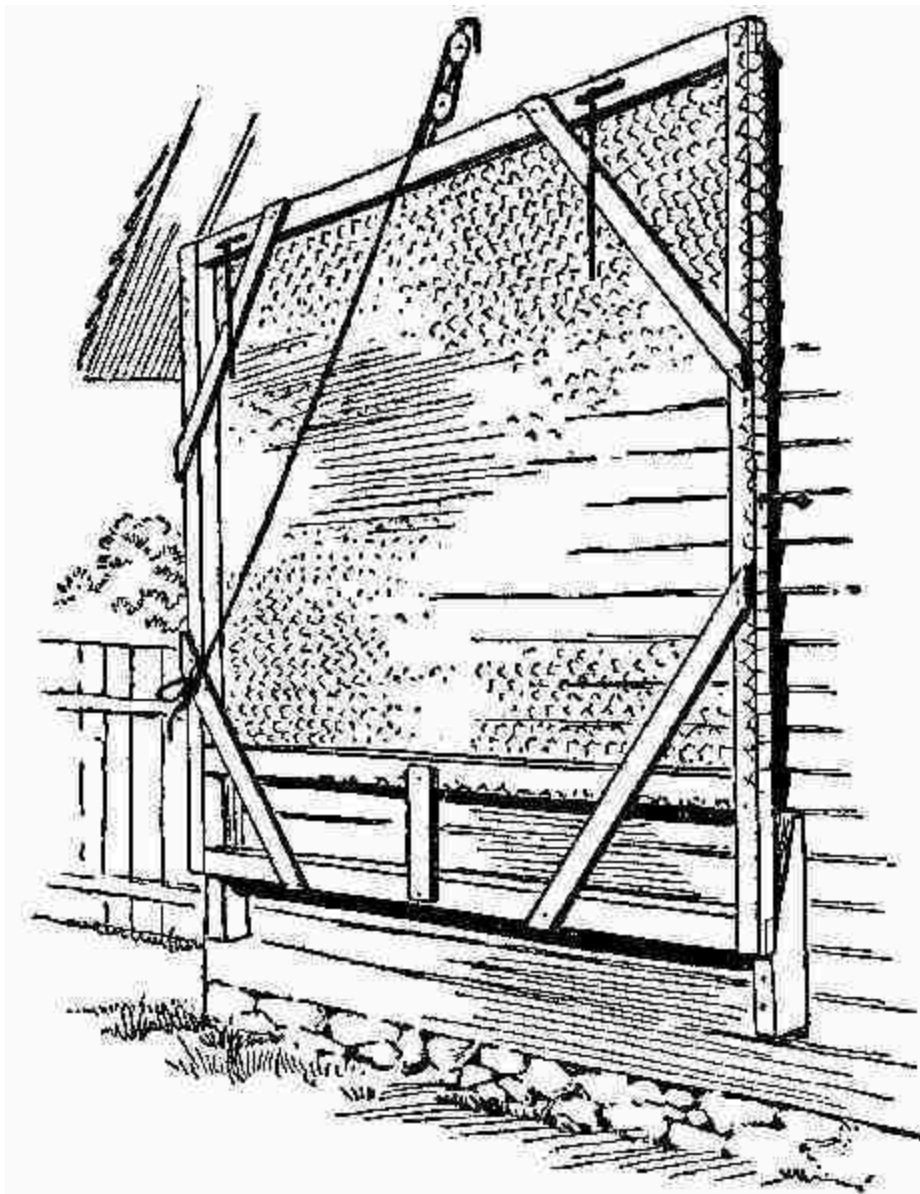
Learn the principles of pruning: cut off the branch, no matter how small, close to the trunk or larger branch from which it grew; cover the wound with a dressing to prevent decay. Trees, shrubs, vines, and bushes should be pruned every year. Cut out all dead wood, and then prune to shape the tree or shrub as you want it or to produce the greatest quantity of fruit, blossoms or branches.

#### CLEANING RUGS

The sanitary home has never a carpet these days, but rugs on bare floors. These rugs, if small enough to handle every week, make the semi-annual old bugbear of house-cleaning a thing of the past. What could be more dreary than to come home from school some afternoon and find the floors littered with flattened old straw, so gray with dust as to be scarcely recognizable? Getting that straw out was the boys' work, the girls did the sweeping and mother washed the floor. How cheerless the days that followed! How damp the floors, how extra careful we had to be not to carry in dirt on our way to bed! The whole house wore a dejected expression reflected by the family. All because of those miserable carpets. They had to

be beaten, too, and the clouds of dust that had to be breathed before we heard the welcome call, "That's enough now. Don't whip that carpet all to pieces. Fold it up and bring it in." As we folded it we realized how far from clean it really was and how we longed to *turn the hose on it*. But no one had the courage to suggest such an unorthodox proceeding. Probably the colour would all run and the carpet would shrink and everything. But anyhow we wished it was really clean, now that so much discomfort had been endured to clean it.

Rugs on bare floors are preferable. They can be swept and beaten every week and they can be washed. No rug should be hung on a line to be beaten. It is bad for the rug and a waste of energy. A rug-beating rack can be made which will save the wear on the rugs and get them more nearly clean than any other dry method I know of. It is described, by Mr. W. C. Egan, who devised it, as follows:

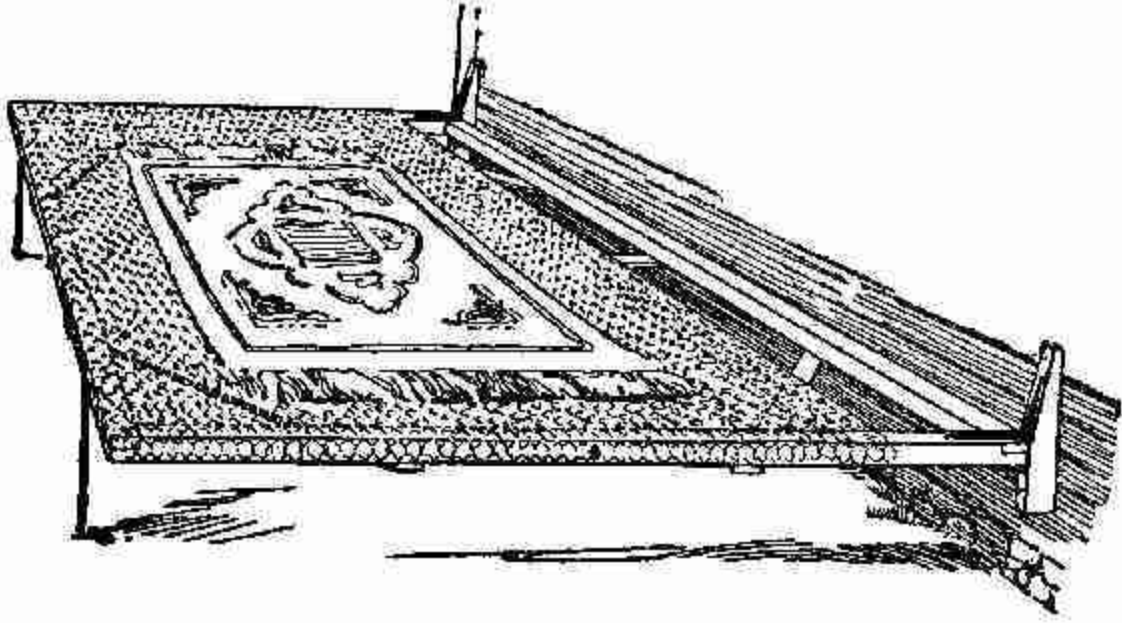


**Rug-beating frame up against the barn**

Make a frame of four by four pine timbers, braced across the corners. It should be somewhat bigger than the biggest rug you expect to beat. Stretch galvanized iron fencing over this frame and staple it securely all round. The best place for this frame is at the side of the barn. Strong strap hinges should be used to attach it to a piece of four by four spiked to the barn at a height convenient for your beating. When the frame is not in use it is pushed up and rests against the side of the barn, held in place by hooks. A rope and two pulleys enable one to raise and lower the frame easily. When

down, the frame rests on swinging legs made of inch iron pipe and attached to the frame at the outer corners. The rug should be laid on the netting pile downward.

Rug-beating is hard work no matter what kind of tools one has. But who does not love to ply the hose? I made up my mind once that a rug that had to have an expensive compressed air bath or stay dirty was not living up to its function as a sanitary floor covering. I experimented with an all-wool rug, some good white soap, warm rain water, and a scrubbing brush. A good lather was laid first on the back, then I threw discretion to the winds and lathered the face of the thing. I scrubbed it as if my life depended upon making the colours run, if they would. Then I let the children turn the hose on it. We turned it over and over and over again, till it was very, very wet. It was also clean. We left it on the grass in the shade the first day. Then we laid it still damp, face down, on the clean, dry floor of the porch where the sun could get at it and the breeze. It was dry by the night of the second day and so clean that it was a real joy to handle it. One by one we put every rug in the house through the same course of treatment. A couple of Wiltons, a few of Brussels carpeting, some that were woven out of old ingrain carpets, the rag ones, and finally the precious Orientals went through the water cure. Before I dared do this last act, I got advice from a rug man, who said that really good rugs would suffer no harm from such treatment. But one never believes until he tries it, and now we all believe, and our rugs are more beautiful than before. We treated the best rugs very gently, of course, but none the less thoroughly, and we dried them face up on the hard floor right in the sun part of the time. It takes about three days and nights to get the dampness all out.



**Rug-beating frame, down in use**

Good rugs ought never to be treated roughly. They should be swept gently *with the nap*, and never beaten with a whip, hung on the line, or shaken. Lay on a soft carpet of grass or on a rug-beating frame and beat gently with a flat rattan beater. When rolled, roll with the nap; never fold them.

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## XI

# MAKING THE COUNTRY A BETTER PLACE TO LIVE IN

ONCE asked Professor Bailey, "What is the most important farm crop raised in the United States?"

Without a moment's hesitation he answered, "Boys and girls."

Of course they are.

The best farmers, the real bone and sinew of the country, are the kind that raise the crops themselves, without much help from the outside. They grow nearly every thing they eat, and exchange their surplus for the food and clothing that they can't raise. There is a type of farm life where the family is brought up on the principle that what is too poor to sell is good enough to eat. The boys and girls of such a family are too good for such a life. They do not stay in the country. Like the big apples, the prize potatoes, and the gilt-edge butter, though raised on the farm, they are consumed in the city.

The country is the best place in the world for boys and girls to grow up in, just because it is the country. But there are ways in which country life can be improved and if the grown folks are too busy raising crops, the young folks must head the campaign which is to make the country a better place to live in.

Since this is a book on outdoor work we cannot consider ways of making the life indoors more attractive, more comfortable, more convenient, and more sanitary, but concern ourselves with outdoor problems only.

Boys and girls, stop and think. What can you do to make your own particular corner of the country a better place for you and your companions to live in? When a crowd of boys meet together, what do they talk about? Are they interested in local affairs or do they tell each other of the great things they expect to do when they get away? A wise old man once said, "In

a republic you ought to begin to train a child for good citizenship on the day of its birth."

Are you going to be a good citizen? Are you patriotic? Do you salute the flag at school, and then go out and break the game laws? Train now for citizenship. There is more patriotism in obeying the laws of your home, your school, your town, and your state than there is in parading with flags and band in the National Guards. Good citizenship begins at home. How can you make your own home a more desirable place for your brothers and sisters to live in? Take a look at the house. Is it plain and unadorned and uncomfortable? Are the surroundings bare and ugly? Have you had experience in building, painting, and planting? If you can help build a corn crib, you can make a porch over the front door or a sidewalk connecting the back door with the pump or the milk house. If you can help paint the barn, why not the house? If you can plant trees in the orchard, why not shrubs in the door yard, and vines over the porch? Don't think you must have expensive pillars and fancy railings. They will not look as well as rustic work or pillars of home-made cement. The vines will soon cover the porch with their greenery if given half a chance.

#### OUTDOOR CLUBS

Have you a boys' club in your neighbourhood? Or a girls' club? You used to have a literary society in school, and it failed? Why was that? The boys didn't take any interest in it.

Why not have a club that the boys will take an interest in and a club that the girls will take an interest in? What kinds of clubs do boys like? Athletic clubs where they wrestle, box, turn handsprings, have jumping, skating, walking, and running matches, and play such games of skill and endurance as hare and hounds, pitching horseshoes, and baseball. They like all sorts of clubs that get real things done, like raising prize corn or cotton or pigs or training colts or steers or dogs. Boys and girls like to compete for prizes. How boys or girls will work to do something so much better than any other boy or girl in the crowd that the judges will award the prize to them. It is hard in contests like these to be able to walk up like a true sportsman and congratulate the winner. But a boy can learn to do it; so can a girl. All over the United States boys are banding together to raise better corn, better cotton, better chickens, better fruit. North, west, east, and south, thousands

of boys are raising corn. They test their seed, prepare the soil, plant, cultivate, and harvest the crop, weigh it, take it to the exhibition where they compare it with other boys' crops, and see for themselves who has the best yield. One boy, a member of the Winnebago County Farmer Boys' Experiment Club took first prize of fifteen dollars in gold for the best ten ears of corn. This club has about eleven hundred members. There is a Winnebago County Girls' Home Culture Club with an equally large membership. These boys and girls are growing up to be good citizens right there in the country, where they were born. They don't have to go to the city to find education or good manners or a good time. The fathers and mothers, the school teachers, the ministers, and the county superintendent of schools all work together in Winnebago County, Ill., and they can everywhere.



Photograph by Helen W. Cooke

### **Is This Work or Play?**

The boys in your home school can form a Boys' Agricultural Club now. The first thing you need is information about other clubs. Your club will not be just like the others. It ought not to be. But if you know how the others are managed it will help you to manage yours. Send to the Secretary of

Agriculture, Washington, D. C., and ask for Farmers' Bulletin No. 385 on Boys' and Girls' Agricultural Clubs. On page fifteen of this bulletin are suggestions as to an invitation to be sent out for the first meeting. If your teacher is willing you can hold the first meeting some Friday afternoon in the early spring at the school-house. If the teacher is not yet interested hold the meeting at some home in the neighbourhood. If you are acquainted with the county superintendent or the school commissioner, tell him about the club you want to start, and maybe he will arrange for the first meeting and get all the boys and girls in the county organized. You could have a local chapter of the club, with local exhibits and local prizes; then you could have a space at the county fair, and members of different clubs all over the county could compete for first prize.

The bulletin gives suggestions for a constitution, enrollment of members, and a scheme for cards on which to keep a record of the crop you are going to grow. There are rules, too, that each person who competes for prizes must observe.

A good many boys' clubs start in with growing a crop of corn, and girls' clubs with bread-making. They need not do these same things every year, although one can learn something new about growing corn, raising chickens, or making bread every year.

The country would be a better place to live in, if there were more boys' and girls' clubs.

#### ATTRACTING BIRDS

The country would be a better place to live in if there were more song birds there. I know of a shrewd firm of real estate men, who wished to attract a certain class of residents to their suburban section, knowing that others would follow and property become more valuable. They laid out the woodsy tract with as little change from the natural conditions as they could, and still have a sanitary, convenient, and comfortable suburb. They did not chop down the trees in order to run straight roads through, nor did they fill in the small gully that wanted to be a brook. They encouraged the brook and ran their roadways so as to avoid the big trees and give each building site a character of its own and privacy. Then they put a man in charge with strict orders to make the place attractive to song birds; to protect and feed them; to destroy their enemies. He was also to foster and encourage such wild

flowers and ferns as grew naturally in the woods, and to propagate and increase them so as to make the place a paradise. The man entered into the spirit of their idea and succeeded wonderfully. The real estate men advertised and the right people came and were convinced and bought homes there and "lived happy ever after."

#### **BRINGING BACK THE SONG BIRDS**

How can boys and girls bring back our song birds? I will not say much about why we want them, for in enlightened America we take it for granted. Some people still want to be convinced that birds are of practical value. I will say only that the damage to crops by insects in nineteen hundred and four, is estimated at nine hundred and seventy-five million dollars. Investigations by scientists in state and nation all go to prove that a vast percentage of this loss could have been saved by birds. I wish every child would be ambitious to increase the bird life on every farm, on every village block. Here are some facts that ought to be convincing. I take them at random from my notes:

Kingbirds kill bot-flies.

Brown thrashers feed mostly on insects, especially white grubs and curculios.

Cat-birds, cuckoos and orioles are very important enemies of gypsy moth.

The red-eyed vireos are "premium caterpillar hunters."

Bluebirds board themselves. Eat cut-worms, furry caterpillars, and grasshoppers.

Wrens' food is ninety-eight per cent. animal matter.

Warblers, titmice, creepers, and nut hatches eat lice.

A pair of robins fed their nestlings this menu in three hours, bringing food every three minutes: sixty-one earth-worms, sixteen yellow grubs, thirty-eight other insects. Also four grasshoppers, several dragon flies, and a few moths.

Robins rank first as enemies of white grub.

Kingbirds protect poultry by driving away hawks; ninety-eight per cent. of their food is insects, mostly injurious sorts.

Woodpeckers destroy grubs in living trees. Phoebes catch flies, lighting on backs of cattle so as to be handy; also elm-leaf beetle, adults of canker-worms, cut-worms and gypsy.

Baltimore orioles are worth their weight in gold as destroyers of gypsy and brown-tail moths.

Rose-breasted grosbeaks cleaned out potato beetles.

Scarlet tanagers ate gypsy moths at the rate of thirty-eight per minute for eighteen consecutive minutes.

Thirty cedar waxwings will destroy ninety thousand canker-worms in a month.

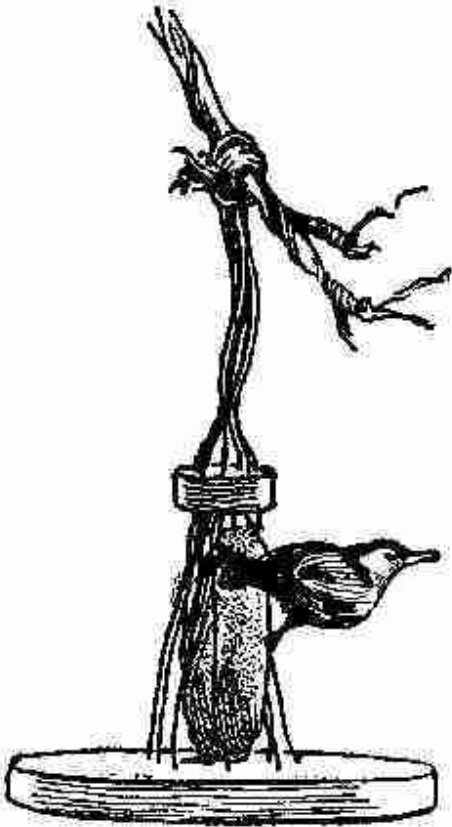
So we can pile up the evidence in favour of the birds.

#### **HOW TO ATTRACT BIRDS**

Two words tell us what to do to increase bird life: provide and protect. We must provide food, water, and nesting places. We must protect from disturbance, from natural enemies, from destruction by hunters who sell the feathers.

All over the country, laws to protect birds are being introduced into legislatures. Boys and girls may think that they cannot do much to help make laws. They can if their fathers are in the legislature as lots of fathers are, take the country over. Maybe your father does not know how much birds are worth. Get him to read the bulletins issued by the government. The boys who protect the birds around home will be the law makers some fine day themselves. They'll "see to it," then.

But now what can you do to-day? Is it winter? Feed the birds. There are many winter bird residents. Where are the insects in winter? Have they gone south? Not a bit of it. They lurk under the bark on your apple trees. They hide on the fence rails and under the leaves. Trust the birds to find them unless snow prevents. The extra feeding you give them will not toll them away from the insect food they love, but will keep them "on the job" and will keep them from starving in stormy weather. Water, too, they often suffer for in winter. Supply it in shallow basins and slightly warmed. Tie suet to the trees; sacks made of loose netting will hold nut meats for them. Scatter grain for the grain eaters on a platform.



**A birds' table hung with  
wires**

In spring furnish nesting places and material, protection from cats and distressing disturbances; mud for robins, string for orioles, floss, feathers, and straw for others. Do something every day for your birds. Drinking fountains are a necessity, especially in towns where there is no running water. Shallow basins are best. They will often come right to the door and drink or bathe, unless frightened by some real or fancied danger. To make the birds tame you must make them feel safe, and supply their wants.

#### **THE TRAFFIC IN BIRD SKINS**

Not many girls wear birds' feathers in their hats. But many women do, and girls get to be women very soon. No one knows how many birds are slaughtered in America each year for hat trimmings. A few facts are available such as: seventy thousand skins were sent in four months from a small district on Long Island; one New York house contracts to furnish to Paris forty thousand skins in one season; four hundred thousand bird skins from America sold in one London auction room in three months. These numbers fairly stagger the reader. I don't know one American girl who would kill a bird. If every one of them would refuse ever to wear any bird feathers there would be a great falling off in this traffic.

Collecting birds' eggs and nests is still quite common, and should be discouraged. The present state of the bird population does not warrant the destruction of any except for the big museums. Their collectors are trained

experts who collect only such birds as are needed for scientific purposes. They go at the right season to do the least damage, and they do not slaughter by wholesale.

Besides cats, which can be regulated to a certain extent in our homes, birds have other enemies. Crows, though valuable insect eaters, are bad nest robbers and have been caught in the act of killing nestlings and even small adult birds. Snakes eat both eggs and young. Guards for cats will keep out squirrels which molest the birds' nests. Ground nesting birds may be protected with wire netting. Where this has been tried, in no case did it cause birds to desert the nests.

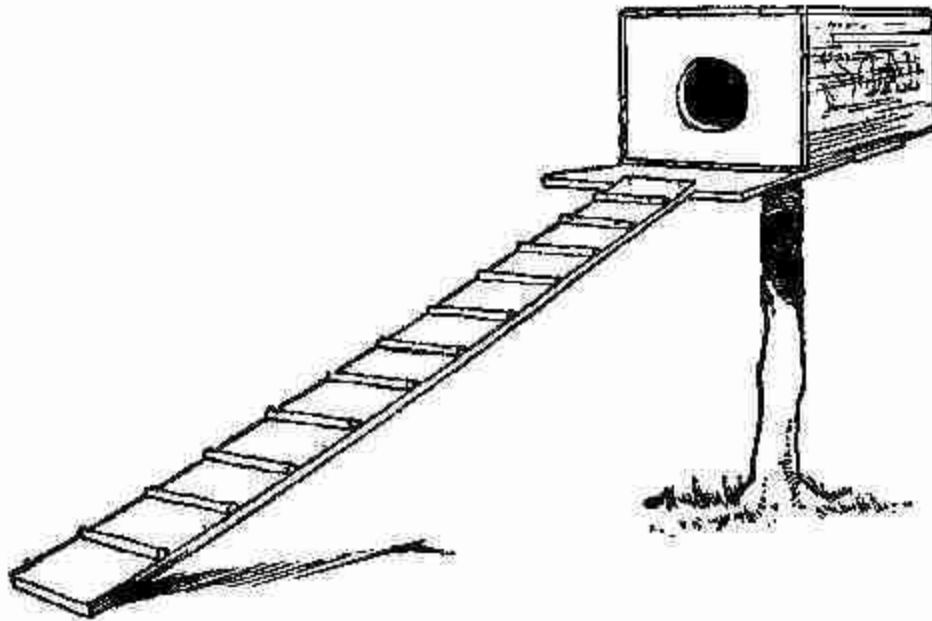
Birds need thickets, hedge-rows and shrubbery for nesting places, hiding places, and shelter from storms.

Every farmer who kills the birds on his place justifies the destruction by the evidence that they eat fruit. True, some of them do. But if water is provided many of them prefer it to fruit juice. To preserve our strawberries and cherries, we should plant June berry and Russian mulberry, which the birds like better. Chokeberry, buckthorn, elder berry, and mulberry will attract birds away from blackberry and raspberry patches. Wild cherry will protect the grapes, as both ripen late.

#### **DOMESTICATING WILD GAME**

The country would be a more attractive place to live in if there were more wild game. Thirty years ago, when I was a little girl in the middle West, my brothers used to shoot "prairie chickens" (grouse), quail (bob-white), wild geese, brant, wild ducks, and even bigger birds. But now the guns are all rusty, and the powder flask is empty. I came across the old wad-cutter in the attic and hardly recognized it.

Efforts are being made in several states to rear wild fowl in the barn yard. Bob-white, grouse, mallard, wood ducks, and Canada geese are being experimented upon. A measure of success has already been achieved, but more experience is necessary especially with regard to the feeding of the young birds.



**A wood duck will nest in a box like this**

Probably the wild fowl for young hunters to experiment with is wood duck or mallard. A man whose ten years' experience with raising wild fowl has earned him the title of expert, writes as follows: "I think it would be a most useful work to educate our young people up to the fact that with a little patience and a small outlay they can help to increase our supply of wild birds. For raising wood ducks, all one needs is a small pond or even an artificial tank surrounded by a few bushes enclosed by a wire fence. In one corner, place a box on a post three feet high with a cleated boardwalk leading up to a platform from which they can reach the entrance, which should be a round hole. Turn a pair of wood ducks into the enclosure the first of March, and with luck your duck will build her nest, and lay from eight to twelve eggs. In about four weeks the eggs will hatch and the troubles commence."

He goes on to say that some kinds of wild geese are comparatively easy to raise and that they do not require much of a pond, but ample grazing facilities, like their domestic relatives. Mallards, also, are very easy to raise.

As wild fowl bred in captivity bring a very good price and the demand is increasing with the spreading interest in the subject, raising wild fowl might be a source of income to an enterprising young man or woman.

All spring shooting of wild fowls ought to stop. Don't say, "If I don't shoot them, somebody else will." That is not the attitude of a good sportsman. Public opinion among boys can only be established by boys. If you don't believe in hunting in spring, when the ducks are laying or brooding the young, you can not only stop doing it, but you can influence others. Will you do this? To kill one mother duck this year means eight or ten less next year. It is a plain example in arithmetic to see what a big blunder you make if you shoot in spring.

#### **A GAME PRESERVE**

If you live on a big farm or ranch well wooded and watered, your conditions are ideal for creating a private game preserve. If a few wild birds are known to be already at home on your place, encourage them. Let them breed in security and plant their favourite food crops. Small areas of land in various out of the way places can be ploughed and planted in spring to buckwheat and millet, wheat, rye, and barley.

The bob-white has become so rare that you will probably have to plant some seed birds, as they say. They can be bought for five to ten dollars a dozen. Care should be taken that the birds are not frightened when liberated. To spend ten dollars for birds, only to lose them by carelessness, is poor business. These suggestions are given by an experienced game warden: "Take the boxed birds out near some good, thick shelter where they can hide and gain confidence. Attach a long rope to a soap box, scatter grain about near the end of the box nearest the cover, and scatter sheaf grain along toward the cover. Take only three cocks and three hens from the shipping box and put them in the liberating box. Go some distance off and be deliberate. Let the quail get rested and quiet. Pull the long rope, lifting the box gently and steadily. The birds will see the grain and hop out. Watch them from your safe distance following the wheat toward the cover. Keep up the supply of wheat until they are accustomed to their new home, and can find their way back after roaming. Birds should not be planted later than May first."

#### **PROTECTING THE WILD FLOWERS**

The country would be a better place to live in the whole or part of the year or to visit for a day or a week or a month if there were more wild flowers there. Even the man who doesn't know one flower from another will

acknowledge, if asked, that wild flowers make the woods and the roadsides and the meadows prettier to look at.

The country over, our loveliest wild flowers have met the same fate as the bright-feathered birds. They have been hunted for their blossoms and the gatherers have not cared whether they pulled the plants up by the roots or not. The case of trailing arbutus is a particularly sad one. In localities where it used to flourish, selfish and wanton hands have literally rooted it out until none remains.

Only lately has any effort been made to protect the wild flowers and multiply them. Now, in the general awakening of the public to the fact that we are blundering and wasteful, a widespread interest has grown up in saving the wild flowers.

In your own locality you can help this good work. Refrain from destroying the plants yourself. When you gather flowers in woods or meadow do so in moderation. A few loose, graceful sprays will give you as much pleasure as a huge bunch inartistically crowded into a vase. Have you not often seen children returning from a walk in the woods bearing handfuls of columbine? These frail blooms wilt in the hot sun, and the roadway is often strewn with forlorn bunches of them, dropped by tired children. How much better that each child should gather a few and put them all in a botanical case or wet paper to be distributed when they reach home. Those hundreds on the dusty road will never be visited by the ruby-throated humming-bird, nor set any seed for next year's flowers. Older boys and girls can do much to influence the younger ones to gather sparingly.

Another way to increase the wild flowers in your locality is to propagate them. Gather their seeds and plant them in your garden where you can protect the young seedlings from harm. Where they are big enough, set them out where they will have natural conditions. Or undertake a bit of wild gardening right in the woods or the roadside where the plants grow naturally. Clear out less desirable sorts, lessening the struggle for your favourites. Cultivate them a little. See that they do not suffer from too much sun or rain or drought.

If you know of a plot of woodland soon to be denuded or a piece of wild land to be improved, get permission to gather bulbs, roots, and plants there. If you know the flowers the year 'round, you will be able to recognize the

lilies, the orchids, the blood roots, the wild ginger, hepatica, violets, and can transplant them to your own woods or garden.

#### PREVENTING FOREST FIRES

It is October now, and this morning's paper had accounts of terrible forest fires raging in Minnesota. Hundreds dead, thousands homeless, and millions of dollars' worth of property wiped out.

Nobody knows, who has not fought fire, what a fiend the foresters have to deal with. I have looked up many forest fire statistics and I find always noted among the "sources of fires," this item: *Forest Fires Set By Children*. There may not be much that boys and girls can *do* to put in practice the big things we hear talked about under the name of conservation, but one thing you can certainly refrain from doing, and that is, setting a forest fire. A person who makes a fire in the woods is responsible to the community for that fire and its consequences. To boil a coffee pail, to broil bacon, to bake biscuits, to fry fish, to give comfort to the hunter, trapper, camper, or picnicker, many are the legitimate uses of a fire in the woods. No real sportsman forgets his fire. His last act before leaving a camp is to see that no vestige of it remains. He makes sure every spark is dead, then throws on another pail of water, and goes on with a light heart and a clear conscience. If you have ever left a fire in the woods, anywhere, your conscience ought to give you a good jab when you read of forest fires, though distant, a jab that will prevent your repeating the offence.

#### KILLING WEEDS

Weeding is the boy's job, isn't it? If only one could get some kind of inspiration into weeding, so as to rob the work of its drudgery!

If we must serve our time at weeding, let us at least weed intelligently. What is a weed anyhow? In Germany, I am told, the peasants call weeds "*Unkraut*". Since "*Kraut*" is cabbage, "*Unkraut*" must be weeds.

A weed is really a plant growing where we don't want it. The worst weed in a hill of four corn stalks is the fourth stalk of corn that crowds the others. The worst weeds in a row of beets are the little beet plants that crowd each other. What a plague they are!

Some of the plants we usually include among our "coarse native weeds" are grown in gardens in Europe. Mullein, for example, over there is called "the American velvet plant" and a well-grown specimen is really handsome.

If weeds are plants out of place there is much to be done by boys and girls in the way of ridding gardens, lawns, school grounds, and village streets of their overgrowth of weeds. If you clear out one thing put in something better or nature may put in some plant that will not please you. Save seeds from your own garden and drop them along the roadside.

The school grounds are the particular province of the school boys and girls. Join together to make the grounds more beautiful and there is no end to the improvements that will follow.

A lecturer once visited the school in a small village in the state of New York. On his way from the village to the school-house he was impressed with two things: first, the wonderful size and vigour of the burdocks that seemed to have possession of even the front yards on the business streets; and, second, the quantity of rubbish accumulated on the margin of the pretty little stream which wandered under the bridges of the town. Do boys and girls know what public spirit is? Do you know how your little village strikes a stranger? The lecturer was so struck by the sad state of the town that he made up his mind to talk to the school about it. He did. He found that public spirit was not dead there; it was only dormant. The boys and girls had passed by the burdocks so often during their growth that they had taken them for granted. They had so often thrown papers, broken dishes, worn-out baskets, barrels, and rubbish over the bridges that they forgot to notice how it looked. What else is an old creek like that good for anyhow? Can't go swimmin' in it.

Before the man finished his sociable little talk with the boys and girls he had organized the younger ones into brigades of twenty to make war on the burdocks. With the help of teachers and boys he mapped out the town and assigned given localities to certain groups. Each group had a captain with orders. The lecturer had a burdock plant brought in, a tremendous one, root and all, from the school yard. He showed the boys and girls how well adapted this weed is to make a living, how by means of burs it steals rides, travelling from place to place, dropping a few seeds here and a few there. He showed them the tough, long root and told them the plant's life history.

Has the burdock any vulnerable spot they wondered? The only time when burdock is weak is when it comes up as a seedling. One scrape of the hoe would kill hundreds then.

Hearing what was up at school, an enterprising business man offered to give ten dollars to the squad of pupils who brought in the largest number of burdock plants. This added zest to the work and a generous emulation. Before the week was up, the town was rid of burdocks, and there were wagon loads of them withering on the vacant lot near the school. The squad that won the prize brought in upwards of seven hundred plants, root and branch. They donated the money to the school library.

The boys and girls in that village didn't need to be waked up but once. They went to work on the little stream. They had bonfires at the water's edge. They planted willows and other water loving trees on the banks, they asked the selectmen to pass a law to forbid the throwing of rubbish and sewage into the stream. They enforced the law themselves. Then they built two little dams, and made a skating pond right near the school house.

#### GETTING RID OF POISON IVY

If there is any one thing that would make the country a better place to live in for some people, it would be to eradicate poison ivy. When it once gets possession of a fence row, it is an awful job to get it out. Cutting off the tops is about as effectual as cutting your hair. It grows again thicker than ever. The roots and the creeping stems run under ground and every cubic inch of soil has to be gone over.

A great many beautiful plants will have to be destroyed in our fence rows in getting out the poison ivy. But we can replace these, and by constant watchfulness keep the ivy out.

In some localities the village selectmen have seriously undertaken the eradication. Any one who has ever suffered will agree that the work ought to be taken hold of in a public way. Many people are immune. Those who know themselves to be so should undertake the work. A bounty is offered by some towns for uprooted plants.

The hands should be washed frequently with hot water and plenty of soap when working on poison ivy. Washable overalls and shirt should be worn,

as the oil of the ivy gets on the garments and may poison any one who handles them.

### LESSENING THE PLAGUE OF MOSQUITOES

Every boy and girl in the "mosquito belt" realizes keenly that the towns as well as the country would be better places to live in if there were no mosquitoes.

Some people do not believe that it is possible to lessen this plague, much less end it. But such a belief is pure ignorance. I know of an army post where in one season the mosquitoes were eradicated. It was easy there, because the post was isolated and because, when the commandant issued a general order that all rain barrels were to be covered or emptied, the people went right out and obeyed. You see, army people get a fixed habit of obedience. Then the health officer, who really had the matter most at heart, though backed by his superior, had squads of prisoners at work gathering up and carting off tin cans or other rubbish capable of holding water. Pools were drained. Sewer openings and ponds were oiled. Before the mosquitoes had fairly got out of winter quarters all the stagnant water was coated with an oil film. There was no use trying to lay eggs under those conditions, so they left for parts unknown. As mosquitoes cannot fly far unless carried by the wind, they undoubtedly perished just outside the gates, and the people came out and sat on their porches safe and happy. They were ashamed that they had grumbled when the orders came to cover the rain water barrels.

Mosquitoes breed in water. The wigglers of the watering trough or rain barrel are young mosquitoes. You can raise your own mosquitoes as well as your own chickens and pigs. A little precaution would save much annoyance. Neighbourhoods should unite to rid themselves of the pest. Boys can do the work required. The school children in Worcester, Mass., wage very effective war against mosquitoes every year under the guidance of their teachers. The saving in cost of netting and wire screens would almost pay the expense of a campaign against mosquitoes and flies.

After emptying or covering all the water receptacles on the place, it is well to place a few decoy pails in promising situations. When the mosquitoes have deposited their eggs, tip over the pails and that is the end of that lot. One female can produce four hundred eggs, so you see what a calamity it is for her young to come to maturity, which they may do in eight to ten days.

Mosquitoes have their natural enemies. Where areas of water are too large to oil, we should see to it that fish are plentiful, especially goldfish, sunfish, roaches, killies, and minnows. Toads, frogs, and lizards also prey on mosquitoes as do the nymphs of dragon flies and other water insects. Swallows and purple martins catch mosquitoes on the wing.

#### FIGHTING FLIES

The house fly is no longer a mere nuisance, but is a menace to health. He is well named the typhoid fly and the filth fly. The boys and girls who help rid their neighbourhood of these disease-carrying pests are real patriots.

Flies are not a heaven-sent plague in this day and generation. Flies in the milk, flies in the pantry, flies on the kitchen door, flies buzzing about the table, are the obvious result of carelessness and mismanagement. What is more, the remedies are not hard to apply. The typhoid fly (house fly) breeds in horse manure. The adult fly feeds upon every known variety of filth as well as upon good food, but the undeveloped fly is a footless maggot and it breeds in your own and your neighbour's stable yard.

People will go on buying fly paper, fly poison, fly traps, screen doors, and window netting to keep flies out, but the very fly that has visited a typhoid patient to-day may to-morrow leave the imprint of his foul feet on the baby's face, or drown himself, but not his germs, in your gravy.

What does your father have a manure pile for? If he is a frugal farmer he expects to put it on his fields when the other work is out of the way, and plough it in. He knows the value of manure on fields. But does he realize that the best time to carry the manure out is while it is new? Every expert will tell him so and why. In the pile by the barn it lies and burns. Have you seen it smoke? Burnt manure is wasted fertilizer. When it rains, the valuable elements needed by the soil leach out and nourish the crop of "jimson weeds" and burdocks that will crowd round the barn yard next year.

Meantime the flies buzz round the manure pile. The worse it smells the better they like it. They are there for business. Eggs, thousands upon thousands of tiny flies' eggs, are deposited by industrious and prolific flies. A fly's egg! The hired man will laugh at you for bothering over a thing so insignificant. But when his wife comes down with typhoid and the flies come in and worry her, he will complain of his luck and drive out the flies,

which go merrily forth to start little private epidemics all over the neighbourhood.

Destroy their breeding places. That is one remedy for flies. Trap them, poison them, discourage them.

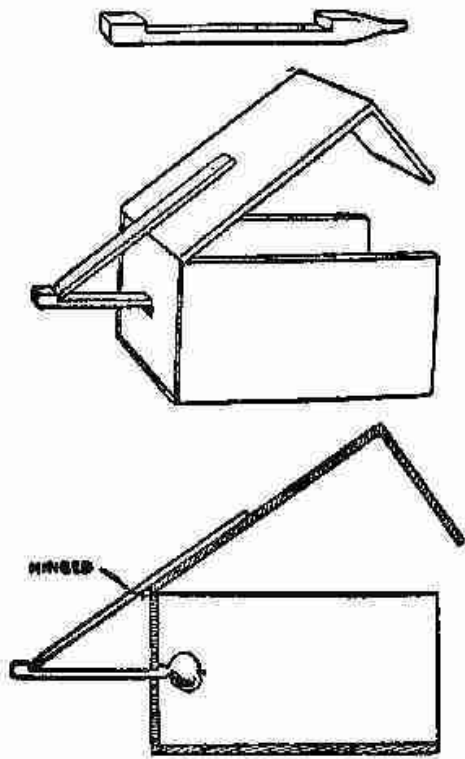
Is it worth while for you to do this when the rest of the people do not? Yes, indeed. If you have very near neighbours, their flies may get to you to some extent, but with nothing to furnish breeding places, and no foul-smelling swill or decaying animal or vegetable stuff around, they will not be attracted to your place. Awaken the neighbour's interest in your "fly-destroying crusade." If you can reach results best by forming a club, organize and pass resolutions and wake people up to their responsibilities. This is practical work for a boys' good citizenship club.

#### TRAPPING

I know a city boy who is fortunate enough to have a farm home to go to as soon as school closes in the summer. With his parents and brothers and sisters he lives the life of the farm boy, with enough of gardening, a little of chicken raising, one cow to milk, and a chance to measure his cunning against that of many "varmints" which would otherwise destroy his garden and steal his chickens. He knows how to use a gun, and when, and where. He can make a good trap, a scientific and humane trap, and he knows the ways of the two-or four-or six-footed enemies he is at war with. Between them and him there is a fair field and no favours, just as between one wild creature and another. If to-day he outwits a crow, to-morrow a skunk pays the crow's score with heavy interest by making a meal of a nestful of young chickens.

This boy has learned enough of the art of preparing skins to make those he gets salable, and he exhibits with just pride a handsome fur skating cap made by his mother out of skins of mink he has taken. His traps add something every year to his growing college fund.

There are a great many things about the business of trapping that seem very horrible and brutal to a sensitive person. Because many cruel men have gone into that life, which is a life of the greatest hardship and has little in it to encourage gentleness, we have rather taken it for granted that all trapping is unjustifiable and that a boy who wants to set traps is an inhuman monster

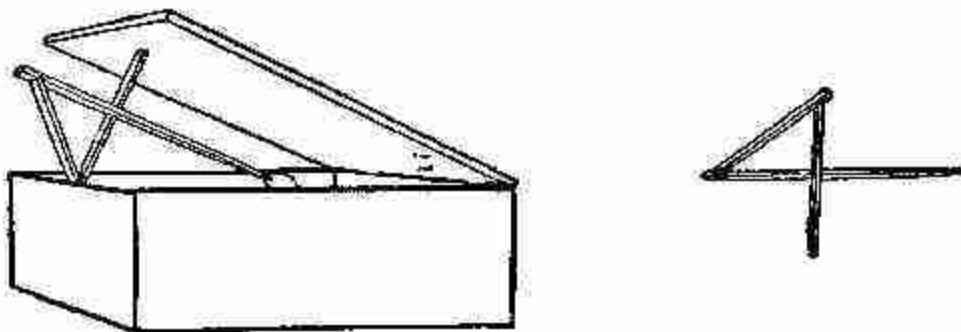


**Simple box-trap**

and not to be tolerated in a civilized home. If fathers and mothers were all like my young friend's parents, they would see that trapping ought to be a part of a boy's training, just like using an axe, or a saw, or a gun.

Trapping everything would be bad business. You would not catch squirrels in a trap any more than you would shoot bluebirds or brown thrashers. One could easily damage his neighbourhood and himself by trapping the wrong things or trapping in the wrong way. A trapper who is a sportsman will see to it that his traps are of the right kind. I would not have a mouse-trap in the house that made a practice of catching mice by the foot or tail. There are traps of many kinds for a variety of purposes and the trapper must either catch his prey alive and provide a

way of despatching it humanely or use a trap which is instantaneous in its deadly work.



**Box-trap and figure 4**

Boys who have learned to trap in the natural, legitimate way do not become "fish butchers" or "game hogs" when they grow up. I once saw a picture of

a game warden standing triumphantly beside a mound of dead crows, two thousand and twelve was the number, I believe. He had cunningly learned to imitate their call so successfully that they could not resist coming within range of his deadly weapon. Crows may be harmful to wild fowl but no boy with right instincts would be guilty of an act so base as this, so unbecoming a sportsman and a gentleman.

Getting rid of the animals which prey upon orchard, garden, and chicken roost is, without question, one of the ways of making the country a better place to live in. Trapping may be regarded as clean sport when done for this purpose, or for food when needed. Catching animals alive for the sake of taming and training them as pets is treated in another chapter and has its own rules.

There are a number of fur-bearing animals which, though too shy to venture inside the barn yard, prey so successfully upon the less fortunate ones, that it has become our duty to take up warfare against them. This duty is all the more heavily laid upon us because, in the act of civilizing the woods and converting the hills and valleys into cultivated fields and pastures, we have destroyed the natural hiding places of the wild things and "upset the balance." If we were suddenly to abandon this country, it would not be many generations before the buffalo, the wild pigeon, and the wild turkey would return to their haunts, the forests would recover the hills, the potato beetle would go back to its Colorado weed, and some natural enemy would control the San José scale and the English sparrow and reduce them to their natural places.

In some localities trapping of fur-bearing animals is still a money-making small industry and if properly carried on will lead to no evil results. The more a boy knows about the habits of the animals he seeks to outwit, the greater will be his chances of a capture, and when he knows a little he will want to know more. He will learn that there are rules in this game as well as in games with his human fellows, and that there are things "that no man would do," and pretend to self-respect. A knowledge of woodcraft is indispensable to the trapper and helps him to take care of himself and act with good judgment in cases of emergency.

A boy that sets a trap takes a certain responsibility. If he fails to visit his traps he breaks a rule of the game. A live animal in a cage trap begins to

suffer very soon for water and for food. An animal in a steel trap, if not dead, will often pull or even gnaw off his injured leg, and escape. His tragic story may often be read in his footprints in the snow. If trapping for skins you must take them off while fresh, as they taint very quickly and may be ruined by delay.

#### TRAPPING MINK

The boy that catches a mink is a pretty lucky boy in these days when those wily little robbers have grown so scarce. The price of mink fur made into muffs and collars is so high as to make a mink skin worth trying for. I can imagine the surprise and well-earned triumph of my young trapping friend when, after trying for a year or two to solve the mystery of the disappearance of his thoroughbred chickens, he finally succeeded in capturing a fine mink. A friend of his to whom he had taught all he could of the art of trapping caught another. And this happened within the city limits of the nation's capital! Who says now that the mink has disappeared?

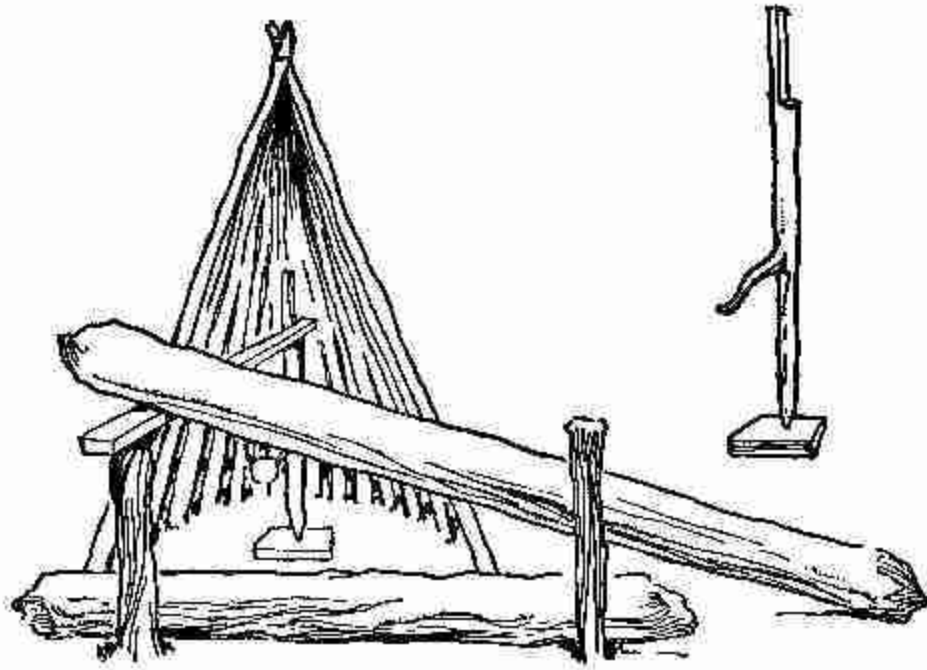
The mink is a flesh-eater, and lives on what he can catch, varying his bill of fare with frogs, snakes, birds, mice, muskrats, and fish. It is always open season for trout in the mink's code of laws and though he is not a water animal his home is more than likely to be near a trout stream, on the bank, in a well-concealed place. It is not fair to trap mink in the breeding season, which is April or May. The young are at the mercy of all sorts of flesh-eaters, including their own fathers, who are a most indiscriminating sort. There ought to be some form of guarantee to a mink mother that while she is foraging for food for her young she will not be enticed into a trap. Later, when she goes a-hunting on her own account and the chances are even, she is legitimate prey for the trapper.

Steel traps are best, say the experts, and they should be cunningly concealed. Gouge out a sort of hole in the bank, conceal the trap at the front, and put the bait farther in so that the trap must be passed to reach the bait. Muskrat flesh, fish, or other meat is the bait used. A common practice is to scorch the bait, to make the odour more pervasive and attractive. The price of fresh mink skins varies according to size and condition from two dollars and a half to four dollars.

#### TRAPPING SKUNKS

The last thing you would expect of a skunk is that he should be popular among the girls. But under the seductive title of Alaska sable, the fur of the plain Jersey or York State skunk is worn with satisfaction by ladies of good sense and good taste. A skunk's pelt is worth two dollars and a half or more and although he is of undoubted value to the farmer as a destroyer of insect pests, I shall not undertake his defence. A cloud of witnesses would rise up to recount their losses from the marauding skunk. His fondness for poultry would be mere circumstantial evidence that he is an enemy of the wild birds as well, but we have direct evidence enough to convict and condemn him. Because of his unusual weapon, used only when hard-pressed in an unequal battle, a good deal of special precaution has to be taken when trapping *Mephitis* for his fur. The least taint of the unmistakable odour ruins the skin, as no cleansing compound has been invented strong enough to remove it or drown it. It is said on good authority that the skunk seldom besprinkles itself when discharging its "rear battery."

Skunks are not very clever nor very swift. They go about at night for the most part, or early evening. The young are born, six to nine in a litter, in April or May. The nests are hidden in holes in hollow trees, among rocks, or in the ground. The young ones frequently follow the old ones all summer or even longer, little realizing that this is a dangerous habit. By tracking them from the scene of their nocturnal visit to or from the stream they run to daily for water, one may find the hiding place. A clever trapper succeeds in capturing a whole family oftentimes by simply making the path the skunks follow more distinct, treading down the grass, and even setting up sticks to guide them along toward the place they wish to go. Traps with bits of meat for bait are set at intervals along the path. A snare and spring pole are said to insure no bad consequences. One author advises the hunter that striking a sudden blow near the tail paralyzes the ejecting muscles. No doubt! But in the meantime what is the skunk doing?



**Deadfall trap**

The white stripe on the skunk's back, while a valuable warning to all of what is approaching, is a disadvantage from the trapper's viewpoint. This stripe varies in length and some varieties are without it entirely. There is a story of the days when the Indians in western New York used to bring in many skunk skins to the local fur-buyer. One red man, a notorious cheat, came in one day with a single skin to sell.

"Long stripe or short stripe," said the buyer, whose prices varied with the length of the white stripe on the skunk's back.

"Ver' short stripe. How much pay?" said the Indian.

"Let's see the skin," said the buyer.

The Indian showed the skin, which was that of a young animal, and very small, the stripe extending the entire length of the skin.

"You said short stripe," said the indignant buyer, pointing the finger of scorn at the runty little skin.

"Short skunk, short stripe," said the Indian with a shrug. "What you pay?"

I cut out an item from the daily paper last week which had this headline: "Skunks sent him to college." Can you draw your own inferences? The fur of skunks is very valuable now and in many fashionable Paris shops it is advertised with large placards printed distinctly for their English-speaking customers, "*Veritable Skong*."

#### TRAPPING WOODCHUCKS

Judging by the tales they tell, New England boys of the passing generation spent most of their time trying to outwit the woodchucks which infested their farms. If all their tales were true, the barn doors of their respective states must have needed stretching to hold all the skins of all those woodchucks, and no boy could possibly have been long without that valuable possession, a whiplash made of woodchuck hide. This little cousin of the squirrels is neither very fleet nor very cunning. He has, though, very quick ears and quicker eyes, and knows that his hole is the safest place for him when boys are around.

The only excuse for hunting woodchucks is that they sometimes get so numerous as to do real damage in the garden, either by their holes and the mounds of earth they throw out, or by eating more vegetables than can reasonably be spared. A better game than hunting them would be to discover how they build their underground galleries. Are these mere holes deep enough to crawl into for safety? Is there more than one tunnel? Has the owner an exit as well as an entrance to his home? Has he a nest, and where and what is it? Does he hoard for winter, or hibernate?

#### TRAPPING MOLES

It is hard to get a new point of view. Having been brought up in the belief that the mole is a nuisance, pure and simple, I find myself unable on short notice to believe that this little blind miner is actually useful. If only he would confine his sphere of usefulness to some other neighbourhood than our lawn! We all think that his underground passages disfigure the lawn. But does the grass die where the tunnels run? I think not. You see patches of dead grass on many lawns, but do you find moles at work in these same lawns? In fact, the brown, dead patches of grass are probably killed by the white grub, arch enemy of grass roots. The mole is arch enemy to the white grub and others of his ilk. According to people who know about moles, we

ought to decorate them with medals instead of trapping them and decorating the barn door with their tiny skins.

The first mole I ever saw was one brought in by our old cat. She laid it down with a sort of shamefaced air as much as to say, "Things have come to a pretty pass when a self-respecting cat is obliged to bring in the likes of that. It fair turns my stomach!" It was not an attractive object, but we children turned it over and over with a stick. What an odd shape, so unlike the animals familiar to us. Its nose like a gimlet, its fore feet like little shovels; no wonder it could tunnel. No eyes, no ears; but what use has a mole for either? Do you know what Oliver Herford said of the mole?

"See, children, the misguided mole,  
He lives down in a deep, dark hole;  
Sweetness and light and good fresh air  
Are things for which he does not care.  
But say not that he has no soul,  
Lest haply we misjudge the mole."

No one can say that the mole has not a redeeming feature. Surely there is no creature clad in a coat of more surpassing softness and fineness than the mole. Are the exquisite "moleskin" garments sometimes seen in furriers' windows really made of tiny skins of this despised little quadruped?

It is not likely that any of us will ever catch many moles. If they are troublesome in your lawn, you and the neighbour boys can do some trapping with mole traps. They are of a kind specially fitted to outwit the mole in his tunnel, and directions accompany each trap.

Every boy knows what "knuckle down" means and how sore your knuckles get in marble time. There is usually one boy in the crowd who is lucky enough to have a knuckle dabster, made of moleskin. "There, use that. Soft as velvet, eh? Nope, don't want to sell it. Caught a mole last summer, tanned the skin myself and my mother made this for me, like the one in 'The Boy's Own Book.' Wouldn't take a dollar for it."

#### TRAPPING MUSKRATS

The first fur collar I ever had was sold to me as "electric seal." There was no deception practised on me, for I knew that the fur was neither electric nor seal. But I didn't know then that it was muskrat fur. They call it Hudson seal nowadays, I believe. These small relatives of the beaver have so few

natural enemies, and are so prolific that they are in no danger of disappearing from our ponds and sluggish streams. The beaver, on the other hand, is supposed to be protected by law. Until it is against the law to sell and to wear beaver skins, trappers will evade the law and escape the fines.

Muskrat fur is not so fine nor thick as that of the beaver and not nearly so expensive. A fresh skin is worth twenty-five to forty cents. They are more in demand now than ever, owing to the fashionable demand for furs and the scarcity of other fur-bearing animals. There are many ways of trapping them. As they are aquatic and active in the winter they are often taken through the ice. Muskrat trappers are always good skaters. A hard blow on the ice will stun the rat, which is pulled out through a hole. They are sometimes speared through holes in the ice. A boy might develop enough patience and perseverance, as well as skill and alertness, in a job like this to make it pay better in some other field than the sale of the skins.

Musk rats are often caught in traps, too. To be successful at this it is necessary to learn a great deal about the little fellow's habits of life, his house, his food and his ways of escaping enemies. It is well to know his enemies, too. These are the fox, the mink, and the otter. You would be a lucky boy, indeed, if instead of common little musquash you bagged an otter whose pelt is worth fifteen or twenty dollars. My father has an otter skin cap about which he and my uncle tell a truly exciting story. They caught an otter, but that was sixty odd years ago.

Musk rats are the greatest nuisance in ornamental grounds where there are large water features. They have an unfortunate fondness for lily bulbs. The boy who can outwit them will win favour with the gardener and the garden's owner, with the muskrat skins thrown in.

#### **TRAPPING GOPHERS**

Our old dog Nimp was convinced that the way to get a gopher was to dig him out. Doctor Hornaday tells an amusing story about his having that same conviction when a boy. Many a night Nimp would come home from the pasture, panting, his coat all rough with the reddish soil that we knew had come out of a gopher hole. Weary, yes, but discouraged, never. The old dog would go back to his job morning after morning. Sometimes we would try to help by carrying buckets full of water and "drowning him out." Never did Nimp scent a gopher near the cattle well but once, and then the boys

drowned him out with a vengeance. The hunted little creature leaped out of a hole so unexpectedly near where the boys sat that one turned a complete somersault and landed in the last pailful of water. Nimp was quicker than his masters and soon laid the bedraggled little miner at our feet. We felt pretty small.

Very little can be said in defence of the gopher. He is an undeniable nuisance and helps to bring the farmer's crop down to a lower figure than it ought to be. Traps and poisoned vegetables are swifter methods of dealing with the case than digging, for the gopher is himself past master in the art of digging.

#### TRAPPING THE WEASEL

One of the natural enemies of the pocket gopher is the weasel. If only we could set the weasel on the gopher and then had something like a mongoose to keep down the weasels! I never yet heard a good word for the weasel. He seems to be the embodiment of all that is mean and sly and hateful. It is undeniable that he does not obey the laws of the woods, that he kills for the mere joy of killing, and that is a high crime. Men with weasel-like ways get to have the same blood-thirsty look. The weasel is a savage, hunting every wild creature in the woods, rabbits, mice, chipmunks, moles, rats, grouse, chickens, and ducks, and even insects. He robs the nests of birds, eats eggs and young, and even the old birds are not safe from him.

I just read in a book that "weasels are so small that their fur has little value, but the time will come when it will be eagerly sought and used." Well, that time has come, but, who ever went to a shop and asked for a weasel tippet? But ask for ermine and they will show any quantity of it. The price! Well, wouldn't the weasel be surprised to find himself so popular. It all comes about because of that interesting habit of his, changing colour in the winter. The weasel is a sort of peculiar shade of brown as you can testify if you have caught one; the ermine is pure white all but the tippest tip of the tail which is dead black; yet they are one and the same. Weasel in summer and ermine in winter.

The weasel, the mink, and the marten are all enemies of the native wild game, and efforts to exterminate them are always applauded by sportsmen. Much is yet to be learned of their habits. Trappers have succeeded in

keeping the mink and marten in check, but the weasel goes his murderous way, feared and hated by everybody.

#### TRAPPING RATS

There is no pest around the farm yard or barn yard anywhere so hard to cope with when once they get a foothold, as rats. Finding them numerous in the barn once, we put chicken feed in the uncemented cellar of the house. Before the end of the first winter of that arrangement we were praying for a visit from the Pied Piper. The rats took possession. They broke dishes, seemingly for the fun of it; they gnawed the softened woodwork around the kitchen sink and held high carnival at midnight throughout the spaces between the walls; they all but bit the babies in their cradles and defied all our efforts to outwit them. Traps, cats, poison, we tried everything, but they outstayed us. If ever we get into a like case again I shall be tempted to try ferrets or cyanide.

Some people are successful trappers of rats, and these suggestions come from them. Set a trap in a pan of meal or bran, cover with same and put it in a runway. Make the runway easy to pass through by placing boards or boxes along near the walls. Cover a trap with thin brown paper or cloth and set it in the runway. Smoke the trap over the fire and heat it hot (not hot enough to draw the temper of the steel), after each setting. Change the place of the trap very often. Wear gloves to keep the odour of your hands from the trap. The rat is the very wisest of all his family, his behaviour seems to be the result of impish intelligence rather than mere instinct for self-preservation.

No true sportsman will allow his antipathy to rats or weasels to lead him to commit acts of cruelty. Fighting them with their own methods makes you into a human rat or weasel.

#### TRAPPING RABBITS

There are times when rabbits get too numerous, and times when they are needed to eat, and times when you want to try your hand at taming a wild one. Under these circumstances it is legitimate sport to hunt or trap them. If damage is being done to crops in the spring we shall be forced to wage war against them in self-defence during their breeding season. Otherwise no sportsman would do it. If there is so little legitimate rabbit food in winter

that they are driven to destroy fruit trees to get a little bark, then the inference is that there are too many rabbits. Study the rabbit's ways of living, and learn his weak points. Find out if he has a "tendon of Achilles" or vulnerable spot. Look one over. What are his conspicuous characteristics? Is it not evident that his life is one long series of narrow escapes? He has few, if any, wits; how low his forehead. Timid eyes. But ears! Can he not hear you coming a mile off? And LEGS! Did you ever see a greater development in that direction? Yes, in a grasshopper, but nowhere else. The rabbit is a perfect mammalian grasshopper. When you stop to think of it you will see a certain pathetic side to its life.

The rabbit has its wild enemies, ever watchful, ever close on its trail. The hawk, the mink, the weasel, the fox, the lynx, and others are rabbit hunters. Besides his quick hearing, and his swiftness, Br'er Rabbit has a wonderful power of becoming invisible. His nondescript colour, combined with his ability to "freeze," serve him as well as a cloak of darkness. The cotton-tail rabbit is commonest in the Middle and Southern states, while his bigger cousin, the varying hare, overlaps the rabbit's territory in the colder parts, and takes his place in the most Northern states. The varying hare is called also the snow-shoe rabbit and the white hare, but in summer he is dull russet brown. You may have heard of the wonderful change of colour of this and other animals. Interesting stories are told of the sudden blanching of the fur, of its turning white, "in a single night," like the locks of the prisoner of Chillon. Not a word of truth in that story. Why do people, whose only fitness for telling stories lies in their having an imagination, make up such yarns about real things? They could invent an animal and then tell as many wonderful tales as they liked and nobody would be deceived. The truth about animals is wonderful enough. If writers would only take pains to find out the truth instead of repeating fancies!

Suppose the early ancestor of the white hare had a grayish-brownish coat, just the thing to protect him from his enemies in a world all full of grayish-brownish things. But one day there came a snow storm, and all the gray-brown things were covered with whiteness, except the poor hare. Suddenly he became the most noticeable object in the woods. Then all his neighbours saw him and wanted him, and mostly they got him.

It was about then that the hare began to be the "varying hare." A law of nature came to his rescue. Some hares there were which were not so dark

coloured as others. They may have been longer winded and swifter footed, too, but anyhow they escaped and lived to bring families into the world. As like breeds like, these young hares took after their parents, and because they were lighter coloured in the winter they in turn escaped and carried this peculiarity into the next generation. It took endless years, and innumerable generations of hares, varying this way and that to fulfill this natural law, and fix the habit. But now that it is fixed we may well view it with wonder, and call it an example of the law of the "survival of the fittest." How is the change brought about? Just as the chickens and the birds moult, and the horse sheds, so do the rabbits. Their summer coats are thinner and brown. One by one the brown hairs fall out in the fall till finally the new coat is there, which is white. It is not like the human hair changing from brown to white. In the fall and then again in the spring there is a time when the varying hare is a variegated hare, his coat being mottled with white and brown.

Rabbits are hunted with dogs and their trails in the new snow are easily followed by the hunter alone. They are caught in traps and snares of various kinds. In one of his lessons in woodcraft, Mr. Seton describes a rabbit snare as follows: "String, a shoe-lace, a buckskin thong, or even a strip of clothing may be used as a snare. There are many ways of making a rabbit snare, but the simplest is the best. The essentials are, first, the snare—an ordinary running noose; second, a twitch-up—that is a branch bent down or a pole set in the crotch of a sapling. The snare is fast to the end of the pole, and spread open in a well worn runway. The loop is about four inches across and placed four inches from the ground. The pole twitch-up is held down by placing the cross-piece of the snare under some projecting snag. The rabbit bounding along, puts his head in the noose, the slight jerk frees the cross-piece from its holder, and in a moment the rabbit is dangling in air."

Rabbit fur is not very durable but is much used for the manufacture of less expensive fur garments. Under the name of "French seal" it finds a ready market and is really soft and pretty.

#### TRAPS THAT BOYS CAN MAKE

There are a number of traps and snares that boys can make. Descriptions of these are to be found in books on amateur carpentry, manual training, and

books for boys of various kinds. The illustrations in this chapter are intended to give a few suggestions.

#### MONEY AND RECREATION IN TRAPPING

I shall not attempt to go at this subject from a professional side, as I think no boys care to trap for a living. Whatever may be said about the boy having a gun in a thickly settled suburb, nothing can be offered against his trapping if he goes at it in an amateur way and with no intent to exterminate the animals (which only a shrewd trapper could do).

I will presume the boy to be attending a neighbouring school either on the edge of a city or in a town. Under these circumstances he must attend to his traps early in the morning or after school. At first there may be no more than enough money in it to cover the cost of traps, but nevertheless the recreation which it offers will appeal to the average boy. As his knowledge of animals becomes greater with time, he will get more and more pocket money.

When he starts in, the other boys may laugh at him and say that there is nothing to trap. In most cases they would make a big mistake, because there often are, on the edge of a city, more fur-bearing animals than in the surrounding country. This for the reason that the professional trapper is not present and most of the city boys do not know how to trap. There are, say, muskrats and an occasional mink along the rivers and streams. The swamps usually abound in muskrats. In the woods and fields are squirrels, rabbits, raccoons, opossums, and (in the North) woodchucks.

It is legitimate to catch the water animals in ordinary steel traps because, if set right, the captive is instantly drowned. For dry land the steel jaw-trap is not suitable, because it will rarely kill the animal, but cause him much suffering as it usually breaks his leg. Often in such case the trapper will only find a foot in his trap, the animal having gnawed or twisted his body free. Nevertheless any trap is humane which kills the animal instantly. There are many new traps on the market which will do this, but on account of their being patented and high-priced they are not extensively used. The traps which are most commonly used for this purpose are the deadfalls and snares.

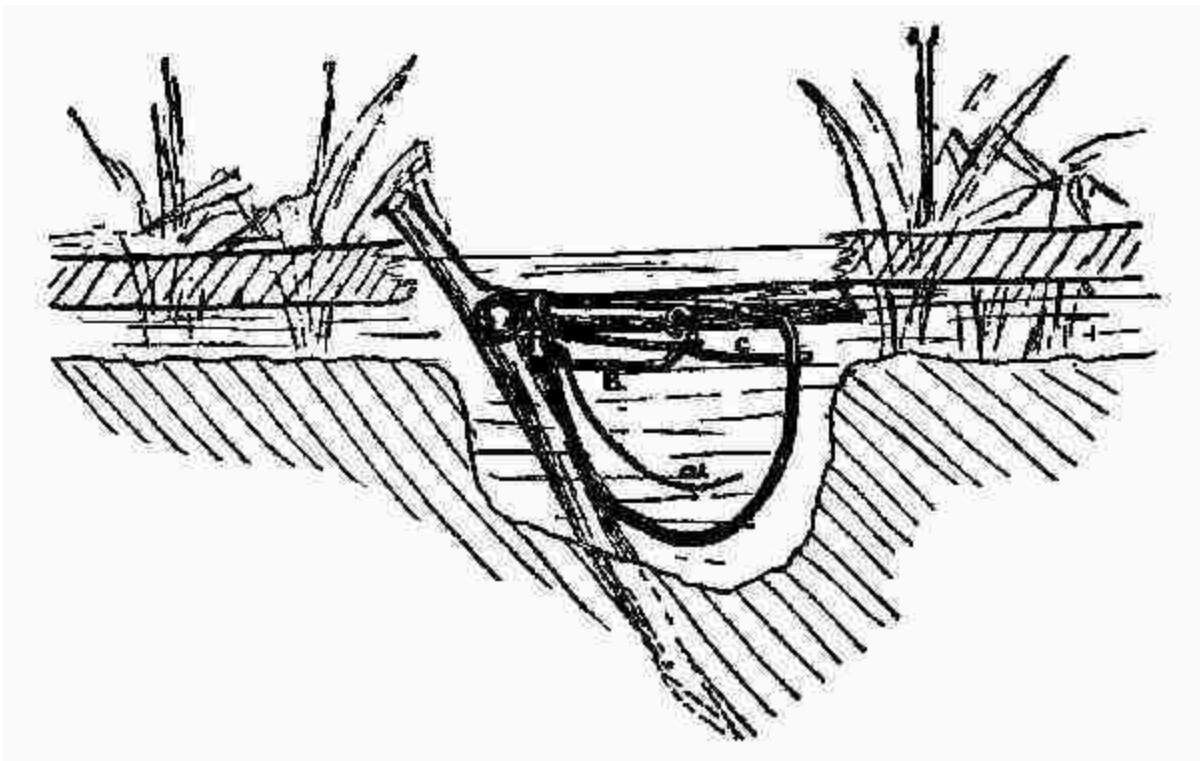
The muskrat lives wherever there is a body of water. He feeds chiefly on vegetable matter which he obtains in the swamps or digs on the banks, although he frequently visits a cornfield or vegetable garden. Only in cases of extreme hunger, as happens when they are frozen in, have they been known to eat their own kin. In swamps they have houses made of rushes and twigs, standing in a rounded shape about two feet above the water.

To trap in the swamps one must have high rubber boots and if the water is deep a small boat is necessary. A home-made flat-bottomed canoe, made of canvas, will be found to answer the purpose admirably. Where it is shallow enough to use the boots, a long, heavy staff should be carried, as the mud is very often treacherous and interwoven with muskrat runways. I might as well say in the beginning that the intending trapper should take a friend into his confidence and the two set out to trap together, for in this way they can help each other out of difficulties. (My friend had to do some pretty stiff pulling once to get me out of a mud hole into which I had recklessly plunged, having only in my mind to get to my traps quickly.)

Along the rivers the muskrats live in holes in the banks. In trapping in such places one may walk along the bank or use a boat, setting the traps in the entrances of houses or in the runs.

Before the trapping season begins it is very wise to go over the territory and locate the different houses, runways, and feeding places. This will save time when trapping begins, which should not be before December, because up to this time the pelts are not in their prime. The trapping season lasts for about three months or until the ice breaks up in the spring.

If the water is not yet iced over, the muskrats can be caught with the steel jaw-traps. They should be set in the runs or at the entrances of houses so that they are just under the surface of the water. The chain should be staked in the water as far out as possible. The muskrat will in every instance try to swim out into deep water and the weight of the trap on his foot will pull him down and drown him. Traps may be baited with apples, carrots, turnips, and nearly any vegetable or fruit. The bait should be stuck on a slanting stick so that it will hang about a foot above the pan of the trap.

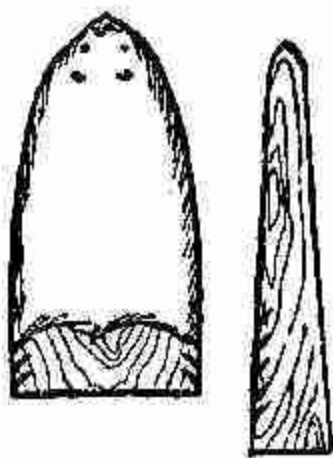


**"Stop thief" trap**

When the water is frozen over, other methods must be followed. Many trappers cut the houses open and set the traps on the inside, but those who wish to keep the muskrats in the vicinity will not do this, because it destroys their homes and causes them to seek new shelter. For my own use I have "stop thief" traps which kill instantly and are not very expensive. A hole is cut in the ice and the trap set before the house entrance or in a swimway. In going through, the muskrat puts his foot on lever *a*, which releases *b*, and this in turn lets down lever *c*, which strikes him over the neck or back, breaking it instantly. As shown, the trap is fastened with staples to a wooden prong, one end of which is stuck in the mud at the bottom and the other fits just under the ice.

Mink are rarely caught, because they are very crafty and keen to the scent of a human being. Once in a while they are caught in a trap set in the water or in the entrance to a muskrat house. This is accounted for by the fact that the mink preys largely upon these weaker animals in the winter when food is scarce. Sometimes they can be lured with a muskrat carcass or a dead bird. If the trap is not set under water there is little probability of getting the

mink. The trapping of mink should be encouraged, because they kill not only muskrats, but chickens and other domestic fowl as well. One must use his own judgment and set his trap in a place frequented by the mink. Prime mink skins usually bring three or four dollars from any local fur dealer. On the other hand muskrats are more plentiful and bring only about thirty cents. Thus it is that some boys prefer to keep the muskrat skins and tan them at home. From these skins they make comfortable caps and gloves.



**Stretchers for skins.  
The narrow one for  
mink, the other for  
muskrat**

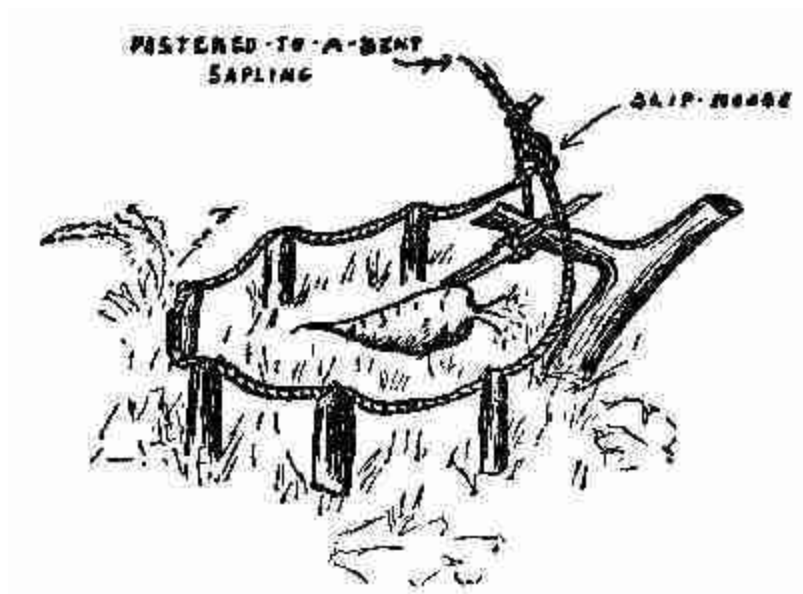
To skin the muskrat and mink, commence on the hind legs. The skin is slit down one leg and up the other. With muskrats the tail is cut away from the rest of the skin. The mink's tail adds greatly to the value of the skin, so the bone is carefully extracted with a pair of pincers and the tail left on the skin. The skin is then gradually peeled down over the body and head. It is then stretched with the fur side inward on a board as shown in the figure on this page. After this it is hung in a dry, airy place to dry, away from the sun. For home tanning a fresh pelt needs only salt, but the following solution gives somewhat better results and makes the skin more pliable:

Salt, two pounds.

Sulphuric acid (com.) two ounces.

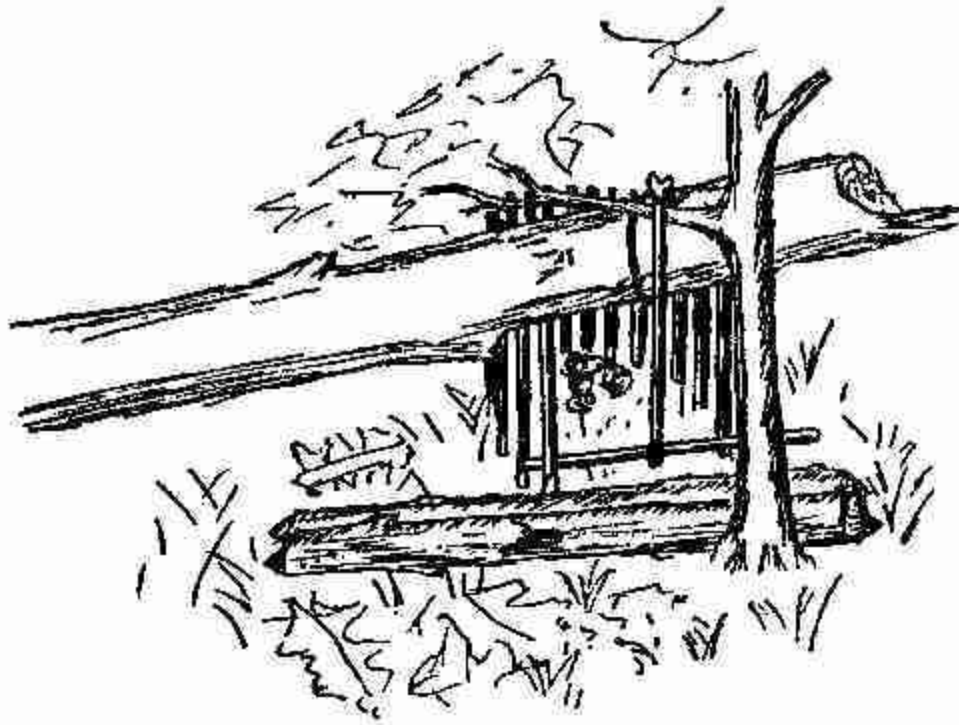
Rain water, one gallon.

The pelt should remain immersed in the solution for about two days. When taken out it must be first nearly dried and then the flesh side scraped and rubbed until soft with some dull steel instrument, such as an old blunt chisel. Care should be taken not to break the skin as it is very fragile in some places, especially on the belly.



**Snare with carrot bait**

The land animals can be caught in snares or deadfalls. Very likely most boys know of these, but I have illustrated them here in the forms which I think have served me best. Usually only the smaller animals are caught in the snare, such as rabbits and squirrels. To bait for either of these corn or apple is commonly used, although onion makes a good scent bait to draw rabbits from afar. Besides these named nearly any green vegetable or fruit will answer very well. These animals being maybe the least wary of them all are therefore very easy to catch. For an opossum green corn and a little raw meat is all that is necessary, while for a raccoon a crawfish may be added. This latter is considered the best, and hardly ever fails to lure the raccoon. The skins of the raccoon and opossum bring about a dollar and a half, and half a dollar, respectively.



### **Deadfall**

Rabbits and squirrels are caught as game, while raccoons together with opossum are considered eatable by most trappers. The up-to-date people who order "marsh rabbits" at the most fashionable restaurants are eating no other than muskrat. These they eat with a great relish under the new name. I will add that it makes a great difference in eating a muskrat whether you let your imagination get the best of you. Many times I have eaten muskrat with quite as much comfort as though I were eating rabbit. Naturally the meat has a very strong taste which must be removed before cooking, by soaking over night in salt water. Young fat woodchucks are also frequently eaten.

It is hard to set down on paper just how and where to set the traps and it can only be learned from another trapper or by experience. The most important thing is to observe closely and learn the habits of the animals.

STANLEY COVILLE

### **CURING AND TANNING SKINS**

The boy trapper must know how to take the skins from the animals he traps, and how to treat them to preserve their beauty and value. The skin should

be taken off before it becomes tainted, and with greatest care not to injure it. Some skins are exceedingly tender. Be careful to remove bits of fat or flesh; left to dry on the skin, these detract from its value.

No artificial dressing is needed to cure or dry a skin. The fresh skin should be tacked to a smooth board or drawn over a stretcher, fur side in, so that the air can get at it freely. It should not be put in the sun, or rain, or artificial heat.

When thoroughly dry, the skin is ready for market or it may be tanned at home. A boy fortunate enough to obtain a valuable pelt like that of marten, mink, or otter, will certainly want to try his hand at tanning. You want first to be sure to use a mixture which will not injure the fur but will fix it more firmly in its place. Never put any dressing on the fur itself. You also want the skin to be soft and pliable so that it can be made up into some form of garment. The following directions are adapted from "The Tricks of Trapping" by W. Hamilton Gibson, a reliable source of all trapping lore for American boys: "After every particle of loose flesh and fat is removed from the skin, it should be soaked for a couple of hours in warm water. While waiting, prepare this mixture: Take equal parts of saltpetre, borax, and sulphate of soda. Mix with enough water to make a thin batter. Paint the wet skin over thickly on the flesh side. Fold the skin flesh side in and lay in an airy place, for twenty-four hours.

"On the following day prepare a second mixture consisting of two parts sal-soda, three parts borax, four parts castile soap. Melt these together over a slow fire. Apply this mixture in the same manner as the first, twenty-four hours later. Fold skin as before and leave another twenty-four hours. Make a third mixture of equal parts of common salt and alum, dissolved in warm water and thickened with coarse flour to the consistency of thin paste. Allow this to dry on, then stretch the skin lightly and scrape off the hardened paste with the bowl of a spoon. Sometimes a second or even a third treatment with the last mixture is required to make the skin absolutely pliable, after which it should be finished with sand-paper and pumice stone. A skin thus dressed should be soft as velvet. The alum and salt set the hair securely."

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## APPENDIX

### FREE PRINTED MATTER. HOW TO GET IT

There are three principal sources of free printed matter on outdoor work subjects. These are (1) the United States Department of Agriculture. (2) State Agricultural Experiment Stations. (3) Commercial houses who sell supplies for outdoor occupations.

(1) The Farmers' Bulletins are the ones which will be most useful to outdoor workers. They are written in plain language and treat every subject in a practical way. To get them, you should address a postal card thus:

Secretary of Agriculture,  
Washington,  
D. C.

On the other side of the card write as follows:

Please send me the list of publications for free distribution sent out by your department, and oblige,

Sign your name and address distinctly.

In a few days you will get a printed circular giving the numbers and titles of all the Farmers' Bulletins and other free literature they have. Choose the ones you want and address another postal card to the Secretary of Agriculture. Ask for the bulletins wanted by number and title both, to avoid mistakes.

Some of the bulletins of the United States Department of Agriculture are not for free distribution. They are too valuable. A charge is made to cover cost of printing. To get any bulletin mentioned in this list *with its price*, address a letter to Superintendent of Documents, Washington, D. C., and enclose the amount in money order or coin. Do not send stamps.

(2) To get the bulletins of your own State Experiment Station you have only to address another postal card; this time to the Director of State Experiment Station, with the name of the post-office and state. If not sure of the title and number of the bulletin you want, tell the director what phase of the subject you are interested in. For instance, one experiment station issues several poultry bulletins. Do you want the one on "House Construction" or the one on "Feeding Pullets?" The more definite you are in your requests the more likely you are to get exactly what you need most.

To get the bulletins of another station than your own is not quite so simple. They have no fund for distributing bulletins in other states. But I have never failed to get them by asking for just the thing I need. It is well to offer to pay for these; the price is always small. Some of them are republished by the United States Department of Agriculture and appear in their free list as Experiment Station Work, I, II, III, etc.

(3) The booklets and catalogues sent out free by seedsmen and other commercial houses are mines of information, condensed and well arranged. You may be sure that the advice they give is good, too, as it is to their interest to have their patrons succeed. You can tell the difference very quickly between the "hot air" of advertising matter and the practical advice to beginners given in catalogues.

I most earnestly advise every one of you who is engaged in a money making enterprise to subscribe for some good periodical. There are good magazines devoted to many of the occupations, and some of the general magazines have special departments which are full of up-to-date suggestions which have not yet been put into books. The latest and best word on your subject is none too good and may make a difference of dollars in or out of pocket. If you devise any new apparatus or discover any time or money saving methods, don't keep these things to yourself. Help the world along by writing to some magazine about it. They are on the lookout for valuable novelties. The stories told by boys and girls in this volume have almost all appeared in a magazine first.

#### **THE OUTDOOR WORKER'S LIBRARY**

The following is a list of useful books, magazines, and bulletins on all sorts of outdoor occupations, written by experts. They are here arranged by subjects under eleven of the chapters of this book.

N. B. Some of these books are expensive. Get them from your library if you can. The librarian will usually order a good book which is in demand.

#### CHAPTER II.

United States Department of Agriculture:

Farmers' Bulletin No. 332. Nuts and Their Uses as Food.

Farmers' Bulletin No. 188. Weeds Used in Medicine.

Farmers' Bulletin No. 252. Maple Sugar and Sirup.

Plant Industry Bulletin No. 107. Root Drugs. Price 15c.

Vermont Agricultural Experiment Station Bulletin No. 105. Maple Sap Flow.

Vermont Experiment Station Bulletin No. 26. Maple Sugar.

Practical Forestry. Gifford. D. Appleton & Co.

Mushrooms, Edible and Otherwise. Hard. Mushroom Publishing Co., Columbus, O.

#### CHAPTER III.

Farmers' Bulletin No. 22. The Feeding of Farm Animals.

Farmers' Bulletin No. 205. Pig Management.

Farmers' Bulletin No. 49. Sheep Feeding.

Farmers' Bulletin No. 137. The Angora Goat.

Farmers' Bulletin No. 64. Ducks and Geese.

Farmers' Bulletin No. 234. Guinea Fowl.

Farmers' Bulletin No. 357. Methods of Poultry Management at the Maine Experiment Station.

Farmers' Bulletin No. 177. Squab Raising. Price 5c.

Farmers' Bulletin No. 390. Pheasant Rearing in the United States.

Bureau of Animal Industry Bulletin No. 68. Milch Goats. Price 13c.

Cornell University Rural School Leaflet. Vol. 4. No. 1. Horses. Ithaca, N. Y.

Poultry Bulletins Nos. 240, 282, 274, 249. Cornell University.

The Poultry Book. Doubleday, Page & Co.

#### CHAPTER IV.

The Poultry Book. Doubleday, Page & Co.

Our Home Pets. O. T. Miller. Harper & Bros.

The Self-Supporting Home. St. Maur. The Macmillan Co.

Goldfish Culture. Mulertt. H. Mulertt, publisher, 289 Fennimore St., Brooklyn, N. Y.

#### CHAPTER V.

Illinois Agricultural College Extension Course. Dairy Lessons for Use in Public Schools.

Farmers' Bulletin No. 413. Care of Milk in the Home.

Farmers' Bulletin No. 196. Usefulness of the American Toad.

Farmers' Bulletin No. 328. Silver Fox Farming.

Farmers' Bulletin No. 330. Deer Farming in the United States.

#### CHAPTER VI.

American Boys' Handy Book. Beard. Harper & Bros.

Bound Volumes of *Country Life in America*. Articles on Swimming Pools, Springs, etc.

Farmers' Bulletin No. 138. Irrigation in Field and Garden.

#### CHAPTER VII.

Farmers' Bulletin No. 397. Bees.

A B C of Bee Culture. Root. A. I. Root Co., Medina, O.

How to Keep Bees. Comstock. Doubleday, Page & Co.

CHAPTER VIII.

Farmers' Bulletin No. 165. Silk-worm Culture.

CHAPTER IX.

Botany. Bailey. The Macmillan Co.

The Sea Beach at Ebb-tide. Arnold. The Century Co.

Cornell Nature Study Leaflets. How to Make a Collection of Insects. Comstock. J. B. Lyon, Albany, N. Y.

United States National Museum Bulletin 39. Collecting Fossils, Plants, Insects, Shells, Arrowheads, etc.

CHAPTER X.

Farmers' Bulletin No. 415. Seed Corn.

Farmers' Bulletin No. 175. Unfermented Grape Juice.

New York Experiment Station at Geneva. Bulletin No. 258. (Popular edition.) Making Cider Vinegar at Home.

CHAPTER XI.

Farmers' Bulletin No. 185. Beautifying the Home Grounds.

Farmers' Bulletin No. 134. Tree Planting on Rural School Grounds.

Farmers' Bulletin No. 155. How Insects Affect Health in Rural Districts.

Farmers' Bulletin No. 385. Boys' and Girls' Agricultural Clubs.

Farmers' Bulletin No. 368. The Eradication of Bind Weed or Wild Morning Glory.

Farmers' Bulletin No. 369. How to Destroy Rats.

Farmers' Bulletin No. 383. How to Destroy English Sparrows.

Farmers' Bulletin No. 396. The Muskrat.

Farmers' Bulletin No. 99. Insect Enemies of Shade Trees.

Farmers' Bulletin No. 28. Weeds: How to Kill Them.

Farmers' Bulletin No. 54. Common Birds in Their Relation to Agriculture. Price 6c.

Biological Bulletin No. 24. Grouse and Wild Turkeys in the United States. Price 10c.

Bureau of Entomology Bulletin No. 25. Mosquitoes. Price 10c.

Bureau of Entomology Circular No. 11. House Flies.

1909 Year Book of Department of Agriculture. Plants Useful to Attract Birds and Protect Fruit Trees.

New Jersey Experiment Station Bulletin No. 216. The House Mosquito.

Circulars issued by The Audubon Society. New York.

How to Attract the Birds. Blanchan. Doubleday, Page & Co.

Camp Life in the Woods and the Tricks of Trapping. Gibson. Harper & Bros.

Trappers' Guide. Newhouse. (Try to get this book from a library.)



## Transcriber's Notes:

Spelling appears to be evolving between US/UK e.g. both color and colour are seen.

Some page numbers in contents list are incorrect, these have been left as given, but the links go to the correct pages.

CH II is p. 8. (TOC has 9)

CH II is 100 (101)

CH VIII is 337 (338)

CH IX is 349 (350)

CH X is 404 (405)

CH XI is 449 (450)

Appendix is 513 (514)

Book list is 516 (518)

Corrected obvious typos and inconsistencies, otherwise spelling has been left as printed:

p. 149 gasoline -> gasolene.

"skim milk" -> "skim-milk".

p. 163 "Wynadottes" -> "Wyandottes".

p. 181 "precentage" -> "percentage".

p. 228 "vak" -> "yak".

p. 247 "belive" -> "believe".

p. 341 "at" -> "as".

p. 485 "noctural" -> "nocturnal".

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