ELEMENTARY
AGRICULTURE
for SOUTHERN
SCHOOLS

by Robbins and Ireland

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ELEMENTARY AGRICULTURE

FOR SOUTHERN SCHOOLS

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PREFACE

The development and maintenance of interest is the secret of successful teaching. Young people, who have become interested in their school work and have learned that it will be of practical value in the vocations of life, will continue their studies after leaving school. With the present crowded programs in the elementary schools, it is impossible for the teacher to devote a great amount of time and preparation for carrying on the work. This text is planned to aid the busy teacher and to give the pupil some general facts relating to agriculture. It is hoped that the nature and the scope of the subject-matter will aid in linking together the home and the school.

After several years of experience in teaching agriculture, it has been found that teachers have difficulty in producing the desired inspiration from a mass of dry agricultural facts. The correlation of mind and hand enters so well into the study of agriculture that the entire course should center around doing things. Realizing that the compilation of a mass of agricultural facts does not fulfill this ideal, the authors have selected from the field of agriculture those topics which are practical. The subject matter and practical exercises given in this text have been tried and have been found applicable in rural schools. The pedagogical principle involved in this text are the appeals made to the minds of the boys and girls by introducing those things which are most valuable in a well-rounded education. Every child likes pets. He is greatly interested in collecting and in making things. Above all, he should learn to realize the importance of agriculture.

The material has been arranged so that the prospective and experienced teacher may carry on the work of teach-

ing agriculture without great difficulty. It is possible for the pupil to gain information and make application of the knowledge without personal supervision from the teacher, except during the short periods allowed for studying agriculture.

Inexperienced teachers will find a list of questions at the end of each chapter. These are intended to guide the students in their study. The practical work is arranged so that most of it may be assigned as Home Projects. The periods for practical exercises may thus be devoted to reports and discussions of what the pupils are doing. Written reports are valuable for composition work. Realizing that many students have difficulty in using a dictionary, a list of words with definitions, applying to the material in the text has been added. References have been given to aid the pupils and the teacher. These include bulletins from the U. S. Department of Agriculture and from other sources, all of which may be had without cost.

The illustrations are made from actual photographs of farm operations. They offer many suggestions to students who will study them.

In presenting the subject-matter, the authors have tried to avoid the usage of technical terms, beyond the understanding of the average grade pupil.

We wish to acknowledge and express our appreciation for the valuable suggestions of Professor P. G. Holden, Director of the Agricultural Extension Department of the International Harvester Company; Dr. Chas. A. Shull, Plant Physiologist of the University of Chicago; President Henry G. Bennett, of the Southeastern State Teachers College, Durant, Oklahoma; N. Conger, Director of Teachers' Training, Southeastern State Teachers College, and many other teachers.

ACKNOWLEDGMENT OF ILLUSTRATIONS

The following list indicates the sources of illustrations that are not the property of the authors and publishers. Numbers refer to the **Figures**.

The Agricultural Extension Department of the International Harvester Company:—Figures 1, 2, 3, 9, 13, 22, 23, 24, 25, 33, 39, 56, 61, 62, 82, 83, 84, 85, 86, 87, 88, 89, 114a, 114b, 117b, 118, 119, 120, 126, 128, 132, 135, 162a, 162b, 163, 166, 167.

Oklahoma A. & M. College, Hereford, Brae Repeater, Figure 51.

Stark Brothers Nursery and Orchard Co., Louisiana, Mo., Figure 145.

CONTENTS

CHAPTER	PAGE
I. THE STUDY OF AGRICULTURE	1
II. STUDY OF SEEDS	9
III. THE SCHOOL EXHIBIT	21
IV. FARM EQUIPMENT	33
V. THE FARM ORCHARD	49
VI. GROWING TREES	62
VII. CATTLE	75
VIII. WORK ANIMALS	97
IX. HOGS	110
X. POULTRY	128
XI. THE SOIL	146
XII. IMPROVING FARM LAND	158
XIII. SEED GERMINATION	168
XIV. VEGETABLE GARDENING	179
XV. FLOWERS	189
XVI. BEAUTIFUL GROUNDS GLADDEN LIVING . .	199
XVII. CORN GROWING	213
XVIII. THE SMALL GRAINS	220
XIX. FORAGE CROPS	232
XX. COTTON	246
XXI. SWEET POTATO	260
XXII. FAMILIAR FARM ENEMIES	270
XXIII. THE LOCAL CLUB ORGANIZATION	284
INDEX	297

CHAPTER I

THE STUDY OF AGRICULTURE

Agriculture the Pillar of Industry.—What is agriculture? Why do we study agriculture? Agriculture is the science and art of producing plants and animals useful to man. It is the most important industry in the world. It may be compared to the foundation of a house. If the foundation of the house is strong and well built, it will stand for years and be of great value to man. This is true of agriculture, because it is the foundation of all business. Without it we would not have juicy peaches, watermelons, and other delicious fruits to eat. We would not have vegetables such as green corn, red tomatoes, radishes, potatoes, and the like. From the farm comes the “staff of life,” which is bread. The raising of livestock supplies our tables with meat, milk, butter, and eggs. Furthermore, the clothing that we wear is made from cotton, flax, wool, and silk, which are produced on the farm. From the forest we get lumber for building purposes, pulp for paper, wood for fuel, edible nuts, and many other valuable products such as rubber, maple sugar, resin, and turpentine. It is a well known fact that when the farmers of America produce good crops, business flourishes, our needs are supplied, and people are happy.

Knowledge is Power in Business and Farming.—Whatever occupation one may choose for his life's work, it is well that he have a fundamental knowledge of farming. Whether a doctor, minister, lawyer, teacher, mer-

chant, banker, mechanic, carpenter, dealer in lands, or follower of any other profession or vocation, one will find a knowledge of general agriculture helpful in his work. The artist who is familiar with flowers, trees, the contour of lands, and with plant and animal life in general, discovers and uses many beautiful models of Nature's own creation, which are pleasing to the eye when portrayed in a picture. The busy housewife, who knows good fruits and vegetables, poultry, butter, and eggs, will purchase

FIG. 1.—Pigs in Alfalfa.

food of good quality at reasonable prices, and thus prevent waste and unnecessary expense in furnishing the table. A good merchant needs to know the varieties of goods, farm equipment, tools, and luxuries demanded by the farmers in his district. If he is familiar with the crops and animals produced in his community, he is better able to supply the needs of the farmers and prevent loss from credit accounts. Bankers throughout the country have many dealings with farmers and are working for the betterment of farming. Boys who expect to become bankers need agricultural training.

Many boys and girls who study agriculture in the pub-

lic schools will return to the farm and follow farming as a business. These students will learn many valuable lessons in class, which will aid them in their work.

Joy in Agriculture.—There is an unending joy in watching the growth of plants; in seeing how the buds unfurl, how the leaves expand, and how the flowers ap-

FIG. 2.—Hen and Chicks.

pear. Is there anything more enjoyable than visiting a farm where there are young pigs frisking about in the grass and alfalfa? Does it ever occur to you that the old hen, hustling about the orchard, with ten or twelve chicks, for which she may be scratching, will be a source of profit as well as pleasure?

Do You Like Pets?—Did you ever own a pet rabbit? Notice what funny whiskers he has. His nose turns up

at everything. He has a very odd way of holding his long ears. Hasn't he the softest coat? Next to a rabbit, a little mule colt is the funniest thing. What long slender legs he has; what ears; what an unusual tail, and what a mischievous twinkle in his eye. He is not to be trusted, because the long hind legs fly up most unexpectedly.

Why is a Survey Important?—By making a survey of the farm one learns to know the conditions as they

FIG. 3.—Did you ever own a pet rabbit?

really exist. The facts learned will be of much value in talking intelligently about the home and the vocation of one's parents. By comparing the information gained in the study of the home farm with the reports of friends and classmates, many lessons will be learned regarding the most profitable kinds of farming that may be followed in a neighborhood.

In Making a Survey, it will be helpful to take a notebook and make a list of the important facts about the farm. Note the name of the owner, size of the farm, list of the crops raised, kinds and number of animals, manner of marketing, fencing, equipment, implements, sheds, feed for stock, and number of people employed upon the farm.

FIG. 4.—A mule colt. Watch his heels.

It is not intended that one should make an elaborate survey, but obtain those facts of importance to the school district.

The Value of the Survey is that it arouses interest in the home and school. It may present some new view of the methods of handling crops. There is always some branch of agriculture that is especially suited to particular sections of the country. By combining the results of the survey, we learn what is most important to be studied during the year. While it is desirable to have

some knowledge of general agriculture, we should strive to improve conditions in the community.

We may not live upon farms, but most of us are acquainted with farmers and may ask them about the amount of their farm products. Each member of the class providing information from some particular farm of the community will furnish enough information to decide what is the most important product.

QUESTIONS

1. Why is agriculture called the foundation of industry?
2. In what way are you depending upon agriculture?
3. What foods on your table come from the farm?
4. Why do we say, "Knowledge is Power"?
5. Why should boys and girls who do not expect to live upon a farm study agriculture?
6. How are the occupations of men in your community influenced by agriculture?
7. What is the value of pets?
8. What is a *community* survey?
9. Of what advantage is a community survey?
10. Tell how to make a community survey.

PRACTICAL WORK

Exercise 1

Object: Collecting and assembling information.

Materials: Notebook, pencil, measuring equipment.

Procedure: If you live upon a farm, collect the following information from your farm: (if you do not), visit a farm and obtain the information from the people operating it.

1. Give the name of the owner of the farm.
2. Give the location and size of the farm.
3. Give the names of the owners of adjoining farms.
4. List the crops raised upon the farm you are studying, and give the number of acres planted to each.
5. How does the owner dispose of his crops?

6. What kinds of animals are raised upon the farm, how many of each kind?
7. What use is made of these animals?
8. What animals are raised for their products?
9. How are the animal products marketed?
10. What kind of fencing is used upon the farm?
11. How many people work regularly upon the farm?
12. List the farm equipment used to operate the farm.
13. How much grain and hay is kept?

Results: Write out a report of your visit to the farm, which will cover suggestions given in the procedure. Tabulate the results of the entire class upon the blackboard.

Exercise 2

Object: To draw a map of the farm.

Materials: Pencil, ruler, paper, tape line.

Procedure: 1. The size and boundary lines of the farm are first determined. If these are not known, it may be necessary to measure them.

2. Draw a map of the farm, representing the size in proportion to the measurements. The house, barns, and other buildings should also be located in their relative places.

3. Locate the fields, lanes, and roads within the boundary lines of the farm. This may not be difficult, if the farm is small.

Results: Compare the maps with those of other members of the class. Write the names of the crops grown in each field and the rotation on the map. Also, indicate the number of cattle, hogs, horses, and mules pastured upon different fields.

WORDS TO BE LEARNED

Art. Skill in doing things.

Contour. The outline of the surface of the ground with respect to hills and valleys.

Farm. A plot of land devoted to the raising of domestic plants and animals.

Frisking. To move quickly and playfully.

Fundamental. The most important part or the foundation.

Luxuries. Those things which are pleasing, or rare, or costly.

Portray. To picture; to represent by drawing.

Procedure. Methods or steps taken in doing anything.

Rotation. Cultivation of succession of crops on the same land.

Science. A knowledge of principles or facts.

Survey. Finding out the conditions, quantities and qualities of things.

Tilling. To prepare for seed planting and to cultivate.

Unfurl. To let loose.

CHAPTER II

STUDY OF SEEDS

A Field Trip.—Would you not like to go into the fields and study the seeds of our common farm plants? During the month of September there are many kinds of valuable as well as harmful plants, which are bearing seeds. It is interesting and profitable to know what is being raised on the farms near your home.

Learn Seeds.—Did you ever stop to consider that most of the plants of next year will come from the seeds of the plants now growing in our fields? The cotton, corn, and grasses of next year will be largely determined by the quality of seeds planted. In fact, the plants you find growing in the fields are the parents of those which will grow next year. The strong and vigorous stalks of corn bear ears from which many strong stalks may grow. Selection means a larger yield, and greater profits for the labor of growing the crop.

You may be interested in knowing that the improvement in all our farm crops has come through selection and cultivation. Our cultivated plants were once wild. Man has selected the best from these until our cultivated plants not only provide for future propagation but also a large amount of food for the human race. Think of the hundreds of millions of people who eat rice, wheat, and corn as a part of their daily food. Think of the great needs of the people of the earth for food.

Seed Classification.—Experience shows that very few boys and girls or active plant growers are able to take a

mixed sample of our familiar garden, field, and flower seeds and separate them into groups according to species or variety. The seed sample may contain other seeds, untrue to name, with insect life and foreign matter present. Hence, the crop may be planted at a loss and with disappointment to the grower.

FIG. 5.—An early selection of field corn, following most scientific methods of securing the best.

Cheap Seeds that are Expensive.—By obtaining samples of seeds from stores or some other commercial source, some interesting studies may be made. It will be found that many seeds are not what the name upon the package implies. Many contain harmful weed seeds. Others contain a mixture of unknown seeds. The word “adulteration” is applied to these mixtures. Commercial brands of seeds should represent the best that can be obtained, but unfortunately many kinds are poorer than those grown at home. The mere fact that we read a

glowing advertisement in a seed catalogue does not insure a large yield of corn nor a cotton crop free from boll weevil. A careful study of the different kinds of seeds will enable us to detect adulterations.

Collecting Seeds.—You will find it interesting to visit the fields, gardens, and woodlands of your community, collecting for study the seeds that are useful and

FIG 6.—Small grains arranged for the display of heads.
A. Rye. B. Barley. C. Oats. D. Wheat.

harmful. Here you will get acquainted with the natural surroundings of the parent plants and learn how Nature aids them in producing seeds and in the struggle for existence. You will learn why some plants are stronger and better than others. There is much satisfaction in learning why good farmers, who have given their crops proper cultivation and have used proper management, are so successful, happy, and contented with their business.

Beginning the Field Selection of Seeds involves the problem of securing and saving those which yield most. Men have spent years trying to improve the standard of field crops. Their beginnings were with very poor plants, and long continued efforts have been necessary to obtain our high producing varieties.

While many farmers do not have time to collect seeds according to the most scientific methods, the seeds of our

FIG. 7.—A. Good cotton stalk.
B. Poor cotton stalk.

common crops require some study. The idea of field selection, by making use of suggestions for special crop work, will aid in improving the home supply of seeds.

Corn.—After the corn has ripened, go through the field with a seed picking bag and husk the ears from the stalks that have produced the most corn without having any special advantages such as space, moisture, or fertility. Avoid the large ears on stalks standing singly

with an unusual amount of space around them. Preference should be given plants that have produced most heavily in competition with a full stand of less productive plants.

"In all localities the inherent tendency of the plant to produce heavily of sound, dry, shelled corn is of most importance.

"Late maturing plants with ears which are heavy because of an excessive amount of sap should be ignored.

FIG. 8.—A. Poor peanuts.
B. Good peanuts.

Sappiness greatly increases the harvest size and is likely to destroy the quality.

"Short, thick stalks are preferable. Short stalks are not easily blown down and permit thicker planting. Thick stalks are not so easily broken down and in general are more productive than the slender ones. The tendency for corn to produce suckers is hereditary. Seed should generally be taken from stalks that have no suckers." (U. S. Dept. Agri., Farmers Bul., 415: p. 5.)

Improved Cotton.—In selecting seed cotton from the field it is desirable that it should be collected from plants

that begin to fruit early, fruiting rapidly and continuously. Usually plants possessing these characteristics have a strong central stem, with their first fruiting branches formed early and close to the ground. Such plants may vary in height from three to five feet, depending on the variety, soil, and climatic conditions. Plants of this type produce larger yields than those fruiting later and with the fruits higher on the stem. Another

FIG. 9.—A good method of stringing seed corn. It may be handled conveniently, disinfected in barrels and suspended upon nails.

important feature in selecting seed cotton is the size and number of divisions in the boll. Cotton yielding large bolls, averaging 60 to 70 to the pound, are more resistant to weather, easier to pick, and mature much more rapidly than cotton requiring 120 to 150 bolls per pound. Each boll may have from four to five cells in which locks are formed. The length of the fiber may vary from $\frac{7}{8}$ to $1\frac{3}{16}$ inches in the upland varieties. Short staple cotton, like other farm crops, may be improved by selecting the high yielding strains with long, strong, fine fiber.

Storing the Seed Cotton.—In order to prevent injury from moisture, the picked cotton should be placed under cover. Later, the seeds may be picked from the cotton by hand. While only a small amount could be planted by such a method, the improved selections will provide better seed for the following year.

Oats.—"The improvement of oats through the selection of individual plants or heads and the testing of these selected strains is interesting and valuable work for those

FIG. 10.—A schoolroom display adds to the attractiveness of the place.

who have the time and patience to devote to it. The best heads should be selected from strong and vigorous plants growing under normal conditions. The selected heads should be threshed separately by hand and the seed from each planted in a row by itself. The seed from each of the selected rows is threshed and planted; the best rows being again selected at harvest time for further testing and increase the next year."

Peanut seed should not only be selected from plants that are mature, but from those producing a large number of pods as well. By doubling the number of well-

filled pods on each plant, the yield from each acre will also be doubled. Many millions of bushels have been added to the corn crop of the country simply through the selection and improvement of seed.

“What has been done with corn is possible with the peanut, and where we now have an average yield of 34 bushels to the acre it is reasonable to expect this to be

FIG. 11.—Seeds mounted on cardboard.

increased to 50 or 60 bushels through cultural methods and seed improvements.” (U. S. Dept. of Agri., Farmers’ Bul. 431: p. 10.)

Storing Seeds.—The best method of treating seed corn after gathering is shown in the accompanying diagram. Binder twine will support 10 to 15 ears arranged in the manner illustrated. Ordinarily the best place to hang these strings of ears, until they are dry, is in an open shed or in an unused room of your school building.

Later storing in insect-proof boxes or barrels, will prevent losses by vermin.

Heads of small grain may also be bound in bundles as shown in Figure 6, and preserved for future study.

Figures 7 and 8 illustrate methods of preparing cotton and peanuts for school study.

FIG. 12.—Seeds mounted in bottles.

Destroying Weevils or Grain Moths.—Before putting the seeds away for any length of time, it is a good plan to treat them to destroy weevils or moths. Carbon disulphide in a tight box, barrel, or room for two days will destroy any insects that may be upon the seed. The disulphide should be placed in shallow dishes or pans on top of the seed. One-half pint will treat ten bushels of seed and is not expensive. After the grain has been

treated it should be thoroughly aired, taking care that no fire is near when the fumigating box is opened. The treatment may need to be repeated at times during the year.

A School Display.—While collecting various kinds of seeds, nothing will add more to the attractiveness of the school room than a well arranged display. These seeds will also be of value in later studies of seed germination and in preparing exhibits. It is easy to hang ten-ear bunches of seed corn upon the walls where they may be away from rats and mice. After drying, all the small grains may be displayed in glass jars or glass-covered boxes. These should be plainly labeled and arranged in a manner similar to that in Figure 10. The heads of grains, grasses and weeds may be tied in neat bundles for arrangement along the walls. Cardboard and a small supply of glue or library paste may be used in making a very attractive display of individual seeds. Figures 11 and 12 were made in this way.

Even a board with small holes, covered with glass, provides a substantial mount which will protect the seeds from vermin.

QUESTIONS

1. When is the best time of year to make a field trip to study seeds?
2. Why is the study of seeds interesting and important?
3. Prepare a list of ten harmful and ten useful seeds.
4. Mention five impurities of seeds.
5. Explain the best method of studying seeds.
6. When is the best time to collect seed cotton? State five qualities of a good cotton stalk.
7. How many bolls of good cotton make a pound?
8. Give the length of fiber for upland cotton.
9. How may farmers improve the oat crop?
10. State four factors to be considered in collecting peanut seed.

11. Suggest a good method of storing seed corn.
12. Explain a simple way of destroying weevils in grain.
13. What use can be made of the seeds collected in your study?
14. Mention five ways of arranging seed for a school display.

PRACTICAL WORK

1. *Field Trip*.—After completing the study of seeds it is desirable to arrange for a field trip. Each pupil may be assigned to collect ten ears of corn, five kinds of small grains, and fifteen kinds of weed seeds. Arrangements should be made for enough bags or baskets for the pupils to carry the seeds collected.

2. Usually a field may be found near the school for selecting the corn. It may be well to ask the farmer to accompany the class in the study. He may render some valuable assistance and help create community interest in the school. The teacher should select a good type of stalk, bearing a good ear at a medium height as described in the text. This may be used as a model. Each pupil should obtain at least ten good ears from similar stalks. These should be tied with binder twine as shown in Figure 9.

3. A trip for selecting seed cotton and small grains may be arranged, or each pupil may be asked to collect small samples of the best seeds he can find at home, for future study.

WORDS TO BE LEARNED

Carbon Disulphide. A chemical compound known as "high life," used in fumigating grain in storage.

Fumigation. To apply smoke or vapor for disinfecting.

Hereditary. Handing down or transmitting characteristics from the parent to the offspring.

Husk. To remove the shuck from the ears of corn.

Inherent. That which belongs to the plant by nature.

Lock. A natural bunch, or tuft of cotton.

Preference. The ability to choose.

Propagation. The continuance of life.

Sappiness. Full of sap.

Species. A distinct kind or sort of plant or animal.

Staple. The fiber of cotton; the raw material.

Variety. A group of plants that look alike.

Vermin. Animals that are noxious or disliked by man as lice, mites, and rats.

Vigorous. Showing strength.

Weevil. Small insects which eat out the insides of grains.

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"Seed Corn," U. S. Dept. of Agri., Farmers' Bul. 415.

"Oat Production," U. S. Dept. of Agri., Farmers' Bul. 431.

"Peanut Culture," U. S. Dept. of Agri., Farmers' Bul. 436

"Cotton Culture," Oklahoma Bul. No. 97.

"Weeds," U. S. Dept. of Agri., Farmers' Bul. 188.

CHAPTER III

THE SCHOOL EXHIBIT

Who Has the Best?—Do you know the different kinds of corn and cotton raised in your community? Do you know who raises the best? Is there any farmer in your school district who seems to raise better and more regular crops than his neighbors? The best way to find out whether your home products are better or worse than those of the other people in the district is to prepare an exhibit and compare them. How much do you know about the different kinds of grain and vegetables grown about your home? The object of a school exhibit is to find out who grows the best crops, what kind he grows, and how he grows them.

Comparing Products.—Most of our farmers raise some corn, cotton, and wheat. If small amounts of each of these should be brought into the school room, we would find that there is a great difference in the shape and color of the corn. There would probably be a difference in the quality of the cotton and the length of fiber. Perhaps two or three farmers in the community have some product that is better than that of any others. By comparing all of these, we find out which is the best and try to produce just as good or better corn or cotton. This comparison creates a desire to grow products that represent the latest improvement and the highest yield. Our desire is to reach a standard of perfection that gives the highest yield and the greatest income for the grower.

If you are showing a few ears of corn, along with those of several neighbors, does it not give you a feeling of pride to have a judge pronounce your exhibit better than all the others? If you are placed second or third, is there not a desire to improve your corn so that yours may be pronounced the best during the next contest? Competition is not only the life of business, but it is the life of a school. If we feel the need of improving our minds and

FIG. 13.—An inexpensive school display.

of sharpening our observation it is well to try to compare our work with that of other people. Those things which we think are very good may be very poor compared with others of that class.

Parental Interest.—Do your fathers and mothers know what you are doing at school? Many of them depend upon the products which you are studying to provide food and the necessities of life. They immediately become interested in the improvement of the yield

of corn or cotton. When you have a school exhibit and find that a neighbor has much better corn than your father has, you will probably ask your father why he does not raise the kind of corn that his neighbors do. He may become interested and want to see the products compared. A visit to the school means a better understanding of the work done. The fact that the school is doing some work to improve seeds and grain becomes known to many people. They take a direct interest, because, if the crops may be improved, it means a greater

FIG. 14.—A sample of good seed corn.

financial increase. The school is not only aided by the parents of the pupils, but the advertising brings favorable comment from those who are often finding fault with the education of children.

Preparation.—A school exhibit does not imply a special show room with glass cases, blue ribbons, and silver cups for a beginning. It does not mean that a great portion of the school room should be taken up with tables made for the purpose. Children interested in improving the school may start with a board shelf along the wall, with a row of corn and a few bolls of cotton.

The teacher, pupils, and parents should work together to make the school exhibit a success. It should not be the aim of the community to collect all the odd or freakish things, but to collect samples of the best products produced. It is not the purpose of the school to have one or two people supply all the material but that all of the pupils supply some material. Each boy may be able to supply, as a sample, ten ears of corn, twenty bolls of cotton, or a peck of wheat.

Standard Exhibits.—The amounts of standard exhibits are as follows:

Grain Sorghums	10 heads
Oats, barley, wheat, rye.....	1 peck
Edible Nuts	1 peck
Canes	5 stalks
Potatoes	1 peck
Carrots, turnips, beets, root crops..	6 each
Vegetables, fruit, eggplant, pepper, and tomatoes	6 each
Vine Crops (peas and beans).....	1 gallon
Cucumbers	6 each
Cantaloupe	3 each
Pumpkins, squash, watermelons...	1 each
Sweet corn	1 dozen ears
Onions	1 peck
Pop Corn	10 ears
Forage crops	1 bundle
Eggs	12 each

Fruits

Apples (Plate)	6 each
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Corn is perhaps the most commonly exhibited product of the farm. To prepare ten ears of corn representing the best type of the variety requires much care and prac-

tice. The corn selected for seed from the field usually contains some very suitable ears. It is best to collect the seed ears early during the months of September and October. These have been dried until they are firm and

FIG. 15.—Ears properly located on stalk.

A. Those on the left too high.

B. Ears of medium height.

C. The low ear is difficult to harvest.

well seasoned. Uniformity is the great secret of success in any exhibit. In corn, this means a collection of ten ears having about the same shape, the same depth of grains, the same size of cob, straight rows of the same

size and number on each ear, and freedom from insect injury. By laying out in a row fifty of the best ears of corn that you may find, you can probably select ten ears of superior quality.

We consider an exhibit of corn desirable when it possesses these characters: The ears should be similar in

FIG. 16.—Uniform cotton bolls. The green bolls represent the production of one plant.

size, shape, color, and indentation. They should conform to the variety type, being cylindrical, tapering slowly from the butt to the tip. Yellow corn has a red cob and white corn a white cob. Crossed or mixed grains are not desirable in white or yellow varieties. The ears are to be ripe, sound, bright, firm, well filled at the tip and regular at the butt. The grains or kernels should be

uniform in size, wedge-shaped, with a large germ. The grain, when shelled, should weigh eighty-five per cent as much as the ear.

It is an excellent plan to have entire stalks, with ears attached, showing the proper location of the ear. Extremely low ears or extremely high ears are not desirable. An ear three and one-half feet above the ground on a strong shank holding the ear horizontally is the most satisfactory.

FIG. 17.—Cottonseed products.

A. Cottonseed oil.	E. Cottonseed cake.
B. Linters.	F. Cottonseed with linters removed.
C. Cottonseed hulls.	G. Cottonseed.
D. Cottonseed meal.	

Cotton collected during September and October may be used for selecting material for an exhibit. The bolls should have been taken from the plants that are three or four feet high, with low fruiting branches and large bolls. Twenty of the most uniform bolls should be selected. The fiber should be bright, silk-like, white, free from vegetable odor and immaturity, also free from sticks, dust, and stains. The fiber must be strong and of uniform length. It should weigh about thirty-five per cent as much as the original weight of the seed cotton.

The seed should be of uniform shape, size, color, and thickness of fuzz coat. From sixty to seventy bolls make a pound for exhibits. The samples should be true to variety.

The twenty bolls may be mounted in shirt boxes, so that the sample may be covered when not in use. Ginned cotton may be mounted in the same way.

FIG. 18.—Forage Crops.

A. Timothy.
B. Alfalfa.

C. Sweet Clover.
D. Millet.

Cotton by-products are little known by many people who live in a cotton country. It is a good plan to display a little cotton seed meal, cake, oil, cord, thread, hulls, and linters. Types of cotton stalks, both desirable and undesirable, help to develop the interest in such an exhibit.

Forage Crops are perhaps the most difficult to display. They should be cut and dried so that the bundles

are bright, of natural color, and of uniformity. Tying the bundles requires much care. The tops, butts, and centers need a band.

Small Grains are exhibited in paper or cloth bags. A peck of the grain is poured into the bag and the top is rolled down. It is desirable to have grain of uniform size, and it should weigh heavily. In order to get the grains which weigh most, a larger amount of seed is taken and

FIG. 19.—Small grains in bags for exhibition.

thrown across the room. The heaviest grains travel farthest and may be collected for the sample.

Head grain exhibits make a very effective display. From fifty to one hundred heads to the bundle may be tied at the top, bottom, and center. Bright straw free from leaves is best.

Eggs.—To encourage the production of a better quality of eggs and an interest in the poultry industry, nothing is more valuable than an egg show. Twelve eggs are shown as an entry. They should be as nearly alike as

possible. There are white-shelled eggs and brown-shelled eggs. The former are usually from the small breeds of hens, as the Leghorn and our "egg breeds." The brown eggs are from the large general purpose or meat breeds. A dozen eggs should weigh from twenty-four to twenty-seven ounces. The object is to get a dozen eggs that are uniform in shape, size, and color.

FIG. 20.—Provisions for showing and marketing eggs.
A. and B. Egg marketing cases.
(left) Brown eggs. - (right) White eggs.

The individual egg should have a shell as nearly perfect as possible. It should be free from lime knots, blotches, checks, air spaces, and other defects which you may see by holding the egg to the light. Dirty or cracked eggs are undesirable. Washing eggs produces a glossy appearance that is not permitted in egg shows. The yolks should be rich golden in color, without spots except the germ.

One great advantage in learning to judge eggs is the grading of eggs for the market. Often hens lay eggs of

various sorts and shapes. If we should select the most perfect and uniform, these eggs could be marketed at a much better profit. The mixing of the inferior eggs with the choice ones has a tendency to lower the price of the entire lot. That is, white eggs should be marketed as white eggs and brown eggs as brown eggs.

Small cartons or crates for packing one or several dozens, bearing the date when the eggs were laid, will help to increase the value of the egg sales. People prefer to buy a standardized product rather than to take chances on old or spoiled eggs.

QUESTIONS

1. Why are school exhibits important?
2. How would you make preparations for a school exhibit?
3. Make out a list of the important crops grown in your community and tell how they should be arranged for the exhibit.
4. How many ears of corn make a sample?
5. Why is the co-operation of the teacher, pupils, and parents necessary in the building up of a good school exhibit?
6. What is the best method of showing cotton and cotton by-products in a school exhibit?
7. Tell how to collect and arrange forage crops in a school display.
8. Prepare a list of problems to be considered in showing small grains.
9. State several advantages of showing eggs in the school exhibit.
10. Give the standard weight of commercial eggs per dozen. What breeds lay the larger eggs?
11. Discuss the methods of packing and marketing eggs in your district.
12. Of what advantage should a guarantee be in selling eggs?
13. Give the market prices of eggs in your community.
14. State the advantages of infertile eggs over fertile eggs for marketing.

PRACTICAL WORK

Prepare a school exhibit, representing the best that your school and community can produce.

WORDS TO BE LEARNED

Blotches. Large irregular spots.

By-product. Additional material aside from the principal product.

Carton. A pasteboard box.

Checks. Small cracks in the eggs.

Competition. An attempt to gain something for which another is striving.

Conform. To shape in accordance; to make like.

Cylindrical. Having the form of a cylinder.

Exhibit. A collection of articles for making a display or show.

Fiber. A tough substance composed of thread-like tissue.

Forage. For example, as the grasses and hay.

Indentation. The grooves or notches in grains of corn.

Kernels. A whole grain or seed of a cereal.

Linters. The cotton removed from cotton seed after ginning.

Observation. The act of seeing or making conclusions.

Shank. A portion of the corn stalk which holds the ear.

Standard. That which is established by custom or general consent.

Yolk. The yellow mass in the center of the egg.

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CHAPTER IV

FARM EQUIPMENT

Learn to Do Things.—Farmers do not need to be skilled carpenters to make a number of useful articles for the farm. It is very easy to construct a number of small houses and gates during those winter months when the weather does not permit working out in the fields. The saving from increased comforts for the young livestock and from improved ways of doing things will justify learning how to do many things.

Hog Houses.—A brood sow, at farrowing time, needs a house away from the other hogs. Her pigs should not be disturbed, and they need a clean place to start to grow into strong vigorous hogs. An elaborate hog house is not needed in such a warm country as ours, but a simple portable house will do very well. The diagram (Fig. 86) suggests a very simple plan of making a portable house, large enough for one sow and her family. It does not take long to make the house, and it will last for a long time.

Shipping crates are not used often, except in handling breeding stock, but it is well to know how to make them. A simple crate as shown in the illustration (Fig. 21) will do very well. It should be made of strong boards, with a substantial bottom. The most common size is twenty inches wide, three feet four inches high, and four feet long.

Feed Troughs.—Feed troughs are always in demand where there are pigs or chickens. They should not be of

the same size for all kinds of animals. The little pigs and chickens need troughs about three or four feet long and two or three inches deep, while the older hogs need one eight feet long and four or five inches deep. It is well to attach long boards at the ends, to prevent upsetting the trough. Braces should be placed across the troughs at intervals of one foot to prevent the hogs from lying in the trough. A cattle feeding trough is much larger than

FIG. 21.—Shipping crate and unloading chute.

a hog trough. It is placed upon posts as shown in the picture. Hay racks are very useful in saving hay where a number of cattle and horses are fed.

Yards.—Strong fences are needed about barns because the farm animals push against these more often than they do against other fences. These should be made of boards or strong woven wire. It is better to have a small lot about the barn, with larger yards for hogs and cattle farther back. A very good arrangement is shown in the illustration. (Fig. 25.)

Creeps are little pens built for very young stock, so that they may have an opportunity to walk into the creep for their feed without being disturbed by the older animals. Young pigs soon learn to crawl into a pen where a bottom board is off, to eat from a trough or feeder, where the mother can not crowd them away. Calves will do better if provided a small pen in which to learn to eat grain. Colts and young mules need a

FIG. 22.—Hog troughs, made to prevent the pigs taking advantage of each other.

creep so that they may not be fought away from their grain by the larger animals. Fig. 83 suggests a simple creep for pigs.

Poultry Houses vary with the needs of the flock, the weather conditions and the resources of the producer. It is not necessary to build an elaborate poultry house to start the raising of good chickens. A large goods box covered with tarred paper is very satisfactory for a beginning with a small number of hens. In fact, it is not the best plan to build a large house. An eight by ten foot house is the most convenient, and a part of the south side is left open for ventilation.

Fixtures in the hen house should be portable so that cleaning may not be difficult. A dropping board, three feet wide, eighteen inches from the floor, should be placed at the back of the house. Perches are arranged above the dropping board. Small boxes may be used for nests. These should be placed under the dropping boards in order to provide a clean dark place for the laying hens. Portable poultry houses are desirable for large farms.

Brood Coops.—The hen with a newly hatched family of chicks should have a house and a small plot of lawn

FIG. 23.—Cattle-feeding trough.

where the other poultry may not disturb them. This will give the young brood a chance to grow more rapidly, and they will not be injured by the feet of larger animals. A box brooder, two and one-half feet square, sloping from two feet to one foot as shown in the diagram will serve the purpose. A portable bottom protects the young chicks from cold and moisture. A small door with wire netting should be provided.

Rope Making.—Boys and girls like to make rope from binder twine and other kinds of cords. Usually a

small amount of this material may be picked up about the place and converted into useful ropes or strong cords which serve as ties for horses and cattle. The "home-made" rope is as good as that which may be purchased at the store and is less expensive. After studying a few simple details regarding the method of making rope, one may make rope at school. As soon as a working knowledge of this art is gained the work may be carried on at home.

FIG. 24.—A hay feeding rack.

The Rope Machine.—A piece of lumber, two by four, four and one-half feet long will serve as the frame. A hole is bored in the center of the frame and one hole on each side of this one, at a distance of about four and one-half inches. A small piece of board (B, Fig. 30) has holes bored in it to correspond to those bored in the frame A.

Three crank-shaped rods C with holes drilled in the ends or bent to form an eye, made from an old wagon iron, are put through the holes in the frame. The board

B is placed over the ends of the rods at the back of the frame. By turning this board all the rods turn at the same time. Another board D contains three holes one inch in diameter, arranged in triangular manner. These holes are three and one-half inches apart. A piece of rope is fastened to each end of board D and passes around the person's body that holds the twine.

Setting Up the Machine for Use.—Set two posts with smooth sides into the ground so they will not give.

FIG. 25.—Barnyards well arranged.

These posts should be close enough together so the ends of the frame may be nailed to the post. The best distance from the ground will be determined by the height of the boys or girls. Usually the frame should be about waist high to the workers. The cranks and the board for turning the cranks is next put into place. The rope, fastened to the board containing the three holes for holding the cord, is then placed around the waist of one boy, and he is stationed 25 or 30 feet in front of the machine for turning the cords.

Measuring the Twine.—For a small trunk rope, 9 plies of binder twine will be needed. Measure off three groups of 3 strands each. Tie them at both ends. Fasten them to the cranks, and pass the ends of the plies through the holes in the board that is being held by the boy stationed in front of the machine, and tie them together. The groups of strands should not cross one another and should be straight when viewed from the machine or holder.

FIG. 26.—A poultry house that may be constructed at a small cost.

Making the Rope.—After getting the twine properly adjusted for making the rope, begin turning the board that holds the cranks, to the right. This will twist the strands of twine together. Be careful and do not twist the plies so tightly that the grease will run out of the rope or kinks will be formed. Frequently examine the plies near the board that is held by the boy. As soon as they seem to be twisted fairly tight begin taking off the rope. This is done by catching hold of the ends of the plies at the holding board and twisting to the left. The plies will

naturally fall into place and form a rope. A good plan is to have two boys hold the board that was held by the one boy at the beginning of the work. The boy at the machine continues turning the cranks. The boy taking off the rope turns the entire rope gently to the left as the two boys move gently along toward the machine. Another boy may hold the end of the rope to keep it off the ground and keep it from kinking. As soon as the rope

FIG. 27.—Interior of a poultry house. Note the dropping board and nests.

has been removed from the machine tie it at both ends. Fasten the end that was at the machine to the middle crank and hold the other end so it will be taut. Move the board that turned the three cranks and turn the crank by hand to the left. Tighten on the rope from time to time, this causes the plies to be wound tighter. Remove the rope from the machine and singe off the fiber that may be sticking out, and the rope is completed.

Use of Concrete.—Foundations, floors, borders, walks, posts, water tanks, silos, feeding floors, and roads are

being built of concrete. This is almost a concrete age. Various materials are used for making concrete. Portland cement is the basis of the solidifying element. Sand, gravel, crushed stone, and ballast make up the general body of a concrete structure. These materials are mixed, while the cement is fresh, with water in varying proportions. This mixture should be placed in the mold before it has time to "set" or become hard. It is desirable to

FIG. 28.—A brooder coop and pen for chicks.

pack the concrete well into the form while it is fresh. Pounding down with a tamping stick causes the mixture to make a uniform mass.

The strength of concrete varies with the manner of making up the cement, stone and water. "Grouting" is the term applied to concrete for filling in roads, walks or floors. A thin mortar made of two parts sand and one part cement, poured over larger rocks and brickbats makes a good "grouting." Foundation concrete is made

A

B

FIG. 29.—Rope making.

A. Making the plies by twisting twine.
B. Finishing by twisting plies.

of gravel, one part; sand, seven parts; and cement, two parts. Walks are made from "grouting" covered with a fine finish made of one sack of cement to thirty shovels of screened sand. Concrete posts, tanks and other things requiring a form are better if reinforced with iron. Pieces of rods will prevent breaking. The mixture of concrete is about the same as that used for foundation work, with a little more cement added. It is best to use a large

FIG. 30.—Rope machine

A. Frame.	E. Holding board for winding plies to-
B. Crank board.	gether.
C. Cranks.	e. Nails for attaching twine.
D. Guide board.	

amount of water in mixing to insure a uniform product. Floors for livestock should not be finished smoothly, because that permits slipping.

Gates.—Our system of farming makes it necessary for every farmer to provide good fences about his farm. He needs gates to pass from his fields and lots. It is aggravating to have gates that are sagging or that break every time they are pushed by a horse or pig. The best gate is made of five strong light boards, ten, twelve, or fourteen feet long, with uprights at each end and a diagonal brace, supported by two short braces, as illustrated in Fig. 32A.

This gate may be hung on hinges or placed upon a slide.
It cannot sag.

FIG. 31.—Knots and splices.

1. Overhand knot.	21. A. Beginning ring splice.
2. Granny knot.	B. Making ring splice.
3. Square knot.	22. A. Small six-strand rope.
4. Figure-eight knot.	B. Nine strand rope.
5. Bell-cord knot.	C. Lariat rope.
6. Clove hitch.	23. Homemade halter.
7. Weavers knot.	24. Loose double-bow knot.
8. Simple slip knot with safety.	25. A. Beginning thimble splice.
9. Double sheet bend.	B. Second stage thimble splice.
10. Hackamore tie.	C. Thimble completed.
11. Double half-hitch.	26. A. First stage back splicing.
12. Simple halter tie.	B. Second stage back splicing.
13. Timber hitch.	C. Back splicing completed.
14. Ring splice.	27. A. First stage long splice.
15. Sheep-shank.	B. Second stage long splice.
16. Figure eight knot (halter tie).	C. Long splice completed.
17. Cat's paw knot.	28. A. First step mending a broken
18. Double bow line knot.	strand.
19. Stop knot.	B. Broken strand mended.
20. Double bow knot.	

QUESTIONS

1. Name several useful carpentering tools used on the farm.
2. Why should brood sows have individual houses?
3. Explain a simple type of portable hog house.
4. Give the dimensions of shipping crates for hogs.
5. What kinds of troughs are best for hogs and pigs?
6. What is a hog creep? State its advantages.

7. Give factors to be considered in locating a poultry house.
8. Draw a floor plan of a simple poultry house.
9. State the essentials of a poultry house.
10. Describe a good brood coop.
11. What are hotbeds and cold frames?
12. Name the uses of rope.
13. What are the parts of a rope?
14. Name twenty kinds of knots.

FIG. 32. A.—A farm gate that does not sag.

15. How does long splicing of a rope differ from short splicing?
16. Name the parts of a rope machine.
17. What are some of the uses of concrete on the farm?
18. Explain the term "grouting" as used in walk making.
19. Where is Portland cement made?
20. Describe a good farm gate.

PRACTICAL WORK

Exercise 1

Object: To make rope.

Materials: Rope machine, binder twine or white cord.

FIG. 32 B.—Concrete construction.
Above, filling in the concrete form for the post.
Below, a finished corner post.

Procedure: Follow the explanation given for making rope in the lesson.

Results: 1. How is rope made?

2. What does it cost to make a trunk rope? A lariat rope?

3. Measure the length of the strands of binder twine at the start and compare the length with the length of the finished rope. What are the results?

4. Compare the cost of making rope at home with the same grade of rope that may be purchased.

5. Make a drawing of all the equipment needed in making rope.

Exercise 2

If any of the pupils are raising hogs, a small portable hog house may be made for use in caring for the hogs.

Exercise 3

Prepare some brood coops from old goods boxes and also permit the pupils to take them home.

Exercise 4

Construct a cold frame and hotbed on the school ground to raise plants, such as cabbage, tomatoes, egg plants, etc.

Exercise 5

Practice knot-tying and its uses.

Exercise 6

Mold some concrete drinking fountains for chickens. Build concrete borders for the flower beds.

WORDS TO BE LEARNED

Ballast. That which has stability, as coarse stone.

Brood. Young animals cared for by the same mother.

Concrete. A mixture of cement, water, sand, and gravel which hardens into stonelike substance.

Creep. A small passage for animals to enter a pen.

Economical. The least expensive method.

Elaborate. Fancy or worded out with great care.

Farrowing. Giving birth to young, applied to hogs.

Grouting. Coarse stone and cement used for filling.

Guide Board. A board to guide the strands in making rope.

Mold. A hollow form for shaping objects.

Portable. That which may be moved or taken apart.

Portland Cement. A commercial cement used in concrete-making. It was first made in Portland, England.

Reenforced. Strengthening iron or steel supports in concrete.

Slide. A running bar for a gate.

Solidifying. Making solid.

Splicing. To unite by interweaving.

Triangular. An object having three sides shaped like a triangle.

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CHAPTER V

THE FARM ORCHARD

Why We Need More Fruit.—Food experts recommend that a large amount of the human diet be composed of fruits. Very few people fail to enjoy eating a ripe peach or a dish of strawberries with cream. The best way for farmers to obtain these luxuries is to plant orchards that will grow them. If the fruit is to be purchased, there is seldom a sufficient supply for the family. It is indeed a pleasure to pluck ripe peaches or plums from the tree. These forms of “preserved sunshine” not only supply the needs of the summer time, but they are a source of well preserved jams and jellies for the winter. “It never rains roses, if we want more roses, we must plant more bushes,” a famous writer has remarked. The same is true of fruit production. These and bushes must be planted and cultivated to obtain luscious harvest. After we have planted the trees, there is a long period of care and cultivation before the orchard bears fruit. While there may be a great many things to require the attention of farmers, the orchard, has a very important place. The time and energy consumed will be well rewarded in later years.

Location of the Home Orchard.—We usually want the orchard as near the home as possible. It is desirable to have a gentle slope, well drained, but not so abrupt as to allow washing. The south slope is more desirable,

on account of the sunshine and the prevention of cold winds. The soil does not determine the quality or the amount of fruit grown so much as the care given, but for general purposes a rich loam will produce the most fruit. Strawberries and grapes do well on light soils, apples and pears on clay loam, plums and cherries on medium loam, apricots and peaches on light sandy loam.

Source of Orchard Stock.—Reliable nurseries, experienced fruit growers in the community, and the farm-

FIG. 33.—An orchard with a gentle slope.

er's own growing of fruit from seeds may provide a supply of material for planting the orchard. The nearest nursery, whose product is true to variety, is perhaps the best source of fruit trees. The advantages of buying from a local nursery are that you may visit the nursery and see what is being produced; freight charges are saved; the trees are better adapted to your environment. Small fruits and vines which develop from "runners" may be secured from neighbors or produced at home.

Selection of Varieties.—The varieties which have been tried in a community and have been found suc-

cessful are the best kinds to select. The fruits which the family likes best are always to be given preference. In addition to high yielding varieties, it is well to select those which produce in succession. Early, medium and late varieties of peaches and apples furnish fruit over a long period. The same is true with strawberries and cherries.

The following varieties of fruits may be successfully grown in the South:

APPLES

1. Red June.
2. Yellow Transparent.
3. San Jacinto.
4. Grimes Golden.
5. Jonathan.

PEACHES

1. Togo.
2. Early Crawford.
3. Mamie Ross.
4. Elberta.
5. Indian Cling.

APRICOTS

1. Early Golden.
2. Lampasas.

BLACKBERRIES

1. Dallas.
2. Macdonald.
3. Robinson.

STRAWBERRIES

1. Lady Thompson.
2. Klondike.
3. Aroma.
4. Dunlap.
5. Ever Bearing.

PEARS

1. Dwarf Bartlett.
2. Garber.
3. Keiffer.

PLUMS

1. Red June.
2. Burbank.
3. Wild Goose.
4. Golden Beauty.
5. Abundance.

GRAPES

1. Moore's Early.
2. Concord.
3. R. W. Munson.

DEWBERRIES

1. Austin.
2. Rogers.

PECANS

1. Stuart.
2. Schley.
3. Delmas.

PERSIMMONS

1. Yemon.
2. Mino.

FIG. 34.—A reliable nursery. General scene above and office below.

“Heeling-in.”—Nursery stock is packed in moss and straw. The box should be opened, and if the trees are not planted at once, the bundles should be “heeled-in” out of doors, by covering with earth. A trench is dug, the moss or packing is removed from the bundles, and the trees are set vertically in the trench. After moistening, earth is packed about the trees.

FIG. 35.—Small fruits, strawberries and blackberries.

Planning an Orchard.—Tree fruits, in order to obtain the largest production, should be planted separately. The small fruits are more convenient when located near the garden. The check system enables the grower to cultivate more thoroughly and economically. Apples, for a soil of ordinary fertility, should be planted in checks thirty feet by thirty feet, peaches twenty by twenty, plums, cherries and apricots eighteen by eighteen feet, grapes in nine-foot rows, eight feet apart, blackberries in eight-foot rows, two feet apart in the

row, dewberries six feet apart, and three feet in the row, strawberries, thickly in small beds and in wider rows for larger fields.

Planting.—An orchard produces better for a longer period of time, if it is first plowed very deeply or subsoiled, before planting. The locations of the trees should be established by marking the orchard into squares with

FIG. 36.—Planting a tree. The hole is dug larger and deeper than is needed for the tree. The space is filled with rich earth.

a string or wire. The holes in which the trees are planted should be large enough to accommodate the roots without bending them, and deep enough so that some loose soil may be put into the bottom before setting the tree. The tree should be set slightly deeper than it was in the nursery. Care should be taken, not expose the “heeled-in” plants to the air and sunshine until they are ready to be placed in the ground. An hour of exposure may kill the young roots. “Heeling-in” near the place of planting will protect them

until they are set. The month of November is recommended as the best month for planting fruit trees in the South. Farther north, the month of March is the most favorable.

Before placing into the hole, broken or dead roots should be removed with a sharp knife from the tree. The roots should be spread naturally with the soil carefully worked in around them. The trunk of the tree stands in a vertical position. When the hole is half full of earth, it is tamped or pressed down. Complete the filling, packing the soil until even with the surface. A little loose earth should be heaped about the trunk to keep away the mice and rabbits. Cut back the top, for apples, until the tree is about two feet high, for peaches, plums, and apricots, until they are about eighteen inches high. Nursery tags injure the tree and ought to be removed at the time of planting.

Cultivation.—The time to begin cultivation is soon after the orchard is planted. If the soil is pulverized and free from weeds, deep cultivation will not be needed. By keeping the soil loose about each tree, moisture will be conserved. Implements have been designed to provide thorough cultivation. A very common method of cultivation is with a one-horse cultivator; care should be taken to avoid injuring young trees. If no crops are grown in the orchard, frequent harrowing or disk-ing is advisable. The application of mulches and fertilizers aid greatly in securing a vigorous growth. Poor soils may require a straw mulch about each tree. Chickens often aid in cultivating an orchard by destroying insects and by scratching. Shallow cultivation is more profitable than very deep plowing after

the trees have been planted. Cross cultivation is desirable, because a continual turning of the earth in one direction will build ridges.

If a crop is to be grown in the orchard, a cultivated crop is the best, because it provides some animal feed and may be the means of keeping down weeds. Cow-peas, soy beans, or peanuts planted in rows, provide

FIG. 37.—Cultivating an orchard.

excellent orchard crops. They are not so large as to sap the soil, the roots provide nitrogen, and some hay or feed may be harvested.

Pruning Fruit Trees is the process of removing^{out} branches and twigs. Old orchards provide excellent material for learning the best methods of pruning. By carefully removing dead limbs from the tree, fungous diseases are prevented from spreading. There is a tendency of trees to become crowded and thickly branched

at the top. The light is prevented from reaching the lower parts of the tree, and less fruit is produced. Pruning thins these tops. Branches of trees vary in productiveness. Some grow nothing but wood, others bear fruit. By selecting those branches which bear fruit, the yield may be greatly increased. In growing,

FIG. 38.—Pruning young trees.

That on the left is a seedling unpruned. The tree in the center is pruned ready for planting. The tree on the right is marked with a piece of chalk where it is to be pruned.

many branches overlap and prevent fruitful branches from developing normally. Careful pruning will remove competing branches, allowing the desirable ones to grow. Undesirable woody growths are removed in pruning, as water sprouts and fruitless branches. The importance of pruning may be summarized as, (1) Preventing diseases, (2) Permitting light to enter, (3) Selection of fruiting branches, (4) Preventing unneces-

sary competition, (5) Removing excessive woody growths, (6) Preventing old orchards.

The Time to Prune varies with the kinds of fruit grown. Early training of fruit trees is important. After young trees have been growing in the orchard for one year, it is important to begin to train the top in the way it should grow. Main branches are selected, alternating about the trunk of the tree; other branches will develop from these during the next year. Branches are often "trained" by pinching buds, to prevent the growth of watersprouts. The tops of trees may be kept low by this pinching process. This is especially desirable in large commercial orchards.

Pruning involves the making of neat cuts in removing branches. Tools should be sharp so that the green bark layer may not be torn. A clean sloping cut insures prompt healing of the wounds. Large branches should first be notched by sawing from the underside. Then cut the limb, leaving enough branch to insure healing without injuring the tree. Paint should be applied to large wounds, to prevent rotting of the heart wood. Very late pruning may injure trees, and experienced fruit growers practice a system of pruning at various times in the year.

The needs and likes of the grower determine to a large extent the time and amount of pruning. Each kind of tree demands a different type of training. It is generally considered advisable to prune during the dormant season for the heavy cuttings. Small growths are removed at any time.

Control of Disease.—The best way to prevent diseases of fruit trees is to avoid a start of the infection. Strong, vigorous trees of resistant varieties should be se-

lected for planting. Proper cultivation and an abundance of soil fertility will enable the tree to resist many diseases. Keeping the orchard clean, and the removal of dead or diseased wood will prevent much infection. Spraying with various chemicals at the proper time will destroy most of the diseases.

Handling the Fruit Crop.—The primary object of most people is to raise sufficient fruits of all kinds for home use. After this has been canned or stored the surplus may be marketed locally at the stores, shipped to large wholesale fruit companies, or sold along with that of neighboring growers. The last method involves the growing of standard varieties in a community so that carload lots may be shipped at one time. Some farmers sell fruit on the tree to people who have the means of taking care of it.

QUESTIONS

1. Why is a good family orchard important?
2. What kind of site and soil is best for fruit production?
3. Give three sources of trees and small fruits.
4. Explain the term environment in relation to fruit growing.
5. What factors should be considered in selecting the varieties of fruit for the orchard?
6. Name the kinds and varieties of fruit produced in your section.
7. Tell how to "heel-in" fruit trees.
8. How should tree fruits and small fruits be arranged on the home grounds?
9. State the proper distances for planting fruit trees and berries.
10. Explain the preparation of soil for planting orchards.
11. When and how are fruit trees planted?
12. Discuss the proper cultivation for the orchard.
13. How may diseases and insect pests be controlled?
14. Suggest methods of handling fruit in the home orchard.

PRACTICAL WORK

Exercise 1

Object: To plant trees on the school ground.

Materials: Shovel, spade, knife or pruning shears, saw, and trees.

Procedure: Select places for planting the trees. Make excavations for the planting. Have rich garden soil. Plant trees according to directions given in the lesson. Fill in around the tree with garden soil. Water the roots.

Results: Make a written report of trees planted.

Exercise 2

Object: To renovate an old orchard.

Materials: An old orchard, saws, sharp axe, hatchet, paint, shovel, and pruning shears.

Procedure: Go over the orchard, observing the age and desirability of the trees. Remove worthless trees. Cut off dead branches and burn them. Take out branches which are crossed, twisted. Paint surfaces where large limbs are removed.

Results: Visit occasionally and observe the benefits from pruning.

Exercise 3

Object: To learn varieties of apples.

Materials: Six kinds of ripe apples, notebook, standard color charts of fruit from a nursery.

Procedure: Study the apples, noting the shape, size, and color. Find out the names of the apples. After learning the names of the apples, mix the different kinds of apples to see whether you can pick out the varieties. Cut the apples open and observe the different appearances of the seeds and the texture of the fruit.

Results: Try to decide what apples are best to eat. What varieties of apples are best suited for the community?

Exercise 4

Arrange with your county agricultural agent for a demonstration of budding and grafting fruit trees.

WORDS TO BE LEARNED

Abrupt. Sudden changing.

Alternate. To vary or to change by terms.

Chemicals. Materials used in spraying fruit trees.

Cuttings. A severed portion of a plant used for propagation.

Disease. Injury caused by parasites.

Dormant. Inactive or at rest. In plants not growing.

Environment. Surrounding conditions and affecting life.

Factors. Some agency or influence producing a result.

Fungous. Pertaining to a fungus which is a parasitic plant growth.

Infection. That which causes disease.

Loam. Earthy matter composed of clay and sand.

Mulch. Substances spread upon the ground to protect plants from heat, cold, or drought.

Nitrogen. A chemical element used for plant food.

Nursery. A place where trees, shrubs and vines are propagated.

Rejuvenating. To make young again.

Runner. A flat-lying branch with roots at the end.

Site. The place where the orchard is located.

Subsoiled. To tear up the layer of soil which underlies the surface soil.

Tamp. Packing the soil.

Vertically. Standing erect.

"Water-sprout." Growth of a woody branch in an unusual place.

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CHAPTER VI

GROWING TREES

What is a Forest?—A heavily wooded area, a tract of timberland with its varied growth of vegetation, a highly organized portion of the vegetable kingdom are expressions describing a forest. With the exception of mountainous sections and a few waste tracts, the great forest areas have disappeared in the path of agricultural progress.

The present ideas of forestry are limited to the planting and growing of trees in woodlots. Our science of forestry, as applied to the farm does not extend to the great preserves, but is limited to the woodlot and the groves about our homes. The name **Arboriculture**, meaning the cultivation of individual trees, applies more to our present study.

Need of Forests.—Have you noticed the washed and deeply grooved appearance of barren hillsides and sloping fields? The heavy rains have fallen upon these fields for a number of years, carrying away the soil, leaving the land rough and untillable. The torrent of water rushing down to the valleys causes streams to be flooded and great waste of soil fertility. Since hillside land soon becomes worthless, it is quite important that these fields should be replanted with trees which will prevent washing and retain the moisture.

Reforestation.—There are thousands of square miles of waste land in the South that were once covered with

valuable pine forests. The removal of the timber has given room for a dense growth of small evergreens. When these become very dense, fires often burn over great areas, leaving a barren waste of sand and stumps. By proper care in thinning and by preventing fires, a new growth may be obtained. The United States Bureau of Forestry has furnished valuable aid in starting new growths upon barren tracts and in protecting growths

FIG. 39.—Washed lands in the foreground; that in the background is held in place by small trees.

from fires. It is quite evident that sandy land will furnish greater profits if planted with trees than for farm crops.

Are homes without trees attractive? Does the treeless place appeal to you? The protection furnished by trees is worth much. A windbreak of a few rows of trees may be of much value during wind storms. The hot sun of summer is not nearly so disagreeable if we have a well shaded lawn.

Two or three acres of woodlot containing the proper varieties not only provide protection and beauty, but

FIG. 40.—A prairie home that has little to attract young people.

FIG. 41.—A shaded home.

much post timber and firewood may be produced. It is a matter of economy to have a windbreak for the orchard.

A grove of pecans will not only provide shade for the home but will produce many valuable edible nuts.

The Tree.—Since the trees are the units making up the woodlot, it is well to have an understanding of the nature of trees. A tree is a woody plant growing up from the ground, usually with a single stem. The three parts of a tree are the **stump**, **trunk**, and **top**.

The Stump of a tree is the base to which the roots are attached. It has been suggested that there is as much of the tree below the ground as there is above. A tree, two feet in diameter, has a root system, that if all the

FIG. 42.—Parts of a tree.
A. Stump. B. Trunk. C. Top.

roots were placed in a continuous line, they would extend several miles. These not only anchor the tree, preventing its blowing over during storms, but they collect food from a large amount of soil.

The Trunk of a tree is the stem or portion from the roots and stump to the first branches. The length of the trunk varies greatly with the kinds of trees and the conditions under which the tree has grown. Where the trees are closely grouped, they grow tall and the first branches are high up. Out in the open places the trees spread with

low branches. Thus if we desire long straight trunks for making boards and posts, it is desirable to have them growing in a close group or in woodlots.

There are two distinct portions of the trunk in most trees, heartwood and sapwood. The portions are not very well marked in the holly, cypress, cottonwood, and

FIG. 43.—A tree of the forest.

others. The heartwood has a darker color and is used for making furniture and finished wood products. The sapwood is the growing portion on the outside of the tree. It is made of sap tubes, carrying water and soluble foods for the tree.

Some valuable products come from this sap layer; as

turpentine from the pine, rubber from the rubber tree, and maple sugar from the maple tree.

When a tree is cut down, a number of rings may be noticed across the stump. These are the annual rings, formed by periods of growth, each ring usually representing one year of growth.

The Top of the tree is not so useful to man, but it is absolutely necessary for the tree. Those thousands of

FIG. 44.—A spreading oak in the open country.

leaves borne upon the oak are breathing organs. They take in **carbon dioxide** and give off **oxygen**. The green coloring matter, while the sun is shining, combines the carbon dioxide with water, making starches and sugars. Most of the food of a growing tree is manufactured in the leaves.

Kinds of Trees.—Native trees found in many woodlots are often of little value to the farmer. Most of the oaks may be used for making fence posts, but the Bois

d'arc or Osage orange lasts much longer. We think of trees as requiring a very long time to grow from seeds. It is true that twenty years seems long to wait for trees to develop. That is all the more a reason for young people to become interested in planting trees. As our small woodlots become thin, trees may be planted which will greatly improve the quality of the timber.

FIG. 45.—The sections of the log show dark heart wood and light sapwood.

The fertility of the soil, the amount of water available, and the climate or temperature necessarily determine the kinds of trees grown. Cypress, sycamores, willows, and cottonwoods grow best along streams. Oaks, elms, and gums do better in rich soil a little higher than that suited to willows. Pines are usually adapted to higher altitudes or to shady coastal plains.

However, for planting about our homes, there are other trees which grow more rapidly and furnish more durable wood. The Bois d'arc or Osage orange grows rather rapidly in most places.

Locust seeds or roots may be used for propagating a rapidly growing grove. The roots of the locust develop nitrogen nodules, much the same as clover or alfalfa, and actually enrich the soil. Locust post and railroad-tie timber is valuable. Nothing is more pleasing about a home than a row of locust trees covered with fragrant blossoms.

FIG. 46 a.—Reforested wood lot.

The Bois d'arc and locusts contain chemicals which prevent to some extent the entrance of insects and fungi which cause the decay of timbers.

Lumber, including boards, beams and sawed timber, is produced mostly in those sections where there is a heavy growth of native forests. We consider pines, spruce, hemlock, and other evergreens as soft woods. Pine trees are the source of most "soft" lumber. Such trees as oak, elm, maple, ash, walnut, gum, and sycamore are "hard-wood."

The great problem is how to preserve the great forests so that the supply may not be exhausted. The Bureau of Forestry of the United States Department of Agriculture has done much to solve the problems of forestry.

Uses.—Furniture and finishing lumber are most commonly made from oak, walnut, or maple. Elm and gum are used for making baskets, boxes, and crates. Sycamore, ash, and holly provide wood for frames and

FIG. 46 b.—A row of locust trees.

handles. Cottonwood may provide a fair grade of lumber for crating and inside work. It is often used along with linden and other spongy woods for making paper.

The average farm woodlot, if planted by hand, will probably be more satisfactory if Bois d'arc, locust or mulberry are planted closely. These grow rather rapidly, and the trees may be thinned as they become large enough for posts.

Location.—Such a woodlot may be located so that it will prevent the blowing of sand, protect livestock and provide shade.

Collecting.—It should be of interest to pupils to collect samples of different kinds of woods near the home or school. By using a saw, sections, six or eight inches long, may be cut from limbs two inches in diameter. These samples may be cut at an angle on one end as shown in the diagram.

A study of the grain and texture of the wood may be made. White oak, black oak, post oak, red oak, syc-

FIG. 47.—Wood samples sawed to show the grain.

more, red maple, silver maple, elm, black gum, sweet gum, hickory, pecan, walnut, locust, willow, cedar, cottonwood, Bois d'arc, dogwood, holly, sassafras, ironwood, linden, pine, ash, and honey locust are found in many communities. Such a collection provides an interesting study in the differences of hardness and softness of our native woods. A leaf mount of the trees of the community will aid in learning the kinds of trees.

QUESTIONS

1. What is forestry?
2. Explain arboriculture.

3. State the needs for forests.
4. What are the parts of a tree?
5. Name several products obtained from the trunk of a tree.
6. Prepare a list of the timber trees and the shade trees grown in your community.

FIG. 48.—Leaves mounted to show the different types.

7. Name trees used for fence posts.
8. What trees are used for hardwood lumber, softwood lumber and dye?
9. Discuss the importance of a farm woodlot.
10. Suggest the best methods of handling a timber crop to avoid waste.

PRACTICAL WORK

Exercise 1

Object: To become familiar with trees.

Material: Saw, axe, hatchet, and branches of trees.

Procedure: Cut short pieces of branches, about eight inches long from representative trees. Branches from two to four inches in diameter should be selected. These should be sawed to show an angle of the wood. The collection may be taken to school, labeled, and placed in a case for future study. The samples may be fastened to boards and nailed to the wall.

Exercise 2

Object: To learn the kinds of trees near your school.

Material: Notebook and pencil.

Procedure: Visit a park or forest and list as many kinds of trees as you can. Note the differences in branches and in leaves. If you cannot name the trees, ask some older person who is familiar with trees.

WORDS TO BE LEARNED

Anchor. To fix in a stable condition.

Annular. Thickened layers of rings about a tree.

Carbon dioxide. A heavy colorless gas made from one part of carbon and two parts of oxygen.

Deciduous. Leaves falling at the end of the growing period.

Evergreen. Retaining leaves throughout the year.

Grain. The arrangement of fibers in wood.

Grove. A smaller group of trees than a forest without undergrowth.

Mount. To put upon anything that sustains or fits for use.

Nodules. A little lump or knot formed upon the roots of legumes.

Oxygen. A colorless, odorless, tasteless gas making up about one-fifth the air we breathe.

Preserve. A place where timber is grown and cared for, for future use.

Soluble. That which may be dissolved in a fluid.

Texture. The coarseness or fineness of wood particles.

Torrent. A violent rapid flow of water.

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CHAPTER VII

CATTLE

Beef Cattle Gain While You Sleep.—Diversified farming implies the development of a number of different sources of income. Upon larger farms where help is scarce and a large amount of feed is produced, it is often profitable to raise beef cattle. With plenty of pasture and a good supply of corn, one man can do much with beef cattle and hogs. They grow while he does other work, they supply a substantial profit and turn much waste roughage into money. It requires much work to handle dairy products and poultry. Cows must be milked, the milk cared for and marketed, along with a great amount of cleaning utensils. The same is true of marketing eggs and raising chicks. A large number of people are required to do such work, and a convenient market is necessary. The beef cattle industry will appeal to those farmers who have a large acreage available for pasture and very little assistance in handling it. Southern conditions are generally well adapted for the economic growth of beef cattle. Land and breeding stock are comparatively cheap. Barns are not needed, with the possible exception of sheds. Grass grows nearly all the year.

Breeds.—The American beef cattle are limited almost entirely to four breeds and those known as dual-purpose. A beef animal is considered in the meat producing industry as one whose structure and body confor-

mation is primarily for providing beef. The ideal type is one with short legs, heavy, well-developed hind quarters, a wide, thickly muscled back and a short neck.

Shorthorns.—Red, white and roan cattle have been favorites in the beef producing countries longer than any other of our standard breeds. They were first called

FIG. 49.—A grand champion Shorthorn cow. Lovely Thaxton 2nd.

Shorthorns, in contrast to the old Longhorns of England. They not only have the square bodies of good beef animals, but many of the cows are good milk producers. One strain has developed into what we know as the milking Shorthorn. Others have lost their horns and are known as Polled Shorthorns or Polled Durhams. These cattle have all come from the original stock in England. For the amount of feed eaten, these cattle probably gain more pounds than any other breed.

Herefords.—Cattle ranches of the South and West are seldom found without a number of white-faced cat-

tle. They are large animals, with white heads and markings on their legs and bodies. Herefords have unusual vigor and ability to rustle food. Their temperament makes them an ideal grazing cattle. They can do well with short grass pastures where the other breeds would nearly starve. White-faced cattle are also easily fattened in the feed lot. Purebred Herefords cross well with native cattle and improve the quality of feeders.

FIG. 50.—A milking Shorthorn.

Polled Herefords, or “muleys” have developed among purebreds during the past few years. These cattle have the good qualities of their horned ancestors.

Aberdeen Angus.—Due to their shortness and plump, sleek appearance, the Scotch have called their black poiled cattle “Doddies.” The names Aberdeen and Angus refers to the counties in Scotland from which these cattle originally came. We usually speak of them as the Angus. Due to their short, stocky frames, these cattle are easily fed out into prime beef. In fat stock shows, the Angus have excelled all other breeds. Their

smoothness and uniformity appeal to cattlemen and butchers. The early maturity of the Angus is a great advantage in this day of "baby beef" production.

Galloways are also a black, polled cattle from Scotland. Because of long hair, they are not suited to a warm country.

Red Polled cattle are a "dual-purpose" breed, giving milk and furnishing beef. They are not as large as the

FIG. 51.—A Hereford, Brae Repeater, owned by the Oklahoma A. & M. College.

beef breeds. They are hardy, gentle and a fairly good grazing animal.

Feeding.—The great problem in beef production is not so much the breed of cattle as the manner in which they are fed. Any animal, representing a predominant beef type, will feed out into a marketable beef, if given the proper care. Our object is to produce the largest amount of desirable beef at the lowest cost per pound.

For the farmer, with only a few high-grade cows, the production of "baby beef" is perhaps the most profitable.

By "baby beef" we mean calves, grown rapidly and fattened before they are one year of age. A well-bred calf will weigh seven or eight hundred pounds when he is ten months old, if he is given all that he can eat from the time he is old enough to take other food than his mother's milk. Such beef is very tender and commands a high price. As soon as the calf begins to take all the milk from his mother, a small box should be fixed so that

FIG. 52.—A champion Aberdeen Angus cow. Pride Protest 6th.

he may begin to nibble at some mixed feed. This may consist of bran or ground oats and corn with a little cottonseed meal. With the mother's milk, a good supply of grass or hay, and a quantity of ground feed, the calf will develop into a prime "baby beef" within a few months.

A large amount of the American beef supply comes from the range cattle which are fattened in grain-growing sections. Grass-fed calves are shipped to our cen-

tral markets, and those ready for the butcher are sold to the packers. The poor ones are shipped out to farms where there is a supply of feed to finish them for the return to the market. Farmers usually buy a carload of "feeders" at a time when their pasture and grain is the most abundant. These cattle should be of a uniform size, representing a high grade of our beef breeds. Young cattle usually insure a greater profit, because they grow while gaining weight.

FIG. 53.—A Galloway cow. Charlotte of M. L.

It has been shown that a small amount of grain and cottonseed meal fed while the cattle have good pasture, produces the cheapest gains. Summer feeding is becoming more popular. A heavy grain feed is expensive and does not make more rapid gains than feeding with pasture.

A few brief guides to profitable beef production are given below:

Good pastures are essential for profitable beef production.

Use coarse fodders, straws, and the stalk fields for wintering the breeding herd.

Raise and finish cattle on the same farm when possible.

FIG. 54.—A Red Polled bull.

Silage is the best roughage for fattening any class of cattle.

More care is necessary in feeding calves than in feeding matured animals.

Finishing cattle early in the summer is usually more profitable than finishing them later in the season.

Thin steers when put on pasture make larger and cheaper daily gains than fleshy ones.

The use of a small amount of corn in addition to cotton seed meal has proven profitable for feeding steers on grass.

Dairy Cattle.—The dairy cow is one of our most useful and profitable farm animals. She has the ability to take the grains of the fields and rough cheap feeds of our pasture lands and convert them into the most nourishing forms of human food. Through her our tables are supplied with milk, butter and cheese; her

FIG. 55.—A baby beef winner.

calves furnish most of our veal; we sell her offspring for breeding stock; and we return the manure to our soils to improve the farm land.

Food experts are advising children and adults to drink more milk and eat more butter and cheese. These are the best and most economical forms of food. Why not try a few good dairy cows on the farm as a side line or keep a good cow for home use?

Breeds.—Five major breeds of dairy cattle are recognized by the leading dairy men of the United States. While all the breeds are similar in type and general dairy tendencies, each breed has its special merits and

demerits. In general appearance, the ideal dairy cow shows a greater depth of body at the rear than at the front. The hind legs should be wide apart to give a place for a well formed udder. The distance between the points of the hip bones and the distance between the pin bones should be wide apart. The animals should be free from fatty tissue, the skin soft and pliable, the neck long, the ribs well sprung, eyes prominent, well shaped head, flanks thin, and she should be alert and healthy.

FIG. 56.—A good type of feeder.

Jerseys.—Jerseys are one of the most popular breeds of dairy cattle in the South. They are noted for their heavy butter production and good milk yield with a fine yellow color. The fat globules are large, which makes the milk churn easily. This wins favor with the housewife who keeps a cow for family use. This breed of cattle originated on the Island of Jersey, a small island eleven miles long and nine miles wide, in the English Channel. The natives of the island have bred their cattle for more than two hundred years without introducing new blood.

The Jerseys are the smallest, neatest, and the most beautiful in form of the dairy breeds. The cows weigh from 700 to 1300 pounds and the bulls from 1200 to 1600 pounds. The calves are small at birth and mature very rapidly.

The solid colored Jerseys showing various shades of fawn, mouse color, squirrel gray, and very dark brown are preferred by breeders to those having white mixed with the colors named. The animals should have a

FIG. 57.—An ideal Jersey. Note the large udder and milk veins.

black tongue, a light ring around the muzzle, and a black switch on the tail.

Jerseys are especially adapted to farms where butter-fat is sold and to small lots where the animals must be closely confined.

Holstein-Friesian Cattle.—The large black and white dairy cattle that we see at our fairs and on many of the dairy farms of our country originated in Holland. The environment of Holland is well suited to cattle

raising, and the thrifty Dutch farmers who tilled rich lands which were well drained, produced abundant grass crops for feeding their animals. They selected, bred, and cared for their cattle so carefully that they developed a breed of animals that are the largest in size of any dairy breed, and are known as the greatest producers of milk. The Holstein cows weigh on an average of 1200 pounds and the bulls 1700 to 2000 pounds. The

FIG. 58.—A Holstein-Friesian cow. She has great capacity for milk production.

milk of this breed of cattle ranks low in the percent of butterfat.

The Holsteins are rough, hardy, gentle animals that can use a great amount of hay and forage in their ration. The calves are large at birth and make excellent veal.

Guernseys.—The native home of the Guernsey cattle is the little island of Guernsey in the English Channel. History tells us that the ancestors of this breed and the Jerseys were probably the same, but the cattle raisers of Guernsey did not select their animals ac-

cording to type as carefully as did the people of Jersey.

In size the Guernseys may be classed as a medium breed, the cows weighing about 1050 pounds and the bulls 1500 pounds when matured. They vary in color from yellow fawn to brown fawn. Some are marked with white spots which are generally located on the under parts of the body and legs. The nose should be flesh colored and the horns yellow and the hoofs amber color.

FIG. 59.—A Jersey of quality.

The Guernseys are little coarser in conformation than the Jerseys and are good grazers on rough pastures.

Ayrshires were first produced in Scotland, in the County of Ayr, from which they take their name. The surface of the country is rolling and stony and the pastures are sparse. In order to obtain their food they were forced to graze over a large territory which resulted in developing animals of considerable strength and vitality.

Ayrshire cattle are of medium size, the cows weighing on an average of 1150 pounds and the bulls about 1800 pounds. Animals almost white with red or brown spots on the head and neck are most desirable. In Scotland little attention is given to color and the cattle are sometimes almost solid red. The horns of this breed are long, turn up, and have black tips.

Ayrshire cows give large quantities of milk which is

FIG. 60.—A Guernsey cow. Shuttlewick Levy, Grand Champion at the National Dairy Show, 1923.

not rich in butterfat and well suited for feeding infants. The calves are of good size at birth and grow rapidly.

Brown Swiss.—The Brown Swiss originated in Switzerland. They are the result of breeding for animals that would produce beef, milk, and serve as beasts of burden. The cows weigh about 1150 to 1700 pounds. This breed of cattle is light-gray, mouse, dark brown, or brownish dun in color. The horns are of medium size and are white at the base and black at the tip.

Brown Swiss calves are large at birth weighing from 65 to 90 pounds.

Housing Dairy Cattle.—The cold weather and the extremely hot weather are injurious to milk cows. They need protection so that the surplus food may be readily converted into milk. A clean stable will be necessary for providing comfort. Stalls or stanchions are desirable where there is a number of cows, to prevent crowding and fighting.

Green Feed and Pastures make up the greater por-

FIG. 61.—Guernsey cattle.

tion of the dairy ration in the South. Milk production requires feed containing a large amount of water. These are known as succulent feeds. Grass is our most common source of succulent feed, but temporary pastures of oats and legumes will furnish more milk producing substance. In dry seasons and during the winter, the use of silage is advisable.

Grain Feeds provide the solid substances and fats contained in milk. We call them concentrates, while grass, straw, and hay are known as roughage. The amount of the latter should balance the concentrate

fed. Our object is to feed a ration that will not produce too much fat but will cause the cow to produce a large amount of milk.

The amount of concentrates fed may be governed to some extent by the amount of milk given by the cow. It has been estimated that a cow should be fed one pound of grain mixture for every four pints of milk produced. Thus, if a cow gives four gallons of milk each day, she needs the equivalent of eight pounds of grain. Some feeders have taken the butter production

FIG. 62.—Ayrshire cattle.

of a cow as the method of determining how much to feed. If the cow furnishes one pound of butterfat each day, she should have six pounds of concentrated feed. An important factor in feeding a dairy cow is that she requires a certain amount of nutrition to support her body. Additional feed is needed for the production of milk.

Water and Salt are too often overlooked in caring for the cow. If a good supply of running water is not available, fresh water should be supplied in a tank or trough so that the cows may drink whenever they will.

A block of salt, or a small box of salt should not be forgotten in caring for cattle.

Feeding Calves.—For the first day or two, after the calf is born, he may be allowed to nurse his mother. He may not take all of her milk, and she should be “stripped” to prevent trouble with her udder. In order to keep the cow for dairy purposes, the calf is usually fed by hand, or from a bucket. This should be begun while the calf is very young, by placing the fingers in his mouth and holding his head down to the milk in a

FIG. 63.—An Ayrshire cow.

bucket. It is best to have warm fresh milk so that when he begins to suck the fingers, he takes up a supply of milk, just as he did from his mother. After a short time, he drinks the milk readily. Cleanliness of the bucket and milk are important, to prevent diseases such as “scours.” Fresh milk should be fed until the calf is two weeks old, after which skim milk may be gradually introduced into the ration.

Records.—How do you know whether a cow is giving enough milk during the year to pay for her feed? Do

you know how much it costs to keep a cow? If it costs more to feed a cow than the value of her milk, the best thing to do is to get a better cow, or sell the cow and buy milk. Do not keep a "boarder" cow. How are you going to tell which cow is a boarder? The only way to find out is a record for every day in the year. The cow eats whether she gives milk or not, so the feed record is important for each day of the year. It is very easy to make out a record blank for a month and place it in the barn or some place where only a minute is required to record the weight of milk produced and the amount of feed given. The following plans will suggest a record for five cows:

MILK RECORD

Month of	Bossie	Spot	Redd	Beauty	Flossie
<i>January</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>
1 A. M.....	18	16	17	10	12
P. M.....	20	17	17	8	10
2 A. M.....	18	15	16	11	13
P. M.....	19	16	15	12	11
3 A. M.....	16	17	18	9	10
P. M.....	19	16	19	10	12
Total for month....	110	97	102	60	68

The above record indicates the method of keeping weights for the morning and evening milkings. A total for the month will show how much more Bossie returns than Beauty.

It is readily observed that for the first three days in January, Bossie produced almost twice as much milk as Beauty, with a little more feed. Figuring the price of milk at two dollars per hundred pounds, Bossie would produce two dollars and twenty cents worth of milk in three days. Beauty would produce only one dollar and

FEEDING RECORD

Month	Bossie	Spot	Redd	Beauty	Flossie
<i>January</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>
1 Grain.....	8	8	8	6	7
Hay.....	22	22	22	22	22
2 Grain.....	9	8	7	7	8
Hay.....	20	20	20	20	20
3 Grain.....	8	9	6	6	6
Hay.....	18	18	18	18	18
Total Grain... .	25	25	21	19	21
Total Hay	60	60	60	60	60

twenty cents worth. Bossie's feed would cost one dollar for the three days, while Beauty's would cost eighty cents. The profit for Bossie would represent one dollar and twenty cents, while Beauty would only return forty cents or one-third as much. It is evident that Beauty is a "boarder cow" and that she should be replaced, because the labor of caring for the milk and of marketing will represent a loss during the year.

An occasional test for butterfat will indicate the amount of fat in the milk. This is especially important for people selling cream. It is not difficult to make a test with the Babcock tester. The cream tester at your nearest cream station will be glad to test samples of milk, if you will take them to him.

QUESTIONS

1. State several reasons why farmers should keep cattle.
2. Name two principal types of cattle discussed in your text.

FIG. 64.—A Brown Swiss cow.

3. Name the breeds of beef cattle.
4. What are some of the characteristics of each breed?
5. What is a polled cow?
6. Describe two of our common breeds of polled cattle.
7. Why is less labor required on farms where beef cattle are raised than on farms where dairy cattle are raised?
8. Explain the following: Dual purpose, baby beef, purebred, and scrub.
9. Give the weights of some of the familiar types of beef cattle.

10. State several problems to be considered in feeding beef cattle.

11. What are feeders, where are they raised?

12. Which gain the most weight in the same period, old or young cattle?

13. Name eight guides to follow in profitable beef production.

14. State the direct and indirect profits that may be obtained from dairying.

15. Name the five major breeds of dairy cattle.

FIG. 65.—A cream testing outfit, including a cream separator and a Babcock tester.

16. Locate Holland, Jersey, and Guernsey Islands, Ayr, Switzerland?

17. Describe a good milk cow.

18. What breed of cattle is used for cream and butter making?

19. Compare the weights of dairy cattle with the weights of beef cattle.

20. What kinds of pasture are best for dairy cattle?

21. Tell how to feed a good dairy cow.

22. Tell how to teach calves to drink milk.

23. Why is it important to test milk for butterfat and keep a record of the feed consumed?

24. Explain how to keep a monthly milk record for a dairy cow.

25. How would you get rid of "boarder cows"?

PRACTICAL WORK

Exercise 1

Object: To keep a record of the milk produced by cows at home.

Materials: Hand or balance-scales, cardboard, record sheet, and pencil.

Procedure: Rule the cardboard as a record sheet, as described in the lesson. Place the record upon the wall where it may be noted every day. Milk the cow, weigh the milk and record the number of pounds at each milking. At the close of the month, the total production should be added and the result recorded in a book for comparison with other months.

Exercise 2

Object: To find out what it costs to keep the cow.

Material: A pair of hand scales, pencil, and record sheet.

Procedure: Measure and weigh the amount of feed to be fed to each cow during a week. Note the amount fed each day and the cost of the feed. Total the amount of feed used each month.

Results: Compare the amounts of feed given to each cow and find out if the cows are making returns for the feed given.

WORDS TO BE LEARNED

Butterfat. The fat found in milk or cream.

Conformation. The balanced arranged parts of an animal's body to produce a model form.

Diversified. To change, to make different; as growing different crops upon the farm.

Dual-purpose. That which serves two purposes; cattle suitable for beef and milk production.

Dun. A yellowish or grayish brown color.

Feeders. An animal to be fed or fattened.

Muzzle. The covering of the mouth of an animal.

Nibble. To take very small bites.

Predominant. The most important or the most prevalent color.

Ration. An allowance of food fed in one day to maintain the body of an animal.

Silage. Fodder, usually finely cut, preserved by compressing it in a silo.

Sparse. Not thickly grown, thinly scattered.

Stanchions. Upright bars or post to hold cattle in the barns.

Standard. That which is established by a custom or general consent.

Strain. A breed of animals or plants that have related parents and similar characteristics.

Switch. The bushy end of the tail of a cow.

Tank. A large basin or an artificial receptacle for holding water.

Tendencies. Inclination to do things for certain results.

Udder. A large milk gland; as the cow's udder.

Utensil. A vessel for some particular use.

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CHAPTER VIII.

WORK ANIMALS

Horses for the South.—Although the tendency of American farmers is to adopt mechanical means of accomplishing work in the field, there will be a demand for horses or mules to supply the needs of Southern farmers. The farm tractor does much of the work that has been found too hard for animals, during hot weather. It has not yet been so well adapted to the needs of small farmers and truck gardeners.

Types.—Harness or carriage, saddle, and draft horses have been recognized as distinct types. The first two kinds of horses are light bodied animals, unsuited for farm work. They are developed now for the race track and show ring, while the automobile provides a large part of our transportation. Draft horses include those heavy animals which supply the power for moving the plows, cultivators and wagons.

Qualities.—In order to pull heavy loads, a draft horse must have weight. We consider sixteen or eighteen hundred pounds as a very suitable weight for the draft horse. This weight should not be in a form that is too awkward to move rapidly. A draft horse should be able to lift his feet and move with ease. However, in order to move heavy loads, he must not be too high above the ground. His body should be deep and wide. The muscles of the legs of a draft horse must be powerful, and the bones

should be large enough to carry his great weight. We may conclude that a draft horse must be *active, heavy, and powerful*.

Breeds.—Most of the horses which meet the requirements of the draft type have come from Europe.

Purebred horses are registered by breed associations just the same as hogs and cattle. Crossing our western

FIG. 66.—A Percheron stallion.

mares with a purebred sire produces a more improved type of draft animal. Our recognized breeds of draft horses in America are the Percheron, Belgian, Shire, Clydesdale and Suffolk.

Percherons.—This breed of horses came from northern France. They are big black or gray animals. Their size does not interfere with their activity or ability to walk rapidly. Their heads indicate intelligence and an active temperament. The fact that you see so many big

dappled gray or black horses on our farms is ample proof of their popularity.

Belgians as the name suggests, came from Belgium. They are bays, roans, or sorrels. They are the most compact in body of our horses. They have short, broad, massive bodies on short legs. Belgians are inclined to be rather sluggish and stumble awkwardly when walking,

FIG. 67.—A champion Belgian stallion, Lyndale Joe.

but their great size makes them very desirable to cross with our native mares.

Shires are the English black or brown horses. They are suited for slow work where weight and strength are needed. You may recognize them by the white fetlocks. They are larger than most other breeds and are usually more sluggish. They cross very well with our native horses.

Clydesdales are known by their white faces and feet. They come from Scotland, along the Clyde River. They are bay, brown, or chestnut in color. While the Clyde is a large draft horse, he moves freely, with a straight, rather stylish step. There are perhaps fewer physical defects in these horses than in any other breed. However, since they do not cross so well with American stock, they have not become so popular as the Percheron.

FIG. 68.—A Shire stallion. Locking Sailor Emanuel.

Suffolks are known better in England and in the Eastern United States than elsewhere. They are nearly always chestnut or sorrel in color, with very little long hair upon the fetlock. They have small heads, thick necks, and square, powerfully built bodies. Suffolks have not been popular in the West, because they do not produce a very desirable type when crossed with the native stock.

Feeding and Caring for Horses.—We like to have horses that are “easy to keep.” Quiet, gentle horses do

not fret, and they chew their food much better than the nervous type. A horse cannot eat so much for his weight as a cow, and greater care is necessary in giving the food.

Some grain is always desirable in the ration for horses. Especially when they are working, they must have concentrated nourishment that will supply energy and

FIG. 69.—A Clydesdale stallion, Fyvie Baron, 17608.

muscle. Corn and oats are the cheapest and best grain feeds for the horse. A little cotton seed meal or wheat bran often helps make an appetizing feed when added to the corn or oat diet. When a horse is working hard, it is very important that he should have a reasonable amount of grain three times each day. It is much better to feed at regular hours. Hay and straw of various kinds are known as roughage. Horses need a good supply of hay in addition to their grain. Prairie hay or timothy are the best kinds of roughage when horses are working,

because they provide the proper kind of nourishment for building muscle. Oat straw is very good feed, if a variety is desired. Alfalfa, clover, cowpea, and Sudan hay are used generally where the animals are to be fattened. It is suggested that most of the hay be fed in the evening, because it overloads the stomach and prevents proper digestion. Horses should not be allowed a large amount of green food when working, because it has a

FIG. 70.—A Suffolk stallion, Hawthorn on Farmingham.

tendency to produce soft muscles and decrease the endurance. Water should be offered to horses before and after eating, while they are at work. They should not be allowed to drink a large amount when very warm from exercising. Cold water may cause a chilling of the stomach, producing indigestion, or “water colic.” Horses should have access to a block or a box of salt at all times.

While it is better to keep only those horses with very

tough solid feet, it is important to see that they be well shod if their feet become tender. The necks and shoulders of horses pulling heavy loads often become sore. This should be avoided by fitting collars properly. The hames and tugs should be so adjusted that the pressure upon the shoulder may be equalized.

Mules As Work Animals.—The mule is the favorite work animal of the South. This is probably due to the fact that mules can stand hot weather and hard work

FIG. 72.—A team properly harnessed.

better than horses. They are easy to handle in large bunches, live longer, stand more abuse, are freer from diseases and lameness, and are at home with negro drivers. Their praises are sung in the lumber camps, road camps, coal mines, oil fields, and on the battle fields.

Mules and Hinnies.—The mule is a hybrid or cross between the mare and the jack. The hybrid between the stallion and the jennet is called a hinny. The mule is larger than the hinny and is better adapted for farm

work and heavy hauling. Hinnies are not raised for work animals in the United States. Some countries use them in the mines.

Types of Mules Found on Farms.—In the hilly sections of the South we find many small light mules that are about 12 to 14½ hands high and weighing about 800 pounds. These animals were produced by breeding small native mares to small jacks. They represent our

FIG. 73.—A mule team.

cheap mules. Cotton mules are mules that are larger boned and more massive in form, weighing about 1100 pounds and are from 15½ to 15⅔ hands high. General purpose or sugar mules weigh from 1200 to 1300 pounds and are about 15⅔ hands high. Experiments have demonstrated that it pays best to produce the better class of mules.

Leading Mule Producing States.—Some of our most important mule producing states are Texas, Missouri, Georgia, Tennessee, Oklahoma, Mississippi, Alabama, Kentucky, Arkansas and Kansas. During the past few

years mule farms have been established in many other states in the North and West. Our best mules will always come from areas that have limestone soils and abundant pastures of blue grass, clover, alfalfa, Bermuda, and Johnson grass.

Our principal mule markets are located at New Orleans, Chicago, St. Paul, St. Louis, Kansas City, Louisville, Nashville, Oklahoma City, and Fort Worth.

FIG. 74.—A Jack.

Feeding, Care and Management of Mule Colts.—On farms where there are not pastures, the mule colt is taught to eat a little wheat bran, oats, cut grass, and clean hay at four months of age. If the colts are born in March, a good plan is to give the mare and colt access to a good pasture until October the first. The weanling mule is placed in a lot with an open shed and fed corn and cob meal and oats. The animal should have access to pasture of winter oats or be fed some good hay. The mule's ration should be increased as it gets older.

While it is agreed that mules will stand more rough abuse than horses, it is best to care for them properly. The quarters should be kept sanitary, and the mules should be fed properly and regularly. Some authorities claim that it is best to break young mules to do light work when they are two years old.

Young mules should not be confined in a barbed wire inclosure, because they are likely to be injured.

FIG. 75.—A light mule and a general purpose mule.

Feeding Work Mules.—It is advisable to fatten young mules before marketing them as they bring better prices. Mules are fed about the same as horses. The most common feeds used in the South are corn, oats, and hay. Such feeds as cottonseed meal, molasses, cowpea hay, oat straw, and corn and cob meal are fed with good results in some districts. Mules may be fed in lots together while it is not advisable to feed work horses this way, because they overeat.

QUESTIONS

1. Name the principal breeds of work horses.
2. Explain the following terms: breed, type, conformation, roughage, quality, action, and purebred.

3. What breeds of draft horses are raised in your community?
4. Describe a good farm work horse.
5. Prepare a list of feeds that are used in feeding work horses.
6. Find out from practical farmers how much feed they are giving their work teams each day.
7. Get the market price of each feed used and estimate the cost of keeping a good team for one year.
8. For what purpose are mules used?
9. Why do mules do best in the South? Explain fully.
10. Describe a good farm work mule.
11. How does a mule differ from a hinny? Which is best for work?
12. Tell how you would raise a mule colt.
13. Name some of the principal mule producing states.
14. Give the names of our best mule markets.
15. Are the mules raised or shipped into your district?
16. Discuss the feeding of work mules.
17. Does it take as much feed to feed mules as horses?

PRACTICAL WORK

Exercise 1

Object: To study a work team.

Material: One or two good work teams.

Procedure: Learn the ages of horses and mules by examining the teeth. Ask the owner of the team to estimate the weight of the animals, and to show you some of the parts of the horse; withers, fetlocks, pastern, crest, poll, rump, stifle, flank, hock, and girth. Measure the height of the horses or mules in "hands." Unharness the team and see if you can replace the harness. Locate the hames, backband, tugs, hamestrings, lines, quarter-straps, and breeching. How much feed is required to feed the team you are studying?

Exercise 2

Object: To learn to make halters and tie horses.

Material: Three-eighths-inch rope, a halter for a pattern, a tape or ruler, small white cord, or wire to prevent ravelling.

Procedure: Examine the halter pattern and make a halter that will fit the head of the animal, following the plan of the original. Tie or bind the loose ends of the rope to prevent ravelling.

WORDS TO BE LEARNED.

Abuse. Ill use or mistreatment.

Breeching. The part of the harness which passes around the back part of the horse.

Chestnut. Reddish brown color.

Concentrated. Condensed, containing a high percentage of nourishment.

Dappled. A spotted animal; as a dappled gray horse.

Digestion. The power of changing feed into body nourishment.

Draft horse. A horse for drawing heavy loads.

Fetlock. Tufted cushion-like projection above the hoof of the horse.

Hame. Pieces of harness that fit over the collar, to which the traces are fastened.

Hand. A hand's breath or 4 inches used in estimating the height of horses.

Hybrid. The offspring of two animals of different races or species.

Mechanical. That which is done by machines.

Sorrel. Yellowish brown.

Stifle. The joint above the hock joint in the hind leg of a horse. It corresponds to the knee joint in man.

Tractor. A gasoline or steam engine used for drawing implements.

Truck. Vegetables raised for the market.

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CHAPTER IX

HOGS

Pigs and Pigs.—Farming without hogs is like banking without money or plowing without a plow. Certain kinds of banking may be accomplished without money, and it is possible to plow without a plow. However, the greater portion of our farming involves at least a few hogs. One reason for the almost universal raising of the hog is the fact that he is adapted to a wide range of climate and conditions. His original home was probably in warm countries, but he is found in almost all parts of the world. Due to the fact that much of the meat used for human food comes from the hog, special attention has been given to improving and caring for the animal.

It has not been so many years ago since our porkers were long nosed, long eared, razor-backed creatures roaming about the forests. They obtained a scanty living from roots and herbs of the wilds. These swine required almost two years to develop into an animal suitable for slaughtering. Our forefathers found that it was more satisfactory to domesticate hogs and feed them for a more dependable supply of meat.

Under the influences of civilization, hogs have ceased to develop long ears, necks and razor-backs. They have become a rapidly growing animal, the most economical and profitable for the American farmer. Natural se-

FIG. 76—A.

FIG. 76—B.

because they provide the proper kind of nourishment for building muscle. Oat straw is very good feed, if a variety is desired. Alfalfa, clover, cowpea, and Sudan hay are used generally where the animals are to be fattened. It is suggested that most of the hay be fed in the evening, because it overloads the stomach and prevents proper digestion. Horses should not be allowed a large amount of green food when working, because it has a

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Under the influences of civilization, hogs have ceased to develop long ears, necks and razor-backs. They have become a rapidly growing animal, the most economical and profitable for the American farmer. Natural se-

FIG. 76—A.

FIG. 76—B.

lection and experience have taught our farmers that a few breeds are more profitable than a mongrel mixture of all kinds of hogs.

Breeds.—The Duroc is the familiar red hog. The Big-type Poland China first began to revolutionize the pork industry. He is a large black hog seen in so

FIG. 76.—A. Purebred Hampshire sow.
B. A crossbred spotted sow.
C. A razorback sow of several breeds.

many farm yards. The Spotted Poland China has developed more recently, as a distinct breed. The Berkshire is recognized by his hooked nose, sharp ears and blue-black coat of hair. A similar type of hog with a white belt and vest, rather a hog with a dress suit, is known as the Hampshire. The quality of meat from this breed is considered superior to that of other hogs.

The Chester White and the Yorkshire are splendid clean looking hogs. However, their tendency to blister in the hot sun has limited the localities in which they are raised. The Tamworth is a large red hog, having many of the tendencies of the original hog with a sharp nose and ears.

The Qualities of Breeds.—To state that one breed has any great advantages over the others would hardly

FIG. 77.—A Duroc sow. Note the straight feet, the deep sides, the well developed hams and the refined head.

be justifiable. Under ordinary conditions the Poland China and Duroc have been the most popular breeds. In former years, these hogs were selected so that the majority were short, fat animals. They were called lard hogs. More recent selections have developed a longer hog with a high arched back. The even distribution of fat and lean in the sides has created a demand for Berkshire bacon. The Hampshire is also considered a type of hog with firmer and more succulent meat. White hogs produce a very clean appearing carcass,

and many butchers offer a premium for the Chester White of Yorkshire.

Registration.—In order to keep the various breeds pure, associations have been formed for the naming and registration of the breeding animals. The owner may receive a name and number from the association for the hog whose ancestors have been “registered” in the books of the breed. These registered animals are the source of our purebred hogs. Crossbreds are those

FIG. 78.—A Berkshire boar, Anderson Hill Baron.

pigs produced by crossing purebreds of different breeds, as Poland Chinas and Chester Whites. A scrub is a product of no particular breed and is usually an expensive animal to keep. Purebred hogs are so common that it is poor economy to have any other kind for raising young ones.

Type.—The most popular market hog of the present is of the big type, early developing kind, with a long, high-arched back. The demand is for a large percentage of pork chops and lean hams, with a minimum

of fat and other waste. Substitutes for lard have decreased the demand for the former "lard hog." Farmers need pigs which will weigh two hundred pounds when they are six months of age.

Feeding.—For a pig to weigh two hundred pounds at the age of six months, he must have feed. After pigs are two weeks of age and have made a vigorous start, they may begin to look for more feed. We assume that the mother has plenty of grass or clover so that she may

FIG. 79.—A Hampshire, Royal Cherokee, jr.

have a good supply of milk. The young porkers are soon able to crack grains of corn. If a small trough or feeder is placed in the pen, as shown in the diagram, the cracked grain is fed, and that they soon learn to eat. Dry grain prevents bowel troubles, especially if a little charcoal and salt is supplied. Pigs learn to chew dry feed before they learn to drink. After three or four weeks, milk or slop may be fed without causing scours. Pigs will not eat too much if they have a balanced ration and become accustomed to a self-feeder

while they are young. Starting the youngsters to eat while they are with the mother makes weaning a small matter. With an abundance of milk and pasture, they will wean themselves when they are about nine or ten weeks of age.

Feeding for Growth.—Following the weaning period, the great object in growing hogs for market is to develop a frame. Pasture and drinking water should always be present in abundance. Grain is also fed with

FIG. 80.—A Chester White boar. Boulton's Challenger.

a self-feeder, so that each animal may have all that he wants. Ground oats, barley, corn, or rye may be used. Pigs do not eat too much grain if allowed to make their own choice. If plenty of skim milk is available, it will hasten the growth of the porkers. Tankage may be fed in small amounts if there is no milk. These feeds are known as proteins and are essential for the growth of bone and muscle.

Hogging Down.—Finishing for the market means the fattening period usually during the last month before

FIG. 81.—A Tamworth. Oak Grove Lad, a typical bacon hog.

FIG. 82.—A good type of hog. Poland China.

selling the pigs. This process is accomplished most economically by "hogging off" corn, kafir, or rye. A small field should be fenced temporarily. The hogs will do their own feeding, needing only plenty of water, charcoal, salt, and tankage or cottonseed meal. Very little feed is wasted in "hogging off," and older sows with pigs will follow up to finish eating the waste grain. The above method avoids the expense of harvesting the crop and also of carrying feed to the hogs.

FIG. 83.—A creep for pigs.

Marketing.—When a hog weighs from two hundred to two hundred and fifty pounds, he is ready to sell. The object should be to have the hogs weighing about that much at a time when there is the greatest demand and when the price is the highest. Many farmers do not raise enough hogs to ship directly to a large market, and they must depend upon disposing of their surplus at home. However, this may be avoided by arranging to sell when four or five neighbors have hogs for sale. They may then combine their shipment to

form a carload, getting the advantage of the higher price paid at the central market.

Raising Pigs.—A permanent success in raising hogs depends upon the production of those pigs which are fed on the farm. Thus, if the farmer produces his own feed and his own feeding stock, there is no great amount of speculation involved. He sells a finished product without involving the expense and labor of harvesting and of removing a large amount of fertility from the soil.

FIG. 84.—Hogging down corn.

The most important step in profitable pig growing is the selection of the right kind of sows. Regardless of breed, a sow should show the type demanded in a market animal, namely, a strong, wide, deeply fleshed back; smoothly covered shoulders; plump, well-rounded hams; and a trim neat underline. It is doubtful if a sow is profitable if she does not raise seven or eight pigs in each litter. Two litters each year are produced by good sows. Just before the pigs are farrowed, the mother should be placed where she will make her bed in a selected corner. A portable hog house as shown in

the diagram will serve. The mother should not be fed grain during the twenty-four hours previous to the birth of the pigs. A supply of clean water is all that is necessary. She should not be fed too much during the ten days after farrowing.

Diseases.—The best way to handle the diseases of hogs is to avoid them. Over-crowding causes many forms of infection. Lack of clean quarters and filthy

FIG. 85.—A sow with a good litter of pigs.

wallows have been known to start sickness. If hogs have a cool place, they do not need to wallow in the mud. Their drinking water should be clean. Over-feeding after a period of hunger often causes trouble and should be avoided by providing a regular supply of food. Salt, ashes, charcoal, and lime placed in a pan or box where the porkers have access to it, will provide about the best tonic.

If the hogs should become sick, they should be removed from the herd and observed carefully. If the whole herd is not doing well, it might be best to change them to another field or lot.

FIG. 86.—Portable hoghouse.

FIG. 87.—An inexpensive hog oiler. The rope is kept covered with heavy oil. The pig rubs the oil well into its skin.

Lice.—If you notice the pigs rubbing against posts, you may look carefully behind their ears and see small lice crawling about. They rob the pigs of much vitality and cause them much discomfort. An application of heavy oil or the use of hog oiler will rid them of lice.

Worms.—When the hair on the back of a hog becomes rough, when his ears begin to droop, and his tail is

FIG. 88.—Worms hinder the growth of pigs. These sick pigs need clean surroundings and treatment for worms.

no longer curled, it is evident that he is not doing well. No matter how much he eats, his weight does not increase. The hog is probably infected with worms. He should have access to salt and charcoal, with the addition of a little copperas. If he does not get rid of the worms, a capsule of worm medicine should be given by a veterinarian.

Scours.—Over-feeding of rich foods causes scouring more than anything else. Unsanitary surroundings may also cause bowel troubles. The restriction of rich protein

foods and a light dose of copperas will prevent serious trouble.

FIG. 89.—Hog cholera immunization. The pig is placed in a special trough so that he cannot squirm during the operation.

Hog Cholera.—A contagious disease should be avoided by preventing the pigs coming into contact with others that might be diseased. Immunization is the accepted form of preventing hog cholera. A veterina-

rian can vaccinate the whole herd in a short time, making them immune from cholera as long as the hogs live.

QUESTIONS

1. Why are hogs important on the farm?
2. Why is the hog of to-day different from the old razor-back?

FIG. 90.—Pig club pigs. One of these pigs weighed four hundred pounds at eight months of age.

3. Describe the Duroc hogs.
4. What are the peculiar markings of a Hampshire?
5. How are hogs registered?
6. What is a scrub?
7. Tell why he is not profitable.
8. Describe a good type of market hog.
9. Discuss the proper feeding of the hogs.
10. How old is a pig when he is weaned?
11. Prepare a list of grain and green feed used for feeding hogs.

12. Discuss "hogging off" in relation to finishing hogs for the market.

13. When is a hog ready for market?

14. Why should boys join pig clubs?

15. How many litters of pigs does a good sow produce in one year?

16. Name one serious disease of hogs. Tell how it may be controlled.

17. How would you rid hogs of lice?

18. What would you do for worms in hogs?

19. Give five rules to follow in keeping the quarters for hogs clean.

20. Name some mineral feeds good for hogs.

21. Why should farmers kill and cure their own meat?

PRACTICAL WORK

Exercise 1

Object: To study hogs upon the home farm.

Material: Notebook, hogs, hog-pens, lots.

Procedure: 1. What kinds of hogs are kept at your home?

2. State the number of hogs kept at your home.

3. For what purpose are the hogs raised?

4. How large are the pens?

5. Give the dimensions of the troughs in which they are fed.

6. What kind of feed is used in feeding the hogs?

7. What kinds of shelters are furnished for them?

8. Examine them to find if they are lousy.

Results: Write a report of your study, to be read in the class.

Exercise 2

Object: To decide which is the best breed of hogs.

Materials: Information regarding the breeds of hogs. Bulletins, farm papers, and books.

Procedure: Choose four students, two defending one breed and two another breed. Obtain all the information possible from your home and from other sources. Arrange for a date for the debate. Invite the county agricultural agent and your parents to act as judges.

WORDS TO BE LEARNED

Bacon. The sides of a pig, salted and smoked.

Capsule. A small container of a digestible material for holding medicine.

Carcass. The trunk of a slaughtered animal.

Copperas. A chemical preparation of iron used as a tonic.

Crossbred. Produced by mixing breeds or varieties.

Evident. That which is easily seen.

Herd. A number of beasts assembled together.

Immunization. To render animals free from disease by vaccination.

Litter. The young pigs born to a sow at one time.

Mongrel. An animal of mixed breeding, of no particular breeding.

Protein. Feed adapted to the growth of muscle and bone; a compound of nitrogen.

Registration. The act of enrolling or making a record.

Scours. A watery discharge from the digestive tract.

Speculation. Taking chances or risk in business.

Tankage. A waste meat product.

Tonic. A medicine used for increasing strength or vigor.

Underline. The lower border of the flanks of a domestic animal.

Wallows. A place where hogs roll in the mud.

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- "Hog Cholera," U. S. Dept. of Agri., Farmers' Bul. 834.
- "Hogs for Pork and Profit," Int. Harvester Bul. 1922.
- American Berkshire Association, Springfield Ill.

NATIONAL ASSOCIATIONS FOR THE REGISTRATION OF PURE BRED HOGS

Address The Secretary,

American Duroc-Jersey Swine Breeders' Association, Union Stockyards, Chicago.

American Hampshire Swine Record Association, Peoria, Ill.

American Large Black Pig Society, Lexington, Ky.

American Poland-China Record Company, Transportation Bldg., Chicago.

American Tamworth Swine Record Association, Carthage, Ill.

American Yorkshire Club, White Bear Lake, Minn.

Cheshire Swine Breeders' Association, Freeville, N. Y.

Chester White Record Association, Rochester, Ind.

Improved Small Yorkshire Club of America, Espyville, Pa.

National Chester White Record Association, West Chester, Pa.

National Duroc-Jersey Swine Breeders' Association, Peoria, Ill.

National Mulefoot Hog Record Association, Degraff, Ohio.

National Poland-China Record Association, Winchester, Ind.

National Spotted Poland-China Record Association, Bainbridge, Indiana.

O. I. C. Swine Breeders' Association, Goshen, Ind.

Standard Poland-China Record Company, Maryville, Mo.

United States Small Yorkshire Association, California, Mich.

CHAPTER X

POULTRY

Poultry raising has made rapid progress during the past few years and is now considered one of the most important and profitable branches of American Agriculture. It is a phase of livestock production that is well adapted to the small backyard as well as to all sizes and types of farms. It is a business that offers work for boys and girls and adults of the home. The government, schools, and agricultural workers are cooperating with farmers and home owners in the production of "more and better poultry," in order that they may supply their tables with meat and eggs and have a surplus to sell.

Home Projects in Poultry.—The ambitious boy or girl who is interested in animals and wants to do something for himself will find opportunity in poultry raising. It is not necessary that a beginner have a great amount of capital or a thorough knowledge of poultry before making a start. One may start on a small scale with a few dollars and learn as he works.

Source of Stock.—Birds may be secured by buying several settings of eggs, baby chicks, or mature fowls. In purchasing birds or eggs, it is important that the parent stock should be purebred, true to description, free from disease, and strong and vigorous. The baby chicks and mature birds that you are thinking of buying should show marks of good breeding, proper care, good vitality, and uniformity of size.

Poultry Equipment.—The houses, coops, small runs, and yards may be built out of durable material at a very reasonable cost provided that you will do the work yourself.

Familiar Breeds of Poultry

Chickens.

Meat Breeds:

Black and White Langshan.
Cochin.
Brahma.

Egg Breeds:

White, Buff, and Brown Leghorns.
Black, Buff, and White Minorcas.

General Purpose Breeds:

Barred, White, and Buff Plymouth Rocks.
White, Golden, and Silver Penciled Wyandottes.
Buff, White, and Black Orpingtons.
Rhode Island Reds.
Dominique.

Ornamental Breeds:

Games.
Bantams.

Turkeys:

Bronze.
Narragansett.
Buff Bourbon Red.
Slate.
White Holland.
Black.

Geese:

Gray Toulouse.
Brown and White Chinese Geese.
Gray Wild Goose.

Ducks:

White Pekin.
Indian Runner.
Colored Rouen.

FIG. 91.—Black Langshans.

FIG. 92.—Light Brahmas.

FIG. 93.—Barred Plymouth Rocks.

FIG. 94.—Buff Orpingtons.

FIG. 95.—White Wyandottes.

FIG. 96.—Rhode Island Reds.

FIG. 97.—White Leghorns.

FIG. 98.—Black Minorcas.

FIG. 99.—Indian Runner Ducks.

FIG. 100.—White Pekin Ducks.

FIG. 101.—Bronze Turkeys.

FIG. 102.—Gray Geese.

Guineas:

Pearl.

What kind of poultry shall I raise?—We have no best varieties of poultry. Raise the kind of chickens, turkeys, geese, or ducks that you like best. If you will do this, you will likely succeed because you will find pleasure, joy, and profit in your work.

We find many advantages however, if all the people in a given community raise the same breed of poultry,

FIG. 103.—A community poultry project. The farmers bring the eggs in crates ready for making a large shipment.

because they may organize and cooperate in breeding up their flocks and sell high grade products.

Selecting Eggs for Hatching.—In selecting eggs for hatching avoid eggs that are of odd shape and size.

Experience shows that small, round or extremely long eggs will not hatch well. The shell should not be ridged or show rough spots of lime. They should be uniform in color and free from light spots when held before a light. Exercise care in culling out all dirty eggs and eggs with cracked shells. (Fig. 20.)

Proper Care of Hatching Eggs.—Eggs intended for hatching should not be stored in a very cold or hot room. The best plan is to collect them from the nest daily and store them in a cool place. Turn them regularly and set them soon after they are laid.

Selecting Broody Hens.—When choosing hens for hatching eggs and caring for baby chicks, it is important that they should be persistent sitters, of medium size, and motherly instinct. The meat breeds are too large and

FIG. 104.—Sitting hen, placed in a barrel where she will not be disturbed.

clumsy for incubating eggs because they crush a large percentage of them in getting on and off the nest. They are also poor rustlers and will step on the young chicks and kill them in the coops. The egg breeds do not make good mothers for hatchings eggs or brooding chicks because of their size and nervous disposition. Plymouth Rock, Wyandotte, and Rhode Island Red hens, weighing from six to nine pounds, make excellent brood hens that will cover from thirteen to fifteen eggs. They also hover their chickens well and are good rustlers and careful mothers.

The Best Place to Set Hens.—Hens should not be set where other hens will lay to them and worry them. They like a dark nest in some secluded spot sheltered from rain and well protected from dogs and other harmful animals. Probably you have noticed that the hen that steals away from the flock and builds her nest on the ground hatches a fine brood of baby chicks.

Preparing Nests for Setting Hens.—A good barrel placed on its side, chocked with brick or rock makes a

FIG. 105.—A dust wallow for hens.

good place to build a nest for the hen. A box or keg will serve the purpose provided they are large enough to give the hen ample room and proper ventilation.

In building the nest, first place several shovels of soil in the barrel, box, or keg. Round out a nest in the dirt as though you were going to place in the eggs. Line the dirt nest with finely chopped hay. It is now ready to receive the hen and the eggs.

Test the Broody Hen.—After preparing the nest for the hen, go to the place where she is trying to sit and transfer her to the new nest after dark. First set her on several artificial eggs or eggs that have been culled from

the hatching eggs. Let her sit in her new quarters a few days to see if she will hold her nest. If she proves to be a persistent sitter, remove the eggs first placed under her and replace them with thirteen or fifteen carefully selected eggs. It is advisable to set several hens at the same time so that if some of the eggs prove to be infertile or if you get a poor hatch you can shift the eggs or give all the chicks to one hen.

FIG. 106.—An egg candler, showing three inexpensive methods of making an egg candler.

Care of Broody Hens.—Hens that are sitting should be fed, watered and allowed exercise. It is a good plan to have the hens leave their nests about the same time each day. If they will not leave of their own accord they should be removed carefully. They will usually return to their nest before the eggs chill, but it is advisable to watch them and see that they return to the right nest. Place the feed and water near the nest so the birds will not have to rustle for their food.

If you will place wood ashes to which a little sodium flouride or snuff has been added, in a box or old tub and

set it near the hen's nest, she will take a dust bath and keep herself free from lice and mites.

In feeding broody hens, whole grain such as wheat and corn is best. Place the grain in straw litter near the nest, in order to make the hens take exercise while eating.

In case the hen breaks an egg in the nest the shell should be removed, the soiled eggs washed in tepid water and new nest material put in.

Dust the hen two or three times during the hatch with some good insect powder to destroy and prevent lice and mites. Do not dust after the 19th day of incubation. The eggs should not be disturbed after this time, and the powders may be harmful to the newly hatched chicks.

Testing Eggs.—Hen eggs will incubate in twenty-one days. It is profitable, however, to test the eggs on the seventh and fourteenth days and remove all infertile eggs and those with dead germs. There are several practical ways of testing eggs during the process of incubation. If you have access to electric lights, place an oatmeal box with an opening cut in the side about the size of a silver dollar, over the light globe. Place the eggs before the opening. If they are clear, after incubating seven days, they are infertile and should be removed and saved for feeding the baby chicks. Another practical way to candle eggs is to take a shoe box and cut a hole in one end about the size of a silver dollar and another in the lid about the same size. Stand the box on the end and place a lighted candle on the inside. Put on the lid and tie a cord around it.

Artificial Incubation of Eggs.—There are several makes of incubators on the market today that have been successful in the hatching of baby chicks. If you intend setting an incubator, it is best to secure a copy of the directions for setting up and operating the kind of ma-

chine that you are going to set. Study the directions carefully and get the machine in proper running order before attempting to put the eggs in it.

Care of the Hen and Chicks.—As soon as the hatch is completed the hen and the baby chicks should be transferred to a brood coop similar to the one shown in Fig. 28 and given access to fresh water and clean sand.

FIG. 107.—A commercial incubator, in which the electric current heats the water, maintaining a uniform temperature.

Baby chicks should not be fed for thirty-six to forty-eight hours after hatching. For the first few days they should be fed sparingly, hard boiled eggs and dry oatmeal. Sour milk and charcoal should be placed where the chicks may eat. When the little birds are five or six days old, you may begin feeding them finely crushed corn and wheat or commercial baby chick feed. Green feed such as sprouted oats, young turnips, lettuce, and rape should be fed in small quantities, if the chickens do

not have access to a green run. As soon as the chicks are large enough to eat whole wheat they should be fed a mixture of wheat and corn chops. Also keep a good mash mixture and sour milk before them.

Ration for Egg Production

Scratch Feed

Oats 100 pounds.

Wheat 100 pounds.

Corn Chops 100 pounds.

Dry Mash Mixture

Wheat bran 100 pounds.

Shorts 100 pounds.

Meal 100 pounds.

Meat scraps 20 pounds.

Mix the grain feed in a bin and feed the fowls in a straw litter morning and night, giving them what they will eat without waste. Prepare the mash and feed in the hoppers so the chickens may eat at will. If you have a supply of clabber or sour milk on hand the meat scraps may be omitted from the ration. Laying hens should have access to green feed, fresh water, and plenty of grit.

Important Poultry Diseases

White Diarrhea is the most deadly disease among baby chicks. It may be seen in young chicks from a day old to thirty days of age. They have a tendency to huddle together, appear lifeless, sleepy, indifferent and refuse to eat. The droppings which are of a white cream color adhere to the body. The plumage loses its luster and the bird droops its wings.

It is not practical and profitable to treat the sick birds with medicines. Disinfect the quarters and kill and burn all badly diseased birds. Keep sour milk or buttermilk before the chicks.

Roup is another serious disease among poultry. Infected birds refuse to eat and stand off from the rest of the flock. Close examination will show a watery dis-

charge from the nasal openings. The eye lids are swollen and are held closed. The fowl has fever and appears dull and listless.

If the bird has roup bathe the infected parts with a mixture of boric acid and water. Use one ounce of powdered boric acid to one quart of water. Permanganate of potash may be used. The solution is prepared by dissolving as many crystals as will remain on the surface of a silver dime in one gallon of water.

FIG. 108.—A chicken with white diarrhea.

Chicken Pox is a very familiar disease in the poultry flock in the South.

When it makes its appearance one may notice little nodules on the comb and wattles. The birds refuse to eat and lose flesh.

Treatment.—Rub carbolated vaseline or glycerine on the sores.

Care and Management of Sick Birds.—The first thing to do in case some of your birds become diseased is

to separate them from the healthy birds. Clean up the premises and disinfect the yards, houses, and feeding equipment with some good disinfectant. Sterilize the drinking fountains and give each adult bird one half teaspoonful of salts in the drinking water. Put one teaspoonful of carbolic acid in one gallon of water and place it where the birds will be forced to drink it. Feed and treat the sick fowls at some time other than when you are caring for the healthy birds.

FIG. 109.—A chicken with the roup.

Culling Poultry.—Culling is an effort to reduce the number of mongrels and non-profitable fowls on American farms. Many chickens and other kinds of poultry will not pay for their keep, it should be the business of every good poultry keeper to improve his flock for higher egg yield and better meat production.

Time to Cull and Problems Involved.—The best time to cull is during the months of July and August. Some of the phases of culling are as follows:

1. Select the breed and variety.
2. Select the best fowls in mating for the breeding pens.
3. Cull out the inferior eggs before incubation in February and March.
4. Cull the day old baby chicks.
5. Cull out chicks that make poor growth.

FIG. 110.—A. Poor hen.

B. Good hen.

6. Do not select summer chicks for producing layers or breeding stock.
7. Cull Fall pullets.
8. Cull inferior cockerels and cocks.
9. Cull defective and diseased birds.
10. Cull the hens.

In culling hens you will find that the hens that are laying will have a red, swollen soft comb and wattles. The pelvic or lay bones will be wide enough apart to lay from two to three fingers between them. The fowls are active and the eyes are bright. The vent will be wide, smooth and soft. If the hens have been laying for some

time the vent will be bluish white just inside the rim. The shanks will be flat, white and thin looking. The toe nails will be short and the feathers ragged and worn.

The high producing hens in the flock will have a small head, prominent eyes, thin eye lids, large body capacity, thin skin, and soft pliable abdomen. The pelvic bones also bend easily and are thin and straight. The yellow pigment disappears from the shanks after the hens have been laying from four to six months.

FIG. 111.—Poultry marketing. Note the feeding troughs at the sides of the crates.

Marketing Poultry Products.—In producing market eggs, infertile eggs keep best and generally bring better prices on the market. These eggs may be collected daily, graded, and packed in one dozen cartons or egg cases and sold directly to the consumer, retail merchants, hotels, wholesale houses, or commission houses. Where the production is small it will pay best to secure a few good customers and sell to them directly.

In selling broilers, friers, and roasters it is best to raise

some general purpose breeds. In order to receive the highest price for them they should be ready to market early in the season. The fowls should be fat and in good condition for the table.

Hens and mature male birds may be marketed at any season of the year. You may study the market quotations for the past few years and find it advisable to fatten hens before selling them.

Another avenue for marketing poultry is by selling hatching eggs, day old chicks, pullets and mature fowls. If you are raising purebred poultry you will find this phase of the business profitable.

In selling any kind of poultry product you should remember that it pays to produce the best, pack or finish it properly, advertise, be dependable, and guarantee your products.

QUESTIONS

1. Why is the study of poultry important?
2. Name several successful poultry keepers in your community.
3. Classify the breeds of poultry studied in your text and state several advantages of each.
4. How long does it take hen eggs, duck eggs, goose eggs, and turkey eggs to hatch?
5. Tell how to make a good hen's nest and set a hen.
6. Tell how to feed and care for the baby chicks. When does the chick make the most rapid gain in his life?
7. Classify the feeds used for feeding poultry. What kinds of feeds are used on the farm? Why is corn a poor feed for hens when fed alone? Is it a good idea to feed hens fresh rabbit meat? Name several feeds that are rich in egg-building food.
8. What is the use of grit in the hen's diet? Name some sources of grit for the farm flock.
9. How would you test eggs to see if they are fertile? At what temperature should hatching eggs be kept? Explain the selection of eggs for hatching. Prepare a list of poultry diseases, state symptoms, and recommend the proper treatment.
10. Write a good paper on the marketing of poultry.

PRACTICAL WORK

Exercise 1

Object: To study the parts of a chicken.

Material: A hen, and a cockbird, a small coop or box, notebook, tablet.

Procedure: Place the hen upon a table or box before the class. Locate the *comb*, *points wattles*, *hackle*, *shank*, *fluff*, *feathers*, *primary feathers*, and *beak*. Describe the color of the eyes. Weigh the hen. Does the hen belong to an egg breed, a meat breed, or a general purpose breed?

Note the same points regarding the male bird.

Study various breeds of chickens, if time will permit. (The word "Poultry" in Webster's Unabridged Dictionary.)

Exercise 2

Object: To prepare poultry posters for school room.

Material: Large pieces of cardboard, old farm journals and poultry magazines.

Procedure: Cut out pictures of poultry, poultry houses, poultry feeds, and poultry club work. Paste these neatly upon the cardboard and hang them in the school room.

WORDS TO BE LEARNED

Artificial. Produced by human skill in contrast to natural.

Broilers. A small chicken weighing from three-quarters to one and one-half pounds.

Chocked. To make fast.

Clabber. The solid part of soured milk.

Cockerel. A young male chicken less than one year of age.

Cock Bird. A male chicken over one year of age.

Commission house. The place where the products are sent to be sold by an agent.

Disinfectant. A substance adapted for destroying bacteria and disease germs.

Frier. A chicken used for frying.

Grit. Crushed rock or stone used in feeding poultry.

Home Project. Work done at home by the student as a part of his school work.

Infertile. Not fertile, without proper germ for hatching.

Instinct. A natural or inborn inclination to do things.

Listless. Dull without life and inattention.

Mash. A mixture of ground grain bran and the like.

Nodules. Small knot-like growths upon the comb of chickens.

Pelvic. Projections from the bones to which the legs of the hen are attached.

Persistent. Having staying or enduring qualities.

Phase. A particular division or branch; as poultry is a phase of livestock.

Roasters. A matured fowl suited for roasting.

Rustlers. An alert, energetic animal.

Shanks. A portion of the chicken's leg below hock.

Tepid. Moderately warm, not hot.

Vent. The opening of the intestines out to the surface of the body.

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"The Community Egg Circle," Bul. 656.

"Important Poultry Diseases," Bul. 530.

"Hints to Poultry Raisers," Bul. 538.

"Mites and Lice on Poultry," Bul. 810.

"Turkey Raising," Bul. 791.

"Goose Raising," Bul. 767.

"Backyard Poultry Keeping," Bul. 1431.

CHAPTER XI

“THE SOIL”

The Foundation of Farming.—Successful farming depends to a great extent on the kind of soil. The old familiar saying, “A fertile soil means a prosperous people,” is as true today as in the times of our forefathers. Well do we remember the stories of the early settlers who tilled the virgin soils with little thought of wasting plant food which future generations might need. Today farmers find themselves face to face with the problem of building up soil in order that they may be farmed at a profit. If our future farmers must come from the ranks of the school children of today, it is important that the boys and girls should receive training in the fundamentals which will aid them in the production of food, clothing, and shelter.

Soil and Subsoil.—The loose surface layer of the crust of the earth is called soil. The bed or layer of weathered material which underlies the top soil and extends to the bed rock is called the subsoil. The top soil is darker in color and looser in structure than the subsoil. These conditions are due largely to the presence of decayed plant and animal bodies. The subsoil is generally lighter in color than the soil and the particles are finer and more closely united. It holds more moisture than the soil and serves an important part in supplying plants with moisture and food. Good agricultural soil supports plants, serves as a storehouse for heat, water, and food.

Sources of Soil Material.—Soil material comes from inorganic and organic matter. By inorganic matter we mean material that is made from the decomposition of rocks, by such agents as water, air, and heat. The organic matter or humus is the remains of decayed plants and animals. The greater part of cultivated soil is made up of inorganic matter and does not require as much of our time and attention as the humus supply in the soil. (Fig. 112, Soil Materials).

FIG. 112.—Soil materials, air, water, plants, and heat working to break up the rocks into finer particles.

Soil Building Forces.—There are many forces such as water, wind, ice, heat, cold, frost, plants and animals, and elements in the atmosphere that are working hard day and night, breaking, grinding, transporting and decaying the solid rock of the earth's surface. Let us summarize briefly the special work done by our principal weathering agencies.

Water pounds, grinds, and carries material from place to place. It also penetrates large pieces of rock,

freezes, thaws and bursts its object into many small fragments. Ice also forms into great glaciers or avalanches. The movement and pressure breaks, grinds, and transports soil particles. Wind is another one of our soil builders. It carries on its work by picking up fine sand and blowing it against giant boulders and gradually cutting them away. Plants send their roots into the crevices of rocks and pry the material apart. Animals burrow into the ground and open up channels where water and elements of the air enter and cause changes in the soil.

FIG. 113.—Types of soil, clay, sand, loam.

Soils Classified as to Formation.—The two principal classes of soils according to the method of formation are the sedentary and transported. The sedentary soil is further divided for convenience of study into what is known as residual and cumulose soil. The residual soil is soil that remains where it is formed by weathering forces. This type of soil represents some of our poorer soils as well as some of our better farm lands. The limestone and sandy soils that are found in some of our Southern states are good examples of this class of soils. Cumulose soil is formed by the accumulation of waste materials in shallow lakes, or other low places.

This kind of soil is good for truck gardening if it is drained properly and fertilized.

The transported soils are represented by four special classes; namely, alluvial, glacial, aeolian, and colluvial

FIG. 114 a.—Plant food removed. The Kupies are carrying nitrogen, phosphorus and potash from the barnyard and floating it downstream. They are not usually visible but work in the streams of water.

soil. Alluvial soil is formed by the sediment which is carried by water and deposited along the rivers of our country. These soils are commonly called bottom land and are very fertile. Large areas of alluvial soil are found in the United States. Glacial soils are formed

by ice and are found principally in states that are north of the Ohio and east of the Missouri Rivers. Glacial soil is one of our oldest soils and is very fertile. It composes the soil of the North Central states, which is commonly known as the great corn belt. Aeolian soil or wind formed soil is a fine, deep, fertile soil of our western prairies. The "bluff" soils along the Mississippi River are also of wind formation. Colluvial soils are soils that are formed at the foot of hills or mountains. After the weathering agencies have completed their work, gravity transports the material to the lower areas. This type of soil is very coarse in structure and lacking in organic matter. Colluvial soils are well adapted to the growing of fruits.

Soils Classified as to Properties.—The practical farmer classifies soils according to the properties that are related to crop production. These properties are largely controlled by the amount of sand, clay, silt, and humus which enter into the composition of soils. If the percent of sand in a soil is greater than the amount of silt, clay, or humus, we have a sandy soil. If the percent of clay is greater we have a clay soil. Other kinds of soils are named in similar manner. Loam soil, consisting of a mixture of sand, silt, clay, and humus, is one of our best Agricultural soils. There are several classes of loam such as heavy clay loam, clay loam, sandy clay loam, and light sandy loam. The percent of sand in loam may vary from ten percent in heavy clay loam to ninety percent in light sandy loams.

Size of Soil Particles Important.—The size of the soil particles governs the air circulation, heating, water holding power, drainage, and fertility of soils. If the

soil is composed of large rock particles the more space we have between them for the entrance of air, heat, and the passage of water. The sandy soils are good examples of the open porous types of soil. The clay soils with their fine rock particles, close together, and having poor drainage are known as the tight waxy soils. The

FIG. 114b.—Plant food removed. Seven loads of cotton seed contains much valuable plant food.

sandy soils are well adapted to the growing of truck crops, fruit, peanuts, and potatoes and the clay soils produce abundant yields of hay and grain.

Heavy and Light Soils.—The terms *heavy* and *light* soils are not used with reference to the weight of the soil but to the working condition of the soil. One cubic foot of sand is heavier than a cubic foot of clay, but sandy soils are called light soils because they are easy to work. Clay soils are sticky, compact, and require more animal and man power to work them.

Sour Soils.—Acid or sour soils are found in the humid regions and are formed by the decay of organic matter without a sufficient supply of free oxygen. Such crops as cowpeas, clover, soy beans, and alfalfa do not thrive well on acid soils. But the acidity of the soil may be corrected by applying two tons of finely ground limestone per acre.

Alkali Soils.—In semi-arid regions we find alkali spots which were formed by the evaporation of water

FIG. 115.—Soil and subsoil. The shovel points to the line where the light clay begins. The upper portion is top soil.

from the soil which was charged with alkali salts leaving the deposit in the surface soil. Since the quantity in these places does not generally prevent crop growth during years of sufficient rainfall it is advisable to improve the land by plowing under a heavy application of barnyard manure.

Water in Soils.—The water which enters the soil after a heavy rain or the melting of snow and ice which passes down through the loose earth and drains away in the form of springs, is known as a free, or gravity

water. Free water should not come within several feet of the soil as plants do not use this form of moisture and it is harmful to growing crops. After the free water has passed through the soil and found its outlet in

FIG. 116.—Capillary rise of water. The tube on the left shows the soil placed in water. Those in the center indicate the method of tying a cloth over the soil tube before placing it into the water. Lamp chimneys will do as well as these glass tubes.

springs, wells, and small creeks, there remains a thin film about each soil particle known as film, or capillary water. Plants use this kind of water and it is important that the farmer should aid nature in controlling it. Besides the free and film water a third kind of water

occurs in soil. This moisture is absorbed and retained by the soil particles and is known as *hygroscopic* water. Its presence may be detected by heating air dried soil.

How Plants Use Water.—Water is one of the greatest limiting factors in the growth and maturity of crops. It serves as a solvent and carrier of plant food to the root system. Water containing elements of plant food moves through the stem of plants and carries its load to the leaves where crude food is made into finished products. Some of the water passes through the openings in the leaves of plants and regulates the temperature around the plant while other quantities of water enter into the formation of sugar and starch. Water also serves as a carrier of compounds formed in the leaves to the proper place in the plant body.

How Plant Food Is Removed From Farm Lands.—

1. The farmer sells his plant food in form of crops.
2. By allowing the surface water to carry away the best tillable soil.
3. By failing to grow legumes, such as cowpeas, clover, and soy beans.
4. By not raising livestock to consume cheap and waste feeds on the farm.
5. By raising the same crop year after year.

How Farm Soils May Be Made More Productive.—Terrace and drain the land. Practice fall plowing. Raise more livestock and market the crops through them. Practice crop rotation. Add lime and practice timely and thorough cultivation.

QUESTIONS

1. Why is the study of soil important?
2. Why should school children study about soils?
3. Explain the terms *soil* and *subsoil*. Also state the use of each to the plant.

4. Name three forms of matter. What is inorganic and organic matter? Give examples of each.

5. Name nine soil builders and tell how each works on rock.

6. Write out the classes and subclasses of soils according to the method of formation.

7. Why are alluvial soils very fertile?

8. How are farm soils named? What is humus?

9. Why will clay soils hold more water than sandy soils? Name some plants that do well on clay and sandy soils.

10. What are heavy and light soils? Explain fully.

11. Explain the formation of sour or acid soils. How may acid soils be improved?

12. How are alkali soils formed? How may they be improved?

13. State several ways by which plant food is lost from the soil.

14. How may our farms lands be made more productive?

PRACTICAL WORK

Exercise 1

Object: A field study of soils in your community.

Materials Needed: Post-hole digger, yardstick, tapeline, fruit jars, stakes, hatchet, notebook.

Procedure: 1. Lay out an acre tract of land near the school and mark it off with four corner stakes. Record the location and the measurements of one acre of land.

2. Take the post-hole digger and begin digging. As soon as the color of the soil changes, record the depth of the soil and reasons for its color. Fill one of the fruit jars with a sample of the soil. Then continue digging until you have gone from two to three feet deep. Note the color of the subsoil. Why is it moist? Collect a sample of the subsoil in fruit jar No. 2 to be used later in the class room. Repeat this operation, taking samples from three other places on the acre tract. Keep the jars covered and store them at the school building for future study.

3. Estimate the average depth of the soil on the acre of land studied. Why is the soil deeper and different in color in the places where samples were collected?

4. Carefully study the soils and subsoils on several of the best farms in your community. Compare the soils and subsoils of bottom land with soils and subsoils of hilly lands.

Exercise 2

Object: To demonstrate how water deposits its load.

Materials: Fruit jars, soil and subsoil samples collected in Exercise 1, two small vessels holding one gallon each.

Procedure: Pour all the soil samples collected in Exercise 1 together and mix them thoroughly. This will give you a uniform sample of soil. In similar manner mix the different subsoils together.

2. Put a small amount of soil in one quart jar and the same amount of subsoil in another. Cover and shake the jars vigorously. Set aside and allow them to settle for several days.

Results: What size particles does the water deposit after shaking? Why do we always find large boulders at the beginning of a stream? Tell why water deposits its load in layers. Which contains the greater amount of clay, soil or subsoil?

Exercise 3

Object: To show how moisture rises in soils.

Materials: Three lamp chimneys, pieces of cloth large enough to tie over the ends of the chimneys, string, a vessel to stand the chimneys in, and enough dry sand, clay, and leaf mold which has been screened through a piece of gravel screen, to fill each chimney.

Procedure: Tie the cloth on the base of each chimney, fill each with a different sample of soil and set them in the shallow vessel prepared to hold them. (Fig. 116.)

Results: In which soil does the water rise most rapidly? Give reasons for your answer.

Exercise 4

Object: To demonstrate that organic matter gives color to soil.

Material: An old shovel, a place for burning the soil, and a sample of good loam soil.

Procedure: Burn a small sample of the soil collected in Exercise 1 for several hours.

Results: Compare the burned soil with some of the original material. (Note: this exercise may be worked out by some of the older boys at home and the material returned to the school for study in class.)

Exercise 5

Object: To test soil for acidity.

Material: Soil samples, water, glasses, and red and blue litmus paper.

Procedure: Make up a ball of soil similar to a common mud ball. Split the ball and insert a piece of red and a piece of blue litmus paper.

Results: If the blue paper turns red the soil is sour. If the red paper turns blue it is alkaline. If the red or blue paper retains its color the soil is neutral. Repeat the test using lime water and vinegar.

WORDS TO BE LEARNED

Alkali. Soda, ash or salt that is harmful to land.

Avalanche. A large mass of snow and ice sliding down the mountain side.

Humid. Containing moisture or vapor.

Humus. Decayed plant and animal matter found in soil.

Inorganic. Composed of materials other than animal or vegetable.

Leaf mold. Partly decayed leaves.

Organic. That which is made up of plant and animal matter.

Porous. Full of openings so that liquid will pass through.

Sediment. The material deposited by water.

Semi-arid. Having little rainfall.

Solvent. A liquid used for dissolving a solid.

Tilled. To plow and prepare for seed; cultivate.

Virgin. Soil which has never been under cultivation.

Weathering. To expose to air and other weather conditions.

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CHAPTER XII

IMPROVING FARM LAND

Tillage may be defined as the art of improving land for agricultural purposes. Good farmers realize that some plants such as apple trees thrive fairly well in sod land, but grains, fruits, vegetables, and flowers yield best when planted in well cultivated soils.

Why We Till Soil.—In tilling the soil, the farmer has several objects in view; namely, to cut and turn up the soil in plowing, to bury and incorporate the organic matter with the soil particles, to prepare a loose, friable seed bed to receive the seed or plants and the distribution and covering of seed.

Fall Plowing.—If the soil does not blow or wash badly, it may be plowed in the fall. Fall plowed land has many advantages over spring plowing in that it puts the soil in condition to catch and store up water. The soil particles are exposed to the weathering agencies. The organic matter will decay and supply plant food to succeeding crops. Many harmful insects will be destroyed, and considerable work will be out of the way for other farm operations. (Figure 117a, Fall Plowing.)

Subsoiling.—Farm land may be subsoiled by plowing it to a depth of from five to seven inches with a good plow. The turning plow should be followed with a bull tongue or “scooter” run in the furrow behind the turning plow. This method loosens up the subsoil and exposes it to the action of the weathering agencies without bringing it to the surface to interfere with plant growth.

Harrowing the Soil.—Land that is broken in the fall should not be harrowed or leveled but left in a rough condition. Usually, the first thing to do after breaking

FIG. 117a.—Fall plowing destroys weeds and insects.

FIG. 117b.—An open ditch is suitable for draining level land.

land at any other time is to harrow it thoroughly so as to scratch and break up the soil into fine particles.

Mulching the Soil.—Mulching is the process of cultivating the soil after each rain so as to leave a thin

layer of soil particles over the surface to check the evaporation of water. Berries and vegetables may be mulched with straw, leaves, or cotton seed hulls. The soil mulch is good and very economical.

FIG. 118.—A tile drain will last for years and enables the farmer to till all of his land.

“Farm Soils Need Organic Matter.”—In short, “humus is the key which unlocks the store house of soil fertility.” Decayed organic matter performs an important work by binding together particles in loose, sandy soils and by making heavy soils open and porous. Humus

also collects and conserves moisture, aids the growth of useful bacteria and furnishes food for growing plants. Practical plant growers realize the important function of humus in the soil and are working to add more of this material to their soils each year.

Sources of Organic Matter.—One of the best and cheapest ways of adding organic matter to the soil is through the application of barnyard manure. The kind of livestock and the method of handling the manure will

FIG. 119.—Terraces prevent washing.

determine its value. The manure from old animals is richer in plant food than the manure from the young stock, because the old animal can not digest its food as well as the young animal. If the manure is thrown from the barn into holes, if the chickens are allowed to scratch it around and the rain wash out the plant food, it will be of little use to the farmer. The best way to apply manure to the soil is to haul it directly from the barn to the field and scatter it evenly and plow it under. Usually the best time to manure the soil is in the fall. Apply from 8 to 25 tons to the acre and plow it under deeply. This gives

it time to decay and become well mixed with the soil particles.

We can not rely on livestock for the production of all the humus needed on the farm. We must grow such crops as peas, clover, soy beans, and vetch and plow the crops under while they are green. This is known as green manuring. Some farmers let their land lie out to grow up in weeds in order that they may turn under the weeds to add organic matter to the soil.

FIG. 120.—A cotton field washing away.

Stubble, roots of plants, and old straw may be plowed under in the fall, and they add much organic matter to the soil.

Some farmers prefer to “hog down” or “pasture off the crop” grown for green manure and then plow under the refuse and manure. By doing this, greater profit is made from the crop.

Importance of Good Drainage.—Plants do not grow well on poorly drained soils. When free water is too near the surface soil, it prevents the circulation of air and heat into the soil and subsoil. This causes the roots

of the growing plants to decay and their leaves turn yellow and soon die. Too much water in soil also aids the development of wilt and other fungous growth. Useful bacteria will not work in poorly drained soils, and cultivation is almost impossible.

Kinds of Drainage.—The kinds of drainage may be classified as open ditch, blind ditch, and tile drains. (Figs. 117b–118.) The open ditch system is most widely used and is probably the cheapest in point of construction. In preparing open ditch drains it is important that they should be made with the proper grade and width to carry the water. The narrow, deep, spade ditch is a menace to southern farmers in that it erodes the soil rapidly. The latter type of ditch is also objectionable when hauling from one section of the field to another.

The blind ditch drains are constructed by first digging a ditch of the desired grade and width. Poles or rocks are then placed in the ditch and are covered over with at least eighteen inches of dirt.

Tile drains are not used extensively in the South. This is due to cheap land, the tenant system of farming, and the cost of installing the drainage system.

Terracing is the building of ridges along the hillsides to prevent washing and the loss of fertility. While it is probable that much of the water falling upon the hillside will run off, the terrace prevents the sudden rush of water. It provides a side drain which carries the excess water gradually away. In the meantime, the greater amount is absorbed by the soil and remains for supplying plants with moisture.

Terraces are ridges some ten or twenty feet wide, at distances of about fifty or one hundred feet upon the side of the hill. These ridges are about two feet high and will not interfere with cultivation. These terraces are

FIG. 121.—Two types of levels. Above, a Bostrum farm level. Below, a homemade level, in which the pipe is leveled and the reading of the rod is marked accordingly.

graded to have a very gradual slope of about three to eight inches to the hundred feet, as shown by the illustration. Drains are located where it is most convenient. These are shallow open ditches to carry the overflow. (Fig. 119.)

Commercial Fertilizers are those concentrated forms of plant food which are prepared in factories. Waste products from animals, which have been slaughtered, including bones and other parts not eaten by people, are

FIG. 122.—Implements for terracing.

ground and dried with limestone or other material. Bones contain a certain amount of phosphorus, and the meat and other organic materials contain nitrogen. In some parts of the world stone containing phosphorus is mined, ground, and treated with acid to make what we know as acid phosphate. We also have potash, a mineral mined in Germany, though it is also obtained from Kelp ashes, a form of seaweed. Nitrogen is obtained from nitrates, mined in Chile. A mixture of these in proportion makes what is known as a complete fertilizer. This should contain about three per cent nitrogen, twelve per cent of acid

phosphate, and six or eight per cent of potash. Such a fertilizer will add much to the yield on many of our soils.

Commercial fertilizers are applied most often at the time of planting the crop. Attachments have been devised for applying the desired number of pounds per acre, as the drill or planter drops the seed. If sufficient manure and green materials have already been plowed under, a light application of commercial fertilizer will prove beneficial.

QUESTIONS

1. What is tillage?
2. Give several reasons why we till soil.
3. State the advantages of fall plowing.
4. Tell how to subsoil land.
5. What is the function of the harrow?
6. Give three ways of mulching soil.
7. Mention four ways of supplying organic matter to soil.
8. How is good drainage established?
9. Name three kinds of drainage and state the best kind for the South.
10. What is terracing?
11. What are natural, green, and commercial fertilizers.
12. How are terraces laid out?
13. Name several forms of commercial fertilizers.
14. Give the time and method of applying commercial fertilizers to the soil.
15. What are the three big problems to be considered in improving farm land?

PRACTICAL WORK

Exercise 1

Object: To learn the methods of handling soils.

Procedure: As a home project, try plowing a small plot in the fall and compare it with that plowed in the spring.

Observe a crop of rye shown in the fall and plowed under in the spring. A crop of peas may also serve as a green manure crop.

Exercise 2

Secure samples of fertilizers from fertilizer companies and study them in the school room. Try applying some commercial fertilizer to the flowers in pots.

Try mulching tomato plants with straw, leaving another group without mulching. Find out which produces the most tomatoes.

WORDS TO BE LEARNED

Commercial. Fertilizer prepared and sold on the market.

Friable. Easily crumbled or pulverized.

Incorporate. To be mixed or blended.

Menace. Threatens the loss of soil fertility.

Refuse. Waste matter or rubbish.

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CHAPTER XIII

SEED GERMINATION

What a Seed Contains.—Those plants which we grow so abundantly for our major crops are nearly all produced from seeds. Cotton, corn, wheat, oats, and clover are seed bearing plants. Seeds are really the beginnings of new plants. Examine a grain of corn and you will find that it has a heart made up of a small germ or embryo, surrounded by a large amount of food. This nourishment is in the form of starches, proteins, and fats, which serve as food for the young seedling.

Dormant Seeds.—As long as the seed remains hard and dry, it will not grow. The little germ is in a dormant condition, awaiting favorable conditions of heat and moisture. Is this not a wise provision of Nature? If seeds of cotton and corn did not remain dormant during winter, there would not be enough seeds to plant during the coming season, also, the human race would not have the supply of flour, meal, and starches necessary for the maintenance of life. Thus, seeds not only reproduce the plant but produce food for men and animals.

Good Seed Necessary.—Our object in planting a crop should be to secure the greatest returns for the labor and capital invested. Nothing insures a wider margin of profit than good seed. It is no more expensive to cultivate a crop of high yielding corn or cotton than the low yielding varieties. Why not get forty bushels of corn per acre instead of thirty, if we can do it with very little

more effort? The difference in the quality of seed will often make a difference in yield.

Testing Increases Yields.—Some interesting experiments have shown that one ear of seed corn will yield three bushels or more of corn. If one ear of corn planted upon each acre is dead, it is easy to figure how the yield may be decreased almost one-tenth. Not only should the question of seed germination be considered, but also

FIG. 123.—Good and poor seed corn.

weakness caused by insects and diseases. Much of our corn is infected with a moth whose larvae bore into the grain, robbing it of its stored food. These moths and weevils might have been killed with carbon disulphide when the seed was stored during the fall. The germination test made in the spring should eliminate any seeds which show injury from insects.

Testing Eliminates Diseases.—Another great factor in the study of seed germination is the discovery of molds or rots in the young plant. These diseases are

caused by parasitic growths or plant molds, known as fungi. Their threads and cells are too small to be observed by the eye and must be highly magnified for observation. It is known that various kinds of fungi may live in cotton or corn plants for several weeks without entirely killing the stalks. Cotton wilt is caused by an infection of the plant. The smut balls on the corn stalk are really the spore stage of a fungus which began to grow in the plant during its germination. It is impossible to make a germination test to determine which

FIG. 124.—Increasing yields with good seeds.

stalks of corn will be diseased, but we can make tests to eliminate the ears which are weak and show signs of being diseased.

Methods of Testing.—The seed germinator box, rag-doll, blotting paper, and box methods of testing seeds are used. All of these methods are valuable for detecting weak seedlings.

The Rag Doll.—Perhaps the greatest advancement in seed testing has been made with corn. This is probably due to the fact that the ear of corn is convenient to handle as a unit. In each case the ears should be num-

bered by pinning numbered tags to the butts or by placing them in racks as shown in the diagram. (Fig. 126.)

Each doll is made to test twenty ears at one time. A heavy wrapping paper, preferably glazed, is cut about

FIG. 125.—The smut ball is all that this stalk of corn has produced during the year.

fourteen by fifty-four inches. This is placed upon a table, and a piece of muslin, twelve by twenty-four inches, is prepared to cover it. However, the cloth should be dipped in boiling water for a few minutes to remove any matter that might be injurious to the seedlings.

While this cloth is still wet, eight kernels should be taken from each ear, beginning at the butt and revolving the ear to remove a kernel from every third row. These grains should be placed in a row across the cloth with the tips pointing in one direction as indicated in the diagram. (Fig. 127.) Each row should be numbered with colored chalk or with a wax pencil. The doll should

FIG. 126.—Seed ears numbered for testing. Notice that they are strung and placed so that rats and mice will not disturb them.

be rolled very carefully to avoid displacing the kernels and to see that the heavy wrapping paper insulates each row. In using the glazed paper and cloth, the roots of seedling from one ear of corn will not become entangled with those of another. After rolling, the doll should be tied loosely in three places or bound with rubber bands, and then dipped in water to saturate the cloth. A number of dolls may be placed in an incubator, as shown in

the diagram. (Fig. 128.) This incubator is merely two boxes lined with wet sawdust and covered with wet burlap to hold the moisture. A temperature of eighty degrees F. should be maintained by placing the box near a stove or furnace.

The corn should be allowed to remain in the tester for six or eight days if the temperature is low. After unrolling the doll, the rows of seedlings may be checked with

FIG. 127.—Grain placed in a rag doll. The rows in the doll correspond to the number of the ear from which the grains are taken.

the corresponding ears of corn. Those ears showing weak germination, or dead kernels should be discarded.

Cotton.—A similar test may be made for seed cotton, with the exception that a check cannot be made of the plant unit from which the seed came. Weak seeds may be discarded by this method. Cloth used in making the test may be used again if boiled to destroy molds. If the rag doll is properly used it is perhaps the most effective method of detecting weak or diseased seed.

Wheat, Oats, and Clovers.—Seed of these crops may

be easily tested by the blotting paper method as shown in the diagram (Fig. 130). One hundred grains should

FIG. 128.—A germinator box showing how the moist sack or sawdust is placed in the bottom to hold moisture. The top is covered after the dolls have been placed.

be counted out for each square. Sufficient moisture and temperature are necessary to secure satisfactory results in any germination test.

Sand-Box or Sawdust Box Testers.—By drawing cords across a box of sand, as indicated in the diagram (Fig. 131), squares may be marked off and numbered, six or eight seed may then be taken from each ear of corn and planted in the square corresponding to the number on the ear. While the sand-box does not permit the

FIG. 129.—Checking a rag doll tester. The knife points to decayed grains. Ear number 2 should be discarded.

observation on the root system, it provides more natural conditions for the growth of the seedling. The number of seeds germinating may be counted, and the rate of growth observed. Those seeds which appear above the ground first usually produce the best plants.

QUESTIONS

1. Name four conditions necessary for seed germination.
2. What is meant by dormant and active stages of a seed?
3. Why are good seeds so important?

4. How does the kind of seeds determine the kind of crop we will grow?
5. How much corn may be produced by one good ear of seed?
6. Tell how to destroy weevils and moths in seed.
7. What are fungi?
8. Tell how to prevent fungous growth in plants.
9. Explain three simple methods of testing seeds.

FIG. 130.—A blotting paper tester.

10. Of what advantage is seed testing in practical farming?
11. Is it best to buy seed corn on the ear or shelled?
12. What methods of seed testing would you use for testing seed cotton, wheat, oats, and clover?
13. What are the objections to planting old seed?
14. How do you estimate the percentage of seeds that germinate?

PRACTICAL WORK

Exercise 1

Object: To test the germination of seed corn.

Materials: Seed corn stored during the previous fall. Strips of muslin one foot wide and fifty-four inches long. Heavy paper

of the same dimensions. Strings and rubber bands and tags. A box twelve inches by twelve inches square and twelve or fifteen inches deep. Sawdust or moss to retain the moisture in the box. A knife and pencil.

Procedure: Lay out twenty ears of corn upon a table or shelf. Number each ear with a paper tag.

Wet the muslin in boiling water and stretch it evenly over the heavy paper. Number twenty spaces upon the cloth as shown in Figure 127.

Draw eight kernels from each ear and place in rows as indicated in Figure 127. Care should be taken that the ear and the number of the row correspond.

FIG. 131.—Sand or sawdust box tester. A. Removable top with numbers.
B. Box containing sawdust.

After eight grains have been drawn from each of the twenty ears and placed in the proper rows, the doll is rolled carefully to avoid displacing the corn. Bands or strings placed around the dolls as indicated in Figure 128. The dolls are placed vertically in the box, packed with sawdust, moistened and covered. Several dolls should be prepared at one time.

A temperature of eighty degrees F. is maintained for six days. By this time the corn should have made a vigorous growth.

In reading the doll, remove the bands, and unroll as it had been rolled when starting the test. Dead and decaying grains can be easily detected, as shown in Figure 129. Discard those ears showing dead or badly molded grains.

WORDS TO BE LEARNED

Burlap. A coarse fabric, made of jute or hemp and used for bagging.

Detecting. To find out, discover, or lay bare.

Discard. To reject or cast off as useless.

Dormant. Resting or not active.

Embryo. A germ or undeveloped stage of a seed.

Fungi. A low form of plant life that lives on other plants.

Larvae. The worm stage of insects; as caterpillar.

Maintenance. That which supports life.

Major. Most important.

Parasite. A plant or animal living upon another living organism at whose expense it obtains its food.

Preferably. Something to be selected first.

Spore. A dustlike reproduction cell of fungi.

REFERENCES

"The Rag-Doll Seed Tester," U. S. Dept. of Agri., Farmers' Bul. 948.

"Better Seed Corn," U. S. Dept. of Agri., Farmers' Bul. 1175.

"Testing Farm Seed in Home and Rural Schools," U. S. Dept. of Agri., Farmers' Bul. 428.

CHAPTER XIV

VEGETABLE GARDENING

Every Home Needs a Garden.—By raising a garden at home, the cost of living is lowered, and the family will also have food which it would otherwise do without. Fresh wholesome vegetables should be a part of the diet of everyone, and if these vegetables are grown at home, much worry and time are saved in planning and preparing meals. The home garden will offer opportunity for the boys and girls to do work that is a credit to themselves and their country. Very often an industrious child will produce enough vegetables for the family and have a surplus to sell, which will aid him in getting an education. Gardening offers physical exercise and out-of-door recreation, as well as pleasure and profit. While working with plants, one learns many things about them which develops interest in growing plants. By turning small undesirable waste places into gardens which will yield food and add beauty to our surroundings, we become useful citizens. Also a gardener will get joy, contentment, and happiness from raising vegetables.

Location and Site.—The garden should be located near the house so it will be convenient for the housewife to gather vegetables. The housewife finds it inconvenient to depend on the busy farmer to bring vegetables to the house at the proper time. The best site for the home garden is a southern slope with good nat-

ural drainage. This kind of slope is desirable because it warms up early in the spring, enabling one to get the seeds and plants into the open ground very early. In selecting a site for a home garden, it is also well to consider protection from the north and west winds. Such objects as fences, houses, hedges, and trees prove to be useful barriers.

FIG. 132.—A garden for profit and pleasure.

Size of the Garden.—The size of the vegetable garden may vary from a few square feet on a city lot to several acres in the rural districts. The size of the area from which to choose will also depend on the number in the family, the price of the land, the kind of crops to be grown, and the use of the crops. Usually it is better to have a small, well-kept garden than a large one that is poorly worked. The small garden may be cared for by hand implements, while the large garden should be

tilled with horse drawn implements. If properly planned and cultivated, a small garden on a town lot will produce all the vegetables that a family can use.

Fertilizing the Garden.—The best way to fertilize the garden is by scattering a coat of barnyard manure over the surface at the rate of eight to ten tons an acre. Scatter in the fall and plow it under. Especially is this treatment used when applying fresh barnyard manure. A winter cover crop may be planted on the land after other crops are harvested and turned under as green manure.

FIG. 133.—Cowpeas as a cover crop.

Preparing the Seed Bed.—In the spring when preparation of the seed bed is begun, the land should be well broken. Then the next thing to do is to plow the soil deep or spade it well, using a spade or garden fork. If the land is cloddy after breaking, the clods should be crushed with a roller or plank drag, after which it should be harrowed several times with a section or A-harrow. This will put the seed bed in fine shape to receive the seed or plants.

Selecting Varieties.—In selecting varieties of plants for the home garden, the likes and dislikes of the entire

family should be considered. It would be of little use to plant several rows of corn in the garden, if only one member of the family ate corn. On the other hand, if all the members of the family like strawberries, the area devoted to this crop should be much larger. In choosing vegetables for the garden, time and attention should be given to the selection of varieties that mature at different times and yield abundantly. Every garden

FIG. 134.—A hotbed. During the winter, glass covers are placed over the beds as shown in the center of the picture.

should contain early, medium, and late varieties of vegetables. The slogan of good gardening should be, "have something for the table every day in the year." Varieties of vegetables should also be selected with reference to harmful insect pests and diseases. For example, if the tomato plants in your garden are destroyed by wilt one year, you should select wilt resistant varieties the next year.

Source of Seeds and Plants.—The seeds and plants may be grown at home with very little trouble and

small expense. If you are going to buy seed out of town, it is well that you write for seed catalogues early, make up your lists, and order them early in January. This will enable the shipment to reach you in time for testing and planting. Such seeds as squash, mustard, radish, okra, peas, and beans, may be saved from the home garden. Collect these seeds when they are dry,

FIG. 135.—A well arranged garden.

cure them thoroughly in the sun, and store them in a well ventilated place, which is protected from insects and mice.

Hotbeds.—A small hotbed for home use may be made by taking two 1"x12"x6', one 1"x12"x12', one 1"x6"x6', one 1"x6"x12', and one 2"x4"x12'. Cut the brace material so the back of the frame will be eighteen inches high and the front twelve inches high. Prepare the frame and brace it well. In nailing the plank on the brace mate-

rial, let the small plank be on the bottom. This will enable you to bank dirt around the frame so as to prevent cold air from entering the bed. Next, dig the pit about two feet deep and one foot larger than the frame. Fill the pit eighteen inches deep with horse manure to which a little hay has been added. Moisten and pack the manure firmly as it is put into the bed. Cover the manure with six inches of rich garden loam,

FIG. 136.—Companion crops. The corn has just been harvested, and the cowpeas cover the ground.

place on the frame and mound the dirt up well around the sides. The bed may be covered with standard size hotbed sash or heavy drilling. Allow the bed to heat for several days, and when the temperature remains from 84° to 98° Fahrenheit, the seed may be planted. It is always desirable to locate the hotbed in a well protected place, with the highest side to the north.

Cold Frame.—Cold frames are constructed similar to hotbeds. In the hotbed, we have a pit filled with manure, while in cold frames we do not need the pit or

manure for heating it. The frame used for the hotbed is the same as the frame used for the cold frame.

Plants raised in the hotbeds may be transplanted into the cold frame and hardened off before setting them into the field. Tender plants started in the hotbed or cold frame should not be set in the open until after the danger of frost is over.

Use System in Planting.—It is advisable to mark out the rows in the garden before planting. A well arranged garden with straight rows is admired by every one. Also attention should be given to the grouping of plants. The berries and perennials should be planted in one section of the garden, and the tall growing varieties should not be planted with the smaller varieties. Plants that mature about the same time should be planted near each other; this will permit breaking the ground together and save expense of tillage.

Planting Seed.—Seed may be planted by drilling or broadcasting. The drill system is the best for the home garden because the crops are more easily worked. In planting seed, care should be taken that they are not planted too deep or too thick. Small seeds are usually sown thickly and about one-fourth to one-half inch deep while the larger seeds are planted in hills or at short spaces from two to four inches deep. After the plantlets come up, if they are too thick, the crop should be thinned to the proper stand. This enables one to raise strong, sturdy, thrifty plants.

Transplanting.—Frost-tender plants should not be transplanted to the open ground until all danger of frost is over. Usually this is about the middle of April in Southern states. The best time of day for transplanting plants into the open field is late in the evening. If the plants are set out at this time and are well

watered, they will wilt very little. When possible, one may select cloudy days to carry on this work.

Succession Crops.—By succession cropping, we mean the planting of such crops as corn, turnips, lettuce, peas, and beans, every few weeks to come on and take the place of the older crops as they mature. This distributes the food supply over a period of time rather than giving us an over supply at one time without fresh vegetables to eat at other periods.

Companion Crops.—Companion cropping is the planting together of crops of different varieties. For example, field peas planted in corn, or pumpkins in corn, and corn or peanuts in the middle of Irish potato rows.

QUESTIONS

1. Give six reasons why every home needs a garden
2. Discuss the best location and site for the garden.
3. Name several successful gardeners in your community. Tell why they are successful.
4. Observe and describe a good seed bed.
5. Why should the gardener study the selection of varieties of crops?
6. Give six rules that would govern the planting of seeds and transplanting plants.
7. Tell how to fertilize the home garden.
8. What is succession and companion cropping?
9. Why do we cultivate the garden?
10. Why should every farmer eat more vegetables?

PRACTICAL WORK

Exercise 1

Object: To prepare a hotbed and raise plants for school garden and your home garden.

Material: Lumber, nails, saw, hammer, spade, shovels, canvas or glass sash, and horse manure.

Procedure: After selecting a place for the hotbed, dig a pit from 2 to 3 feet deep. The pit should be made 2 feet longer and

2 feet wider than the frame. Fill the pit to a depth of 18 inches with fresh horse manure, moisten it and pack it firmly. Finish filling the pit with rich garden loam. Prepare the frame as described in the text and place it over the pit. Mound up around the sides with earth. Cover the bed with glass sash or canvas. After the bed has begun to maintain a temperature of 70° to 80° Fahrenheit, the seed may be planted in shallow drills about 6 inches apart. Water the bed and ventilate it, in order that the seedlings produce sturdy plants.

Results: Plants produced in the hotbed may be sold to gardeners in the community, planted in the school garden, or transplanted to the home garden.

Exercise 2

Visit a hardware store and study some of our most important garden tools.

Exercise 3

Write to seed houses for copies of their catalogues. Get your parents to order their seed early and test them to see if they will germinate.

WORDS TO BE LEARNED

A-Harrow. An A-shaped farm implement having teeth used to pulverize soil.

Barriers. A natural or artificial boundary line.

Catalogue. A long list of names or things arranged in alphabetical order.

Drilling. A firm twilled cloth of linen or cotton.

Fahrenheit. A mercurial thermometer showing in degrees the various temperatures.

Hotbed. A bed of earth artificially warmed and protected by glass frames or of heavy cloth.

Miniature. The natural thing reproduced on a small scale.

Perennial. A plant lasting more than two years, as a tree.

Resistant. Tending to produce resistance, going against or producing opposition.

Site. Local position.

Slogan. A word or sentence cry.

REFERENCES

The following bulletins may be secured from the United States Department of Agriculture:

"The Home Vegetable Garden," Bul. 255.

"Home Gardening in the South," Bul. 934.

"Tomato Growing in the South," Bul. 642.

"Producing Family and Farm Supplies on the Cotton Farm,"
Bul. 1015.

"The School Garden," Bul. 218.

"Hotbeds and Cold Frames," Oklahoma A. & M. College, Circ.
113.

"Vegetable Gardening," Green, Webb Publishing Company.

CHAPTER XV

FLOWERS

Beauty and Success.—Do you have a feeling upon returning home from a journey that your home is just a little more home-like, a little more desirable than any other place you have seen? Do the flowers have a brighter hue in your garden? Is there a feeling that home is about the best place on earth? If you do not, there must be something wrong.

Is your school a building with four walls, or is it an institution in which you take pride? Is it alive with those little things which add joy to your surroundings?

People through all the ages have taken great pride in growing flowers. Their arrangement in gardens involves a great art. The beautifying of the home indicates fundamentals of success, pride, energy and ambition. Let us consider the uses of flowers as a means of making our homes and schools more artistic. (Figure 137.)

A Border for the Picture.—The size of the buildings and the grounds, along with the general type of architecture, will determine the kinds of flowers to be planted. A small cottage does not require a large garden or park with an endless variety of plants. The flowers should serve as a border, as a background for the picture. The same rule should apply to the school. (Figure 137.) What should be the aims to consider in planting flowers? Most of us are busy with various kinds of work and do not have much time to devote to

the care of flowers. Therefore, we should try to plant flowers which will produce beautiful blossoms without much attention. We like to have flowers blooming all the time. Our varieties should include early flowering types as well as continuous bloomers.

Annuals.—Many of our plants live only during one season. They grow from seed, bloom, produce more seed and die with the coming winter or during the dry season. These are known as *annuals*. The petunia,

FIG. 137.—A successful appearance.

scarlet sage, nasturtium, cosmos, zinnia, larkspur, sweet pea, sunflower, morning-glory and verbena are the most common annual flowers. The seed is usually planted in germinating boxes, early in the spring. Small seeds, such as the petunia and scarlet sage, should not be covered deeply with soil. (Figure 139.) A wet cloth will serve as a covering until they have germinated. Sweet pea seeds may be planted in the trenches at any time when the soil may be worked during the winter. They are more satisfactory if they are ready to bloom during the cool months of spring. Morning-glory seeds

may be planted where the vines are desired. They provide excellent covering for unsightly buildings and fences. Nothing is more attractive than a border of nasturtiums in a window box. Zinnias, larkspur, golden rod and double sunflowers provide a brilliant mixture of color for a garden during the hot season. (Figure 140.)

Perennials.—Our most attractive flowers are produced by those plants which remain alive for several years, not depending entirely upon the planting of seeds each

FIG. 138.—A school ground.

year. These plants are called perennials. Violets, roses, hydrangeas, honeysuckle, daisies, asters, perennial phlox, pinks, lilac, wistaria, oleander, spirea, Japanese quince, syringa, pansies and ferns may be grown under proper conditions of soil, light, and moisture.

What is more beautiful than a rose garden? Cuttings from our most beautiful varieties may be started in wet sand in the school room during the winter. These may be transplanted in March to borders about buildings and walks. Violets and pansies grow with very little

care, blooming when other flowers do not. They form a border for the beds of other flowers. A rose bed may be filled in with petunias, phlox, daisies or asters, to furnish a variety of flowers. (Figure 141.)

FIG. 139.—The germination of seeds. Small seeds are planted upon the surface and covered with a wet cloth. They soon germinate. The seedlings may be transplanted as soon as they are well started.

Shrubs supply a background for our picture. The space behind a building may be transformed into a beautiful setting by planting shrubs which flower at different times. *Spirea* and *syringa* are low shrubs which produce an abundance of flowers very early in the

spring. These are followed by lilacs and snowballs, taller bushes which should be placed farther back. The hydrangea blooms still later, and one or two may add

FIG. 140.—A flower garden in the back yard provides a wide variety of color. much to any garden. Oleanders will not survive freezing weather, but they are very desirable for summer

FIG. 141.—Petunias follow the rose. The mass of flowers lasts until winter. blooming. Nothing is more attractive than a trellis or arbor covered with wistaria or honeysuckle. They vine over a support and produce a very inviting shade.

Wild Flowers.—While we are discussing cultivated flowers, why not notice our native wild flowers? Our woods and fields supply an abundance of rare beauties. Beginning in the early spring, we find a great many wild violets. These are followed by verbenas. Buttercups, daisies, and snapdragons may be found in moist fields. These are followed by several varieties of evening primrose. They are white, pink or yellow. Wild

FIG. 142.—An effective background, in which unsightly fences are covered with ornamental hedges.

larkspur, daisies and poppies are found in many communities. The Texas Blue bonnet is attractive. Goldenrod provide blossoms for the latter part of the season. If we cannot obtain cultivated flowers in sufficient quantities, let us try a flower bed of wild flowers. They are easily found and transplanted. (Figure 143.)

Bulbs.—The most interesting type of flowers is undoubtedly the bulb. Most of these plants are members of the lily family, and they do not depend upon the seed for raising new plants. The bulbs, which are

enlarged stems, divide and the new bulbs are used for planting the next season. Most of our bulbs do not develop well unless they have the advantage of a cold winter. It appears that the flowers do not form so abundantly unless they pass through this long resting period. For this reason, the bulb plants have never been grown to any great extent in gardens. Also, most of our bulb plants are naturally water plants requiring

FIG. 143.—Wildflowers provide an unusual opportunity to improve the variety of plantings.

an abundance of moisture. The narcissus is perhaps the most popular and attractive flower grown from bulbs. These blossom early in the spring when there are few showy flowers. The hyacinth may also produce some delightful colors. If there is an abundance of moisture, the iris is most attractive. Almost all of these bulbs should be planted during the month of November, to insure blossoming the next spring. The canna is a summer flowering bulb, hardy and easily transplanted. A few stalks will furnish a supply of brilliant reds and

yellow for a large portion of the season. The caladium (elephant ear) does not bloom, but the enormous leaves cover a multitude of bare places and is very attractive when properly placed in a flower bed. (Figure 144.) A few tuberous rooted plants produce splendid flowers. Where conditions are right, the dahlia is easily grown

FIG. 144.—A variety of plants in the flower bed. Note the large elephant's ears in the canna lining.

and flowers during the latter part of the season when other plants are taking a vacation.

QUESTIONS

1. Of what value are flowers about the home?
2. What determines the kinds of flowers one should grow?
3. Prepare a list of annual flowering plants.
4. What are perennial flowers? Name several kinds.
5. Observe flowers and make reports as to which stand hot, dry weather conditions best.
6. When is the best time to prepare soil for flowers?

7. Describe two ways of raising flower seedlings to be transplanted to beds.

8. Name three vines used for shading porches and buildings.

9. At what time of the year should shrubs be planted?

10. Tell how to grow roses from cuttings.

11. Prepare a list of wild flowers grown in your district.

12. When should bulbs be planted?

13. Discuss the kinds of soil best for bulbs.

14. Give five hints to be considered in bulb growing.

PRACTICAL WORK

Exercise 1

Object: To beautify the school ground.

Procedure: Look about your school and see where some improvement may be made in the general landscape appearance. Do you find that the corners are filled with dead weeds from last year? Could a trellis be built near the exposed side of the building so that it would not look so bare? Are there shaded corners where ferns would grow? Would not the corners of the grounds be more attractive with some shrubs?

Would it be possible to collect the seeds and roots of our prettiest wild flowers and make a border about the school grounds?

The main part of the lawn or playground should not be cluttered with flower beds, but the flowers should be the finishing border framework for the picture. Each member of the class can bring a cutting from a rose bush for starting in wet sand, later to be transplanted to the corner where the weeds grew so rank last year. A little work by each pupil will do much to beautify the grounds.

WORDS TO BE LEARNED

Architecture. The science and art of designing and constructing, usually buildings.

Arbor. A latticework formed of or covered with vines, branches of trees, etc.

Borders. Margin or edge.

Bulb. A leaf bud usually developed underground.

Institution. That which is established, as a permanent school.

Trellis. A cross-barred lattice. A support for climbing plants to run on.

Tuberous. Tuber-like parts.

REFERENCE

- "School and Home Gardens," Meier; Ginn and Co., 1913.
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CHAPTER XVI

BEAUTIFUL GROUNDS GLADDEN LIVING

Do you like to see a comfortable home nesting among beautiful trees, shrubs, and flowers? Does a well kept lawn with showy flowers, climbing vines, and shrubs carefully arranged to cut off undesirable views, enable you to judge the lives of the people who live in these homes? Do those sturdy shade and fruit trees that are dotted here and there bearing luscious fruit contribute anything to make the lives of boys and girls better? What lad does not enjoy playing on the lawn covered with Nature's carpet green, and sitting with playmates at story telling time or eating the heart of a good water-melon while he smells the odors of new mown hay and sniffs the breezes perfumed with the fragrance of petunias, geraniums, and cape jasmines?

One does not have to be a landscape gardener in order to make the home grounds attractive. The boy or girl, man or woman who likes to work with plants and watch them grow will learn through study and practical experience the best methods of arranging and growing plants for pleasure and profit.

Beautiful Lawns.—The size of the lawn or home yard will be governed by the price of the land, location, kind of home, desires of the family, money required to make and keep the plantings, and the kind of labor available.

Usually in cities where land values are high and houses

are built on small lots, the lawn is very small, while in suburban or country districts the area is somewhat larger.

FIG. 145.—A well landscaped home, below.
The same home before landscaping, above.

Regardless of the size, the lawn should slope gently so that the water will drain away from the house. A southern and eastern slope is preferable because the

plants will be protected from the cold winds of the West and North.

After grading and filling the lawn so as to give the desired effect, the surface should be covered from two to three inches deep with well rotted manure. If the soil is poor it is best to fill the yard with eight or ten inches of rich sandy loam. Then apply a top dressing of humus and mix it with the soil.

FIG. 146.—A lawn with proper slope.

Having prepared the soil for a good lawn you will naturally think of planting the grass and laying out the flower beds, but the best plan is to delay this work until the garden, poultry yards, and cow lot have been fenced.

The walks should be constructed and the flower beds laid out before sowing flower seed or setting out plants. Very often in cities or small towns valuable trees have to be moved or destroyed to make way for a sidewalk with the proper grade.

The Best Grass for Southern Lawns Is Bermuda.—One may get a start with this grass by sowing the seed

or by laying off shallow furrows about eighteen inches apart, dropping pieces of sod and covering them with

FIG. 147.—Bermuda lawn at mowing time.

loose soil. The latter method of establishing a green carpet on the lawn is more satisfactory.

FIG. 148.—Plants used as screens.

As soon as the grass makes its appearance, the weeds should be kept down. Mow the lawn when it is needed and leave the old clippings on the ground to add humus

to the soil. In mowing young or old grass, it is not advisable to clip it very short because the plants need some leaf surface in order to make their food. If the weather is dry the lawn should be watered, and the best time for watering plants is late in the evening. This prevents scalding.

Screen Undesirable Views.—We have many methods of cutting off undesirable views of the backyard. On city lots a good plan is to build a solid board fence about

FIG. 149.—Vining roses over a fence.

five feet high between the front and backyard. Such plants as lilacs, altheas, Amoor River privet, bridal wreath, and spirea may be planted in front of the fence to cut off the view. Another practical method is to plant yellow or red varieties of cannas in front of the fence. Shasta daisies may be planted in front of the cannas, and the bed bordered with vinca or violets. Castor beans may also be used to screen the barnyard fence. Some residents prefer to build ornamental fences between the front and backyard and cover them with running roses or grapes.

Rose Gardens.—The best location for the rose garden is in the backyard or off to one side of the house. The plants should be planted in bed formation in checks from three to four feet apart. The best time for transplanting roses is in the fall or during the months of February and March. For quick results one may set two year old plants. But plants may be grown from cuttings or small nursery stock. In order to obtain beautiful roses for cut flowers it is necessary that the bushes be pruned, sprayed, and given thorough and timely cultivation.

FIG. 150.—A rose garden.

House Border Plants.—Such plants as Amoor River privet, bridal wreath, altheas, Cape Jasmines, Euyonamus Japonica, and Shasta daisies do well and make a good showing when they are properly massed near a building. In making such a planting avoid straight lines. Massed beds of petunias or solid beds of zinnias are easy to grow and make a beautiful display as border flowers.

Flower Beds for School Grounds.—In planning a round bed for the school grounds, the following arrange-

ment is very effective. Lay out the bed from 14 to 16 feet in diameter and prepare the soil thoroughly. Mass

FIG. 151.—An attractive border planting.

red cannas in the center about 12 inches apart. Plant a row of zinnias around the cannas, and border with Shasta

FIG. 152.—A round flower bed.

daisies. Small round beds of scarlet sage or salvia, or a massed bed of vinca is very beautiful.

Oblong Flower Beds.—The oblong flower bed may be 12 feet in diameter and 30 feet long. Prepare the soil as for other flower beds and plant five rows of red or yellow cannas, in the center, set a row of caladiums in front of the cannas, one row of salvia in front of the caladiums, and border the bed with vinca, coleus or alternanthera.

Ribbon Beds for Drives.—One of the most effective plantings along drives is as follows: California privet

FIG. 153.—Oblong flower beds.

hedge that is well pruned as the background, yellow cannas in front of the hedge, roses in front of the cannas, with border plants of violets or verbenas. This arrangement of plants is permanent.

Plants for Marking Property Lines.—California privet and Amoor River privet are used extensively for marking property lines. The plants are set in rows from 12 to 18 inches apart and should be kept well trimmed at all times. For giving that green living effect to lawns in the dead of winter a few evergreens such as: cedars, boxwood, Euyonamus Japonicas, California privet, and Amoor River privet may be planted. They may be

planted singly, in clusters of two, three, or five plants at a place where they will be most attractive.

Shade Trees.—We have two systems of planting shade trees known as the formal and informal. Planting along walks and drives in straight rows is known as formal planting. Informal planting is planting trees to give the natural effect. The nearer the planter imitates Nature, the better the result will be.

FIG. 154.—An attractive ribbon bed.
Cannas and roses arranged in rows in front of the hedge.

Time to Plant Trees.—The best time to set out shade trees is during their dormant period. The months of November, February, and March are probably the best months for doing this work. Trees that are planted after the buds begin to burst do not get well established and will likely die during the warm summer months.

Size of Trees to Plant.—The proper size tree to plant is one from 2 to 4 inches in diameter. It should be healthy, well balanced, and free from bruises. In setting shade trees one may follow the suggestions given for planting fruit trees.

Varieties of Shade Trees.—Some of our most familiar shade trees in the South are the oak, maple, locust, catalpas, magnolia, pecan, walnut, hackberry, cottonwood, sycamore, and elm. If the lawn or school ground contains natural growth of pine, hickory or oak, it should not be destroyed to make places for other trees. The native trees always do best because they are adapted to the soil and climate.

FIG. 155.—A neat hedge marks the property line and does not detract from the beauty of the landscape.

Care of Grounds.—The home and school grounds should be kept clean and tidy at all times. Collect and dispose of paper, cans, old pieces of wood, rocks, dead plants, and general rubbish.

After each mowing the grass should be edged around the beds so as to do away with the ragged appearance. The trimmings should be raked up and hauled away and walks brushed off with a broom. Beds should be kept

FIG. 156.—Formal and informal plantings of shade trees. Above, the evergreens are planted as a design for a miniature park. Below, the trees are planted at random over a lawn.

free from grass and weeds. The shade trees should be mulched from time to time and watered during the hot dry summer months.

Growing Plants for Home and School Grounds.—Such flowers as marigolds, petunias, phlox, zinnias, verbenas, vinca, and salvia are easily grown from seed. A few packages of each kind of seed may be sown at the school in a well prepared seed bed. Some of the plants

FIG. 157.—Well kept grounds.

may be transplanted to the school grounds and others set in the home yards by the students. If you will make a start this year by securing a few violets, cannas, caladiums, and Shasta daisies and plant them in good soil and give them proper care you will have many plants to distribute on the home and school grounds of your community next year.

QUESTIONS

1. Give your reasons why trees, shrubs, and flowers should be planted on the home grounds.
2. Name five factors that govern the size of the lawn.

3. Why should the lawn slope gently from the house?
4. Tell how to prepare a good soil for the lawn.
5. Why should walks and flower beds be laid out before planting the home grounds?
6. Explain two ways of starting Bermuda grass on the lawn.
7. What plants make desirable screens to hide undesirable views?
8. Tell how to make a rose garden.
9. What plants do well when planted around the border of the house?
10. Tell how to make a round, oblong, and ribbon flower bed.
11. What plants are used in marking property lines?
12. Name several common shade trees in your district.
13. When is the best time to set shade trees? Tell how to set a shade tree.
14. When is a lawn or school ground well kept?

PRACTICAL WORK

Exercise 1

Object: To plant trees on the school grounds.

Material: Shade trees, shovels, spades, tapeline, a wagon, and a sharp knife.

Procedure: Locate the places where the trees are to be set. Dig the holes for them, and have some rich garden soil and place it near each excavation for use in planting the trees. Secure the trees from the woods or nursery. Care should be taken not to let their roots dry out. In setting the trees, place them in the holes prepared for them and set them a little deeper than they stood in their original home. In setting, work the loam soil in well around the roots and firm or pack it down. The last few inches of soil placed about the tree should be left loose to serve as a mulch. In transplanting it is a good plan to water the trees. Do not use fresh manure or other rubbish in the holes made for the trees.

Exercise 2

Object: To plant flowers on the school grounds.

Materials: Flower seed, garden implements, and a yardstick.

Procedure: 1. Lay out the beds where the flowers are to be planted and prepare them for the seed.

2. Plant the flower seed at the proper time and thin out the seedlings after they begin growing.
3. Keep the flowers watered, weeded, and cultivated.

WORDS TO BE LEARNED

Diameter. The length of the straight line through the center of an object.

Luscious. Pleasing to the taste and smell.

Ornamental. A plant cultivated essentially for decorative purposes.

Property lines. A division line between personal land property.

Shrub. A small woody plant with many branches.

REFERENCES

"Landscape Gardening," Bailey, L. H., Macmillan.

CHAPTER XVII

CORN GROWING

Kinds and Varieties.—Just as we have different kinds of cattle, we have different kinds of corn. These may be crossed and mixed to such an extent that it is difficult to say which is a distinct kind of corn and a variety. We recognize six kinds of corn; the pod kinds, covered with a pod similar to wheat chaff; dent corns, the larger kinds of our field corn with a distinct dent in each grain; the flint corns, with hard smooth grains; sweet corn, with a wrinkled grain and a sweet sugary taste; soft corn, for making flour and meal; and pop corns, well known for “pop corn and cracker-jack.”

These various kinds are divided into a great number of varieties, more than five hundred. A few of these are listed below.

Dent Corn.

Reid's Yellow Dent.

Boone County White.

Hickory King.

Bloody Butcher.

Ferguson's Yellow Dent.

Mixed.

Iowa Silver Mine.

Leaming.

Squaw corn.

Chisholm.

Flint.

Longfellow.
King Philip.
Triumph Yellow.
Gehu Yellow Flint.
Early Yellow Canada.

Sweet Corn.

Country Gentleman.
Golden Bantam.
Stowell's Evergreen.
Adam's Extra Early.
Mammoth White Cory.
Early Evergreen.

Pop Corn.

White Rice
Yellow.
Golden Pop.
Sure Pop.

From the above lists, it may be seen that our southern farmers may have varieties to meet the conditions of every community. In fact, many of these have become mixed to such an extent that it is difficult to determine which is the best for any particular condition. Just as we should keep pure breeds of hogs and cattle, we should also raise pure varieties of corn. It is more profitable to plant seed from a well-bred strain than from a dozen varieties in the same field. Your county agricultural demonstrator or agricultural college will furnish information that will help to solve the local problem.

Planting Dates, Moisture and Soil Conditions.—The time of planting corn depends upon the temperature and moisture. We may plant from the time of the last

killing frost until June. Some of our common methods of determining when to plant corn are when the leaves upon the white oak are as large as the ears of a squirrel, or when the dogwood trees begin to bloom. It is not a good plan to plant corn during a period of cold wet weather. The corn will usually produce a better crop if we wait until the soil becomes warm and mellow. It has been demonstrated that a rich sandy loam is much easier to get into condition for corn than any

FIG. 158.—Different kinds of corn.

other soil, for there is less trouble in both preparation and cultivation. Hilly soils are not adapted to growing corn, because they wash badly and are not easily cultivated.

Planting and Cultivation.—There are three common methods of planting corn. On the hilly fields, the corn should be planted flat, that is upon the level surface of the field. In dry sections corn is usually planted in a “water furrow.” Wet, flat lands are often better planted upon ridges.

Many farmers plant too deep. They forget that corn begins to germinate hurriedly and that it will be growing within a few days, if the conditions are right. From

one to two inches will insure a good stand, better germination and a better root system.

It is not profitable to plant corn too thick, even if we are sure that there will be ample moisture to mature a crop. The ears are smaller and the number of bushels will be no greater. If the weather becomes very dry, thick corn will suffer much from over-crowding. We consider about three and one half feet as the most desirable width for rows of corn. The grains in each row

FIG. 159.—Checked corn provides a means of cross cultivation.

should be at least twenty inches apart. Checking corn prevents planting too thick, if only two grains are planted in each hill, and also, the advantage of cross-cultivation may save some expense in producing the crop.

Cultivation should begin before the corn is planted, by having a well prepared, clean seed bed. Before the corn comes up, the field may be harrowed to destroy any small weeds that are starting. If the weather is dry and hot just after planting, a roller, made from a log, will crush the clods and conserve the moisture. It should be followed by a harrow to prevent the soil from

blowing. A wheel from a mower will also help for pulverizing the surface between the rows.

The first plowing with a cultivator should be as close to the plants as possible and deeper than later cultivations. During the period of growth from the appearance of the third leaf until the corn is beginning to tassel, there should be some kind of a cultivation each week. Weeds should be kept out, soil kept covered with a dust mulch, and the crust kept broken by this practice.

FIG. 160.—Corn cultivation. It is necessary to cultivate two rows at one time in such a large field.

When the stalks become large, the cultivator should be set so that it will not cut the roots near the row of corn.

Harvesting, Storing, and Marketing.—Pasturing or “hogging-off” corn has become a profitable method of caring for the corn crop. When the ears begin to mature, a small portion of the field is usually fenced with a temporary fence, and the hogs turned in. After the animals have become accustomed to a full feed, they may be allowed the range of the entire field. In order to provide a continuous supply of corn for the purpose, early varieties may be planted for an early

beginning, with later varieties to follow. This method practically eliminates the expense of harvesting the crop.

If the grain is to be used for other feeding than in the field, the corn is either snapped or husked. The snapped corn has enough of the husk to prevent the attacks of weevil and to protect the grain. Corn stored in cribs will be better if not husked.

Marketing corn is best accomplished by feeding the corn to growing livestock and driving it to market on

FIG. 161.—Marketing grain on the hoof.

the hoof. A well known authority has remarked that “the best sack for corn is a pigskin or a cowhide.” If we are selling the grain, it is well to watch the price quoted in market reports of the newspapers. The object should be to sell when the price is highest.

QUESTIONS

1. Name the varieties of corn produced in your community.
2. Find out the planting dates for corn near your school.
3. What kinds of soils produce the best corn? What was the largest yield of corn near your home last year?
4. What are the advantages of planting corn flat, in furrows, on ridges?

5. Make an outline of the steps you would follow in cultivating a field of corn during the season.

6. What do we mean by the following: a drill row, a check row, a down row, a water furrow, a dead furrow, and mulch?

7. Visit a crib of corn near the school and estimate the number of bushels in the crib. (Multiply the number of cubic feet in the crib by two-fifths.)

8. What has been the market price of corn at your town during the past year?

9. How many bushels of corn does it require to produce one hundred pounds of pork?

10. For what do we raise most of our white corn? Yellow corn?

11. Name some products made from corn.

Exercise 1

Object: To determine the percentage of shelled corn.

Materials: Ears of corn, scales, pencil, and paper.

Procedure: Estimate the shelling percentage or quality of corn by shelling ten ears; weigh the shelled grain and the cob. Then find what percentage the shelled corn is of the total weight. Try this with three varieties. Which has the more corn, shallow- or deep-grained ears?

WORDS TO BE LEARNED

Chaff. The external coverings of grains.

Checked. Planted in squares, as corn.

Conserve. To keep from loss or destruction.

Eliminate. To remove injurious substances.

Pulverize. To reduce to power.

Snapped. To break squarely, with a snap or jerk.

Water furrow. An open furrow, between ridges.

REFERENCES

"Corn Growing Under Droughty Conditions," U. S. Dept. of Agri., Farmers' Bul. 773.

"Corn Belt Farming System Which Saves Labor by Hogging-Down Crops," U. S. Dept. of Agri., Farmers' Bul. 614.

"Corn Cultivation," U. S. Dept. of Agri., Farmers' Bul. 441.

CHAPTER XVIII

THE SMALL GRAINS

Oats. An Important Crop.—More than half of the oats produced in the United States is grown in six states; Iowa, Illinois, Minnesota, North Dakota, Wisconsin, and Nebraska. The farmers of these states raise spring oats. Oklahoma and Texas are the leading oat producing states of the South.

The soils that are best adopted for corn will grow the best crop of oats. Loam and clay soils hold moisture longer and provide enough plant food to produce an abundant crop. Oats have a slightly wider range of latitude than corn. The spring varieties are very resistant to frost, being grown farther north, while the winter oats will grow well in the South. More water is required to produce a bushel of dry oats than to grow the same weight of wheat or corn. Soil that is too rich produces a very rank growth of the plant and causes falling of the grain before ripening.

Oats should not be grown under conditions very unlike those in which the seed was grown. Perhaps our winter oats are some strain of the Winter Turf or Red Rustproof varieties. Some of the Red Rustproof oats are grown as spring oats. Northern white oats and black oats are usually sown in the spring.

Rotation With Other Crops.—The greater part of the oat crop of the United States is sown upon the stubble of the corn crop of the previous season. This saves the expense of plowing. When desired, clover,

alfalfa, or grass seed may be mixed with the oats seed broadcasted. Under favorable conditions, the grass stand will be suitable for winter pasturing or hay during the next year. Some farmers have found that a mixture of oats and barley will yield almost as much as each would if planted separately.

FIG. 162a.—Treating seed oats. The necessary equipment is shown.

Preparation and Planting.—Oat land will usually yield more in the South if plowed during the fall and winter. After the middle of January, it is better to double disk the land, harrow, and broadcast or drill from February twenty-fifth to March the twenty-fifth. Winter plowed land should be left rough to avoid blowing or washing. Oats should not be covered too deeply.

Fall sown oats need an opportunity for a good growth

before frost. The last week in September or the first week in October is the best time to sow. There are many advantages in sowing oats at that time, however one may be guided by the conditions in his locality. The soil is usually in very good condition. The work does not interfere greatly with other farm work. In fact, the cotton or corn stalks may be disked and the

FIG. 162b.—Treating seed oats with the formaldehyde solution. One man is stirring the oats with the shovel while the other sprinkles.

oats broadcasted with very little extra expense. Winter oats ripen early and avoid the hot dry weather. It is very much better to sow winter oats than spring oats if they will survive the winter. From two to two and one-half bushels of oats are sown per acre. It pays to treat seed oats with formaldehyde to destroy smut. Your county agricultural demonstrator will suggest a method of using the treatment.

Harvesting.—The grain should be cut while in the hard dough stage. It is a good plan to have the oats well shocked immediately after cutting. Thrashing should not be delayed longer than necessary, but the oats should go through a sweat in the shock. This will avoid sweating or burning in the bin.

Marketing the oat crop involves about the same problems as the corn crop; the more we feed on the

FIG. 163.—Oats in the shock, showing the proper bracing and capping.

farm, the more profit each bushel will represent. Oats ground with corn provide one of the best grain feeds obtainable for raising pigs or calves. It is very important to save enough oats to feed the work horses during the working season and winter.

Wheat.—The great source of bread for Americans is wheat. The United States produces more wheat than any other country in the world. Those states from

North Dakota to Texas produce the greater part of the American wheat crop. South of central Nebraska, Iowa, and Illinois, the farmers raise what is known as winter wheat. They sow the seed in the fall and

FIG. 164.—Corn and oats provide the principal grain feed for our farm animals.

harvest the next summer. The northern section of our wheat belt grows Spring wheat. The seed is sown early in the spring and the wheat is harvested in the fall.

Varieties.—Since most of our wheat is made into flour, millers have recognized two kinds known as *hard*

and *soft* wheats. Hard wheats are more desirable for making flour for light bread. The grain has a hard glossy substance inside the coating which is usually darker in color than that of the soft wheat. The starchy

FIG. 165.—Wheat plants. Note the fibrous nature of the roots.

glutinous nature of soft wheats makes them desirable for making crackers and biscuits.

Kharkof and Turkey wheat are the most popular varieties in the Southwest. They are known as hard wheats. Farther east, red winter wheats and soft white common wheats of several varieties are grown. Many

growers of wheat have the habit of mixing several varieties, or paying very little attention to the variety at all. It is very desirable that each community growing wheat for the market should develop one variety for that community. This should be kept pure by selecting out the best heads and growing them in seed plots until enough seed is produced for a field. Within two or three years, a pure strain of seed wheat may be had that will be adapted to the community and perhaps represent the highest yielding variety.

FIG. 166.—Drilling wheat.

Soils for Wheat.—The soils for wheat are of no special type, if the moisture, fertility, and climatic conditions are favorable. Clay loam is the most common type in the wheat belt, but the grain is grown quite extensively upon soils adapted to corn. With the exception of the early part of the growing season, wheat will grow with a very light water supply. A high yield depends upon a large amount of fertility in the top layer of soil, because the roots are shallow.

Preparation and Planting.—The common practice of preparing wheat land in the semi-arid districts is to disk the field, immediately after harvesting the crop, even before the grain is shocked. This cultivation prevents the caking of the soil and forms a dust mulch to prevent the escape of moisture. As soon as the grain is threshed, the field is plowed, about five or six inches deep. If there are clods, disking again is desirable.

FIG. 167.—Wheat in the shock. The grain is protected from storms and other causes of waste.

Following rain, the field should be disked again. Sandy soils may be listed to prevent blowing and packing of the soil. The following general principle of preparing a seed bed for wheat should be observed; a firm moist underlayer of soil with a covering of loose soil should be obtained by the process of cultivation. If the wheat crop follows corn or sorghum crops, a saving in the production of the crop may be made. After the stalks are removed, disking is desirable. Then the wheat may be drilled without the extra expense of plowing.

Planting in September is usually productive of the

best results, provided chinch bugs, Hessian fly and other insects are not present to cause great damage to the young crop. Moisture is also necessary. It may be advisable to wait until the middle or the last of October to sow wheat, if the conditions are not favorable earlier.

The rate of seeding, or the amount sown per acre depends upon the climatic conditions and the fertility of the soil. From three to six pecks per acre is enough seed.

FIG. 168.—Rye prevents the washing of poor soils, provides some pasture and a supply of green manure to be turned under.

Wheat may be broadcasted or drilled. For a small field, it is perhaps as well to broadcast. Drilling insures a more even stand, covers the seeds better, provides a start that will enable the plants to withstand winter better, and permits sowing grass seed.

Winter wheat provides some valuable pasture during these months when other pastures are not available. If the ground is dry, the plants are not injured, and pasturing prevents rank growth. There is no harm done to the yield if the cattle are not kept too long on the field.

Harvesting and Marketing.—As soon as the straw has ripened so that the grain will not mold in the shock, it may be cut. Round shocks of twelve to fourteen bundles are the most convenient. These shocks should be capped, if the grain remains in the field for some time. Curing in the shock requires two or three weeks, after which the wheat is threshed.

Most wheat is marketed immediately, but it may be stored for some time without loss of weight. The low prices often paid for wheat at thrashing time should be an inducement to farmers to feed most of it on the farm. Poultry will produce greater profits with a large amount of wheat in their ration.

Rye.—Very little rye is grown in the United States for table use. In Northern Europe, there is more rye grown than any other grain; black, white and yellow varieties being produced. Recently varieties have been introduced which produce more grain than our ordinary kinds. In Michigan, Rosen rye has been introduced. Spring rye is common in the Northwest.

Soils for rye may be poorer than for any other grain crop. Light sandy soils are often sown to rye for a fall cover crop. This prevents blowing and provides organic matter to be plowed under. Rye will endure great extremes of heat and moisture.

Time and Method of Planting.—Rye is usually sown in the fall after there is sufficient moisture to maintain growth. From one to two bushels of seed per acre may be sown. The preparation and sowing is quite similar to that for wheat and oats.

Uses.—In Pennsylvania, Michigan, and New York, the crop is used largely for pasture. The grain is consumed mostly by feeding hogs. The straw is valuable for packing. It is a good plan to raise a small

field of rye, to prevent the washing of soils, to provide winter pasture for the chickens and pigs, and to furnish fertility for the soil.

Barley.—There are a number of different types of barley. The common six-rowed kind is grown in most places where barley is planted. The most successful planting is winter barley. Spring barley does better in the Northwest.

Soils adapted for growing oats and corn are suitable for barley. It should be planted from September fifteenth to October fifteenth. The rate of seeding is slightly over two bushels per acre.

For a balanced grain ration, barley excels all other grains. It has enough fat for fattening, and enough protein for growing. Ground barley is excellent hog feed. It mixes well when ground with corn or other grains.

In order to prevent shattering and to prevent disagreeable pricking by the beards, barley should be cut as green as possible to keep the grain from spoiling.

QUESTIONS

1. Name four principal small-grain crops produced in the United States, and give the uses of each.
2. Give the commercial weight of the small grain crops per bushel.
3. Which of the small grains studied are raised in your community?
4. Give the planting dates for planting small grains.
5. What are cereals, cover crops, beards, chaff, and lodging?
6. Outline the steps in harvesting and thrashing wheat.
7. Mention some methods of marketing cereals.
8. How is the land prepared in your community for sowing small grains?
9. Give the current market prices of grains.
10. Discuss the storing of small grains.

PRACTICAL WORK

Exercise 1

Object: To learn the characteristics of pure sample of grain.

Material: Samples of small grains, bottles.

Procedure: Collect as many different varieties of wheat, oats, rye, and barley as you can and put small samples in bottles for use in the class room. The grains should be selected so that a pure sample may be had of each bottle.

Try a germination test of the grain, with wet blotting paper, to see what percentage of the seed will grow.

Exercise 2

Object: To learn the kinds of small grains.

Procedure: Mix a sample of several varieties: a little oats, rye, and wheat. Now see if you can separate the different kinds. Collect the commercial products made from cereals: rolled oats, flour, crackers, bread, cake, macaroni, puffed wheat, bran, middlings, cream of wheat, and wheatena.

WORDS TO BE LEARNED

Broadcas. Scattering seed in all directions.

Caking. To form or harden into a cake or mass.

Capped. To cover the top.

Disked. Cultivation by a disk harrow.

Formaldehyde. A gaseous compound.

Glutinous. Of the nature of glue, sticky.

Inducement. State of being induced.

Listed. Plowed with a lister which turns the soil to the right and left at the same time.

Miller. One who operates a mill.

Shock. A conical pile of sheaves of grain set up in the field.

Stubble. The stumps of wheat, rye, or other grain.

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"Barley Culture in the Southern States," U. S. Dept. of Agri., Farmers' Bul. 427.

CHAPTER XIX

FORAGE CROPS

Sorghums.—In following out a crop rotation, grain and sweet sorghums are often more profitable than grasses or corn. They provide both roughage and grain for the farm animals. Most of those varieties grown in the Southwest are known as sweet sorghums. Regardless of dry or wet weather, the sorghums produce a larger number of tons of feed per acre than any other crop. If sorghum is grown for hay, it should be planted early, so that it may be cut in August. Seed broadcasted at the rate of two and one-half bushels per acre, will produce the best hay. By growing smaller stalks, they will be less difficult to cure for hay. The addition of a bushel of cowpeas or soy beans to the seeding of each acre will greatly improve the quality of the feed. If the sorghum plants are to be used for silage or for grain, it should be planted in rows and cultivated.

Sweet sorghum is often cut green and fed to hogs or cows, in addition to the grain feed.

Kafir, milo, and feterita are the grain sorghums best suited to localities where the rainfall is less than thirty inches each year. Milo is perhaps the best grain producing crop. There are three popular kinds of kafir, the Red, White and Blackhull. Feterita is a very early crop and drought resistant. This makes it an important crop for early feed. From six to eight pounds of seed are needed to plant one acre.

In raising sorghum for grain, the seed should not be

planted too thick. Plates containing small holes may be placed in corn planters for planting the seed properly. Cultivation should be shallow, creating a dust mulch.

In planting for hay forty to sixty pounds of seed may be broadcasted. In sections where the corn crops are not sure, it is advisable to put up sorghum and kafir silage. A supply of succulent feed is thus insured for the dry season and winter months.

Sorghums may be cut by a corn binder if the plants stand erect. It is important to shock the bundles as

FIG. 169.—A field of sorghum.

soon as they are cut. On account of the bending over of the heads, milo should be harvested by removing the heads with a sharp knife.

Seed of sorghums should be stored in a dry place after it is thoroughly cured. The grain absorbs moisture and will mold. Sacks containing the grain should not be piled too close together, because the grain will heat.

Broom Corn is raised extensively in Oklahoma. Other states with a soil and climate of a similar nature may produce good broom corn. Soil that will yield good

corn, or the lighter sandy soils will produce good broom corn. The dwarf variety is the most popular and valuable. It is drought resistant and produces a long well-fibered brush. The height of the stalks averages about five feet, making it convenient to pull the brush.

FIG. 170.—Products of broom corn.

The earliness and high yielding qualities of the dwarf broom corn makes it a very desirable variety.

Planting is generally completed during the month of May. Seed is sown in drills about three and one-half feet apart with stalks two feet apart in the row. Early and frequent cultivation is necessary to keep the weeds from crowding out the slow growing plants. A harrow

will serve for the first cultivations, if it is drawn lengthwise of the row.

When the broom corn is in bloom, the brush is pulled. This method secures a better grade of brush with a

FIG. 171.—A. Johnson grass. Note the runner or underground stem.
B. Sudan grass.

green color. Tall varieties must be bent over or “tabled” before pulling. Dwarf varieties do not require “tabling.”

After pulling, the brush is piled upon stalks in a thin row upon the ground. It is left until partly dried. Shading and piling in thin layers will aid greatly in securing an even drying. As soon as the brooms have partly

cured, they should be stored in a dry place, where they will not heat or mold. Discolored or brittle brushes are of an inferior grade and are not very valuable for making brooms. Seeding, grading, and baling, are profitable to secure the highest prices. Broom corn should not be grown near other sorghums, because it crosses during pollination, producing an inferior product. It

FIG. 172.—Cowpeas in the field.

is suggested that the grower of broom corn start with a small field, learning the business as it develops.

GRASSES

Sudan grass was introduced into America by the United States Department of Agriculture, and was first planted at the experiment station, at Chillicothe, Texas. Less than one-half pound of seeds was imported from Khartum, in the Sudan Region of Africa. This seed has been the source of a very valuable crop.

Sudan grass is similar to Johnson grass in general appearance, but it is an annual, growing from seed each

year. It does not have the underground root stalk like Johnson grass, which causes so much trouble. The leaves are broader and more numerous than those of Johnson grass. (Figure 171.)

Planting should be completed during the month of May. Seed should be broadcasted at the rate of sixteen to twenty-four pounds per acre. Drilling in rows three and one-half feet wide requires only three or four pounds per acre. Sudan grass does best when planted without mixing with other grass seed.

FIG. 173.—Peanuts growing in a sandy field.

Harvesting should start as soon as the first heads begin to show in the field. Cuttings may be made during the year, depending upon the season or weather conditions. The crop may be cut with a mowing machine. Cutting should be done in the morning, and the hay raked up in the afternoon. The hay cures rapidly if placed in cocks. As soon as the hay has gone through a sweat, it should be hauled to the barn and stored.

Bermuda grass is suited for grazing and permanent pastures. It will grow in waste places, and forms a

close network of roots that will enable the crop to withstand much trampling by cattle. After being pastured for a season, much hay may be cut from the meadow. Bermuda seeds may be broadcasted and covered with a roller. Roots may be chopped and scattered over a prepared seed bed and covered by disking. Another method of planting is laying off the furrows, dropping by hand the roots, and covering them with a hoe.

FIG. 174.—Threshing peanuts with a small grain thresher.

Wild Grasses are the source of a large amount of hay in many localities. It is generally more profitable to raise cultivated grasses in a system of rotation than to depend upon the crop of wild hay. Pastures should be kept free from weeds.

Johnson Grass sods may be handled profitably by disking and planting winter oats. The crop of oats will ripen and may be cut the next spring before the grass is high enough to interfere. Then one or two crops of Johnson grass hay may be harvested before the fall seeding with oats.

LEGUMES

Those plants which bear seed in pods and have nodules upon their roots for gathering nitrogen are called legumes. Beans, peas, clover, and peanuts belong to this group.

Cowpeas should be grown on every southern farm. They not only provide a supply of food for animals but also for man. Soil is greatly enriched with the nitrogen gathered by the plants, by plowing under the crop, and pasturing with hogs and cattle. (Figure 172.) Whip-poorwill and New Era varieties are the best cowpeas for general planting. Hay may be made from such varieties as the Red Ripper, Iron, and Clay. The Speckled Crowder and Blackeyed varieties are the best for raising seed.

During April, May or June, cowpeas may be planted. Broadcasting, planting in the row or mixing with corn are common methods followed. Broadcasted seed requires about two bushels per acre, while drilling requires about one and one-half bushels per acre.

Harvesting is often accomplished by plowing out the vines, curing in wind rows, and storing in the barn where there is plenty of air. When the earliest pods begin to ripen the cowpeas may be mowed. They are left during the day and bunched until dry. Hogs and cattle will harvest the crop better than it can be done by any other method, after enough seed has been saved for home use.

Soy Beans are valuable as a forage crop, being rich in protein. The Mammoth Yellow and the Small Yellow are the most profitable varieties. They are planted in rows and are more carefully cultivated than cowpeas. The treatment of the hay and seed of the two crops is about the same.

Peanuts are well adapted to the Southwest, especially to the lighter sandy loam soils. Droughts or failures

FIG. 175.—Alfalfa haying scenes. The small haycocks are being protected from rain by the canvases.

of other crops have influenced farmers to cultivate peanuts very extensively. The nuts may be marketed, and the hay is very desirable for feeding hogs and cattle.

The Virginia Bunch, the Virginia Runner, Spanish and the Tennessee Red are among the most popular varieties.

Peanuts are planted either whole or shelled. The larger varieties will give a better stand if shelled, because so many pods do not contain good seeds. The last half of the month of April is the most common time for planting. The rows are three feet apart, and the peanuts are spaced at a distance of about one foot in the row, covered to a depth of one inch and a half. One peck of shelled peanuts, or one and one-fourth bushels of pod peanuts will plant one acre.

Cultivation is similar to that for corn or beans. After the pods begin to form, the vines should not be disturbed.

Harvesting is best accomplished by cutting the vines for hay and turning the hogs in to eat the nuts. A plow or potato digger will loosen the vines from the soil. After they have begun to cure, the vines may be piled for drying. The peanuts are then placed in cocks. A long pole is driven into the ground, with two cross pieces to hold up the vines, which are then stacked about the pole. The shock is capped with hay. The best grades of nuts are picked by hand. Spanish peanuts are threshed with a machine. The hay is baled for feeding.

Alfalfa. The reason why more people do not grow alfalfa is not because it lacks in value as a forage crop, but because it is different from those plants which they have been growing. It may be grown in well drained soils where there is plenty of lime and fertility. The creek and river bottoms are the best adapted for alfalfa.

The soil should be well pulverized, free from trash, and rubbish. If possible it should be plowed some time

before planting. A field where cowpeas have been grown will make a more satisfactory seed bed than one where weeds have started. Plowing for fall seeding should be done in the spring or early summer, being kept clean by harrowing.

Alfalfa seed is usually broadcasted, but a drill made for the purpose will insure a more even stand. The seed should not be covered too deeply. The amount of seed per acre varies with the conditions under which it is planted. From eight to twenty-five pounds per acre may be used. Fall planting is usually completed during the early part of September. It is best because the weeds do not interfere with the growth, and the soil is in better condition. If alfalfa is planted in the spring, it should be sown in the latter part of March to April the tenth.

If alfalfa has not been grown upon the land it is well to haul a few loads of earth from a field where a good crop has been grown and broadcast it over the field. This serves to inoculate the soil with certain bacteria which are necessary for the growth of nodules upon the roots. These bacteria may be secured in small cans from seed houses for treating the seed at the time of sowing.

The hay is cut just as the crop is coming into bloom. It is best to cut in the morning, leaving the hay until the following day, raking it into windrows. The hay is left in the row from two to four days, after which it may be stacked or baled.

Most varieties of alfalfa are adapted to the South. The drier land seems to prefer the Turkestan, Grimm's or dry land varieties.

It is often suggested that alfalfa should not be pastured until the second season, giving the plants a chance to become well rooted. Cattle bloat if they eat green alfalfa when it is wet. Hogs do better with some corn or alfalfa.

Clovers.—Alsike, bur, crimson, melilotus, lespedeza, and white clovers are grown in various localities with some success. The first two are used mostly for pastures on low lands. Crimson clover matures early, making hay before other crops develop. It improves the soil and furnishes pasture. Melilotus is generally known as sweet clover. It is similar to alfalfa, but will grow upon poorer soils. A mixture with Johnson grass will produce an excellent crop. Lespedeza grows wild in many portions of the South. It is almost as valuable as alfalfa for hay and for grazing. White clover is well suited for lawns and pastures. It is the best bee pasture obtainable.

Vetch.—Vetch will grow where other legumes are grown. The winter vetch remains green all winter. The root system is extensive, enriching the soil. The pasture and hay are of much value. Oats and vetch should be sown in the month of September. One fourth as much vetch as oats is usually sown.

QUESTIONS

1. What is a forage crop? Prepare a list of six familiar forage crops in your community. For what purpose is each used?
2. Give several reasons for planting forage crops in the spring. In the fall.
3. Name three important grasses used for forage. Give several facts about each.
4. Name four grain sorghums.
5. Mention three ways of sodding land with Bermuda.
6. What is the best method of handling land infested with Johnson grass?
7. What is a legume? Name four legume crops produced in the South. Which variety is best adapted to your community?
8. Give three important reasons why legumes are considered such valuable crops.
9. State three ways of growing cowpeas on a farm. Name three varieties of peas and peanuts.
10. How is hay handled on the farm?

11. When should alfalfa be used for pasture? .
12. How is alfalfa soil inoculated?
13. What clover makes the best pasture for bees?
14. What forage crops are best for grass and lawns?

PRACTICAL WORK

Exercise 1

Object: To collect and study seeds of forage crops.

Materials: Collect samples of seeds mentioned in this chapter. Examine them for impurities. Do you find any weed seeds present? Count out one hundred seeds of each forage crop, and estimate the number of seeds that do not belong to the kind you are studying. Estimate the percentage of impurities. Plant some broom corn, kafir, Sudan grass, soy beans, or cowpeas in your garden and see how they grow. Raise two different kinds of peanuts to find out which is better.

WORDS TO BE LEARNED

Cocks. A small conical pile of hay.

Forage. Rough feed for animals, such as hay, straw.

Furrow. A trench made by a plow.

Grain. Sorghum, a cereal grass raised for grain and fodder.

Inoculate. To introduce bacteria by inoculation.

Leguminous. Belonging to a large family of legume bearing plants.

Permanent. Continuing in the same state, fixed.

Plates. A flat thin piece of metal of uniform thickness and containing small holes.

Sweet Sorghum. A variety of cereal grass used for making syrup and forage.

Windrows. A row of hay raked up to dry before being heaped into cocks.

REFERENCES

The following bulletins may be secured from the United States Department of Agriculture:

"Cowpea Utilization," Bul. 1153.

"The Making and Feeding of Silage," Bul. 578.

"Bermuda Grass," Bul. 814.

"Market Hay," Bul. 508.

"The Peanut," Bul. 431.

"Sudan Grass," Bul. 605.

"Use of Corn, Kafir, and Cowpeas in the Home," Bul. 559.

"Sweet Clover, Growing the Crop," Bul. 707.

"Alfalfa," Bul. 339.

"Soy Beans," Bul. 372.

CHAPTER XX

COTTON

The World's Best Fiber.—Cotton may well be called “king of the fiber crops.” In quantity of production it ranks first as the world's textile fiber. It is a staple crop that has supplied man with clothing for many ages. Its seed, stalks, and roots are now being converted into feed, food for the table, fertilizer, paper stock, and medicine. While a number of countries are engaged in cotton production, three-fourths of the world's crop is produced in the Southern states with an area of about one-fourth of that of the United States. Cotton growing is well adapted to the moist, warm, even climate, and soils of the South. These conditions, together with farmers trained in the art of cotton growing and backed by cheap labor, lead one to believe that cotton will remain the chief money crop of the southern farmer.

Types of Cotton.—We have two principal types of cotton in the United States known as Upland and Sea Island Cotton. The upland is classified into what is known as short and long staple cotton. The short staple varieties produce lint that ranges in length from $\frac{3}{4}$ to $1\frac{3}{16}$ inches. The long staple varieties produce lint of a better grade that ranges from $1\frac{1}{4}$ to $1\frac{1}{2}$ inches in length. The short staple varieties may be grown successfully on many kinds of soils varying from the thin light sandy soils to the heavier loams. The long staple varieties are more profitable when grown on bottom lands and very

fertile, moist, loam soils. The short and long staple upland cotton makes up the bulk of the cotton crop.

Sea Island cotton is grown in small areas along the South Atlantic and Gulf Coast. It differs from the upland cotton in that the seed is small and black and the lint is fine, strong, and silky, varying from $1\frac{1}{2}$ to 2 inches in length. Owing to its low yields and special environment Sea Island cotton is not grown extensively.

FIG. 176.—Removing stalks from cotton field and fall plowing.

The Leading Cotton States.—The principal cotton producing states are: Texas, Georgia, Alabama, South Carolina, Mississippi, Oklahoma, Arkansas, North Carolina, Louisiana, Tennessee, and Florida.

Sea Island cotton is grown in Florida, Georgia, and South Carolina. Cotton requires six months of warm weather for growth and maturity and for this reason its production will be restricted to warm climates.

Varieties of Cotton.—We have many varieties of Upland cotton grown in the United States. In many ways they are similar in type of stalk and character of lint. The difference is the result of selection, breeding,

and environment. Considerable experimental work and practical tests have been carried on in the South to determine the best varieties of cotton to grow. Therefore, before selecting a variety to plant in your locality, it will be well to find out from successful cotton growers and your state Agricultural College the names of varieties that are best suited to your climate and soil. If the farmers of your section produce the same variety of

FIG. 177.—Cotton planting scene.

cotton, they will be able to market a grade of standard lint and seed. This will insure a better market for their crop. The Acala, Mebane, Rowden, Lone Star, Okla. Triumph No. 44, Cook's Improved and Texas Storm Proof are some of our most familiar varieties of cotton.

Soils for Cotton.—Cotton is grown on many types of soils throughout the South. The best soil for this crop is a deep, fertile, sandy loam. A soil of this type is easily tilled, holds the moisture well, and supplies sufficient plant food to produce a paying crop. Soils that are very thin and wash badly should not be planted to cotton.

In selecting land for planting cotton it is best not to choose soils that have been growing cotton for more than two years. Cotton produces well when it follows such crops as oats, wheat, cowpeas, peanuts, corn, kafir, and other grain sorghums.

Preparation of Soils and Methods of Planting Cotton.—If the soil has been planted to cotton the preceding year, it will be necessary to cut up the stalks with a stalk cutter so they may be turned under, or gather and burn them to control the boll weevil. After disposing of

FIG. 178.—Cultivating cotton with a tractor, two rows at one time.

the stalks it is a good plan to break the land in the fall. If the breaking is done early the land will collect moisture, the organic matter plowed under will have time to decay, and considerable plant food will be made ready for the young cotton when it is planted. Fall plowing also turns up many insects that are hibernating in the ground and exposes them to the severe weather. In many areas where cotton is grown, the plowing is done in February and March. This enables one to grow a cover crop such as winter oats or rye. If the land is plowed at this time it will be well to "flat-break" the

land to a depth of six or eight inches. After breaking thoroughly disk and harrow with a section harrow. This puts the seed bed in good condition for the crop.

The two methods of planting cotton are known to practical farmers as planting on beds and planting on level. The beds are prepared by throwing two furrow-slices together, known as a "list." The middles are then "burst" out, which leaves beds that are several inches high and from three and one-half to five feet wide. Many

FIG. 180.—Picking cotton in Texas.

farmers plant on the list and plow out the middles of the rows later. In planting level the seeds are planted in a shallow furrow made by opening the level seed bed with a bull-tongue plow. The furrows should be about three and one-half feet apart.

The planting on beds is preferred when the soil needs drainage or washes badly. Level planting is best where the rainfall is limited and the land is level or slightly rolling. As a general rule crops that are grown on level land are more easily and economically grown than on ridged land.

Time and Planting.—Most of our cotton is planted from April 15 to May 15. In states where the last killing

FIG. 181.—Wagons loaded with cotton at the gin. Above, the cotton is just being weighed as it arrives from the field. Below, the bale is being loaded into the farmer's wagon, ready to be sold.

frost appears before March 15 the cotton may be planted early. If the seed is good, from one-half to one bushel will be required to plant one acre, if planted with a cotton

planter. Slightly more will be needed if planted by hand. In planting cotton seed one should avoid planting too deep and too thick. Shallow and thin planting gives better results.

Thinning Young Cotton.—Cotton chopping or thinning may begin as soon as the young seedlings show from two to four leaves. In some sections the dirt is

FIG. 182.—Picking out seed.

thrown from the row known as “barring off” and the plants thinned out from 12 to 20 inches apart in the row with a hoe. In other districts the surface of the ground is scraped near the plants and the loose soil and grass rolled to the middles with a small implement made for the purpose; while in other sections of the South the cotton is plowed with cultivators before chopping. In thinning, leave from one to two strong plants in a hill, and exercise care not to bruise them in carrying on the

work. If the land is thin, it is best to leave only one stalk to the hill, every 18 to 20 inches apart. This will give sufficient moisture and plant food to grow a good plant.

Cultivation.—The kind of cultivation necessary for cotton will depend on the way it is planted. If it is planted in rows, it may be cultivated with walking or riding cultivators. Where the area is large, it is more profitable to use a two-row riding cultivator. While in

FIG. 183.—Marketing cotton.

many hilly sections the cultivation is done by means of a “Georgia stock” with “sweep” attachments. The purpose of cultivation is to keep down weeds and keep the soil finely pulverized so as to mulch the land to prevent the escape of soil water. The proper depth of cultivation is from $1\frac{1}{2}$ to 3 inches. The crop should be plowed every ten days. Good results are obtained when cotton is plowed as soon as possible after each rain.

Manures and Fertilizers for Cotton.—The chief sources of manure and fertilizers for the cotton crop are barnyard manures, green crops, and commercial ferti-

lizers. Natural and green manures are probably the cheapest and the most practical for the average farmer. Experiments show that in some sections of the South good results and considerable profit has been obtained by applying from 300 to 600 pounds of properly mixed commercial fertilizer to the acre. Where commercial fer-

FIG. 184.—Unloading seed at the oil mill. Most farmers sell the seed removed from the cotton at the gin. It is scooped into a trough at the oil mill and carried to the storeroom by a conveyor.

tilizers are used, one application is drilled in at planting time and another about the time the bolls are being formed on the plant.

Insect Pests of Cotton.—The Mexican boll-weevil is the most serious enemy of the cotton crop of the United States. This insect probably originated in Mexico or Central America and entered the United States at Brownsville, Texas. Owing to its rapid spread and destructive nature, it attracted government officials in 1894,

which led to experimental work. Headquarters are maintained at Victoria, Texas; Dallas, Texas; and Tallulah, Louisiana, to study the life, history, habits, and methods of controlling the pest under actual farm conditions. The following preventive measures are recommended by Agricultural workers and should be followed by active farmers in controlling the boll weevil:

1. Collect and burn all cotton stalks and other rubbish where the boll weevil may hibernate during the winter.
2. Practice fall plowing.
3. Select good seed and plant early maturing varieties.
4. Plant the cotton as early as possible but try to avoid killing frost. Plant in rows wide enough to permit late cultivation.
5. Practice crop rotation so that cotton will not follow cotton.
6. Use fertilizer to hasten the growth and fruiting of the crop.
7. Cultivate timely and thoroughly.
8. Get your seed from areas free from the boll weevil.

Poisoning the boll weevil with dry calcium arsenate is very effective and economical in areas where we have sufficient moisture in the form of dew to collect and dissolve the calcium arsenate powder. Where it is not practical to use calcium arsenate many farmers are applying commercial spray mixtures and mixtures of their own make with fair results.

Another familiar cotton pest is the boll worm. This insect may best be controlled by planting rows of corn through the cotton field at distances so as to attract the insect when it makes its appearance.

Cotton Diseases.—Cotton is subject to several fungous diseases such as, boll rot, cotton wilt, and cotton rust. The best method of handling these diseases is to

select resistant varieties, rotate the crop, fertilize the land, and practice timely and thorough cultivation.

Harvesting Cotton.—Cotton should be picked as soon as possible after opening so as to prevent the lint from becoming stained and injured by the weather conditions. In many sections picking may begin as early as August and last as late as December. The customary plan is to hire hands to pick the cotton, paying them so much a hundred pounds. The price varies according to the conditions. The cotton is weighed in the field and loaded and hauled to storage sheds or to the gin.

Ginning and Baling Cotton.—Farmers generally haul their cotton to the gin as soon as they have picked from 1400–1700 pounds of seed cotton. This makes a standard bale of 500 pounds of ginned cotton. The cotton is removed from the wagon at the gin by suction. It is then cleaned and conveyed to the gin saws where the seed is separated from the lint. The lint is then carried to the press and made into a bale; 27 x 54 x 45 inches including bagging and ties. The bale is then weighed and properly marked and turned over to the owner. The seed is weighed and conveyed to the seed house if it is sold to the gin company. If not, it is loaded and carried away by the owner.

Seed for Planting.—If one has a good variety of purebred cotton it is necessary to take special care not to get the seed mixed with other varieties. Foreign seeds get mixed with pure seed when the cotton is ginned. This is due to the fact that about one bushel of seed remains in the gin machinery at all times. If your bale of cotton is ginned following a bale of poor staple cotton, you will likely get some of the seed mixed with your seed and seed from your bale will take their place. This gives you the correct weight of seed but it is not all from your

bale. If you should have several bales of cotton to gin and wish to save the seed for planting purposes, it is best to have it ginned late in the season when the rush is over and the ginner finds time to rid all the machinery of undesirable seed. A better plan is to separate the seed from the lint by hand, if the acreage to be planted next year is small.

Marketing Cotton.—It is not profitable to market cotton in the seed because the buyers are unable to judge what class of cotton it will make after ginning. As a result, the price paid is about the same for all grades because the buyers are not running a risk and protect themselves. The farmer who raises a good grade of cotton loses money by selling it in the seed.

The bulk of the cotton crop is sold after it is ginned. This enables the farmer who raises the better grades of lint to sell his product at a fair price. He also may study market quotations and grades of cotton in the daily papers, and grade his cotton in order to protect himself.

In recent years the cotton growers of the South are marketing their crop cooperatively. This insures a good market, careful grading, and uniform prices to the grower.

The principal grades of cotton are: Middling Fair, Strict Good Middling, Good Middling, Strict Middling, Middling, Low Middling, Strict Low Middling, Good Ordinary, and Ordinary.

Marketing Cotton Seed.—The cotton seed in most localities is sold to the oil mills. The mills separate the seed into hulls, cottonseed meal, cottonseed oil, linters, trash, and dirt.

QUESTIONS

1. State five uses of cotton. Name the two types of cotton. Also tell how they differ.

2. What are the leading cotton producing states?
3. Name six varieties of cotton. Which is best adapted to your section? Why should the farmers of your section raise the same kind of cotton?
4. What kind of soil and climate is best suited for cotton?
5. Tell how to prepare soil for cotton. Give four advantages of fall plowing.
6. Explain two methods of planting cotton. Also state the proper time to plant cotton seed and the amount to plant to the acre.
7. How should the cotton be thinned?
8. Tell how to cultivate cotton.
9. Name the three classes of farm manures and fertilizers. Also give examples of each.
10. When did the boll weevil enter the United States? What is the government doing to eradicate the pest?
11. What preventive measures should the farmer follow in controlling the boll weevil?
12. Why should cotton be harvested as soon as it opens?
13. Give the standard weight and dimensions of a bale of cotton as it leaves the gin.
14. Tell how farmers may keep their seed pure.
15. Why is it not profitable to market cotton in the seed?
16. Tell how lint cotton and cottonseed are marketed.

PRACTICAL WORK

Exercise 1

Object: To study samples of ginned cotton, cottonseed, and the by-products of cottonseed.

Material: Sample of cotton, cottonseed meal, cottonseed hulls, cottonseed oil, and linter.

Procedure: Examine four or five samples of ginned cotton for stain, dirt, trash, and length of the fiber. Compare the color and size of the different samples of cottonseed. Describe the by-products of cottonseed. Find out the uses of each. Test samples of cottonseed for vitality by using the "rag doll" seed tester. How long does it take cottonseed to germinate?

Results: Write out a report of your study of cotton, cottonseed, and the by-products of cottonseed.

Exercise 2

Object: To learn how cotton is ginned.

Material: Notebook, pencil, and a cotton gin.

Procedure: Secure permission from your parents to visit a cotton gin with your teacher.

1. Give the name and location of the gin.
2. What kind of gin do you have in your section?
3. During what part of the year does the gin operate?
4. How is the cotton weighed before it is ginned?
5. How many pounds of seed cotton does it take to make a bale of lint cotton?
6. How is the lint removed from the seed?
7. Tell how the lint is baled.
8. How is the bale covered and tied?
9. How many ties are placed on one bale?
10. How are the bales of cotton marked at the gin?
11. Explain the cost charged for ginning.
12. Where does the farmer get the seed from his cotton after ginning?

WORDS TO BE LEARNED

Calcium Arsenate. A poisonous chemical used for killing boll-weevil.

"Flat-breaking." Plowing the land so the surface will remain flat.

Fungous. The objective of the noun fungi. A parasitic plant, such as mold and mildew.

Lint. Fluff or cotton fibers that are removed from the cotton-seed at the gin.

Staple. The general fiber of wool or cotton.

Textile. Pertaining to weaving or woven fabric.

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"Losses from Selling Cotton in the Seed," Farmers' Bul. 775.

"Cotton-ginning Information for Farmers," Farmers' Bul. 764.

"How Insects Affect the Cotton Crop and Means of Combating Them," Farmers' Bul. 890.

BOOKS

"Productive Farm Crops," Montgomery-Lippincott Company.

CHAPTER XXI

SWEET POTATOES

For Food and Feed.—Sweet potatoes are grown extensively in the South where they are used as an important article of food. Farmers and gardeners in this section plant small patches varying from one-fourth to one acre in size for home use. Some truckers grow large areas to be shipped and marketed in the northern states.

Sweet potatoes are gaining in popularity since they may be served in many delicious ways, such as baked, in pies, puddings, candied, and fried. The cull and surplus potatoes may be used as feed for livestock on the farm and the manufacture of denatured alcohol.

Climate and Soil Requirements.—The sweet potato requires a growing season of four and one-half to five months. The climate should be warm, free from frost, with sufficient rainfall to promote growth. If we have excess rainfall after the vines have covered the rows or land and the plants are making their fruit, we have too much vine growth which results in low yields of potatoes of a very poor quality.

Sweet potatoes may be grown on many types of soil with reasonable success. They do best on sandy loam soils having a fair amount of organic matter and plant food, with a clay subsoil. Poorly drained soils or the heavy clay soils are not adapted to sweet potatoes.

Soil Preparation.—This crop like many others does best when grown in a crop rotation. If the land selected

for the crop has been planted in corn and peas the preceding year it should be plowed deep in the fall, in order to bury and hasten the decay of the organic matter present. Further plowing will not be necessary until a few weeks before the time for setting out the potato "sets" or "slips." Undesirable vegetation may be kept down by harrowing the land with a section harrow or disking it

FIG. 185.—A small field of sweet potatoes well cultivated.

from time to time. In the extreme southern section of the United States where climate and soil permit other truck crops may be grown on the land and followed by potatoes.

Varieties of Sweet Potatoes.—Many varieties of sweet potatoes are grown in the South and one should study the varieties that have been tried and proven successful in his locality before selecting a variety to grow. The northern market demands a dry mealy potato while

the southern consumer prefers a moist-fleshed potato. Some of the most adaptable varieties for the potato growing region are: Porto Rico, Nancy Hall, Dooley Yam, Pumpkin Yam, Bradley Yam, and Georgia Yam.

Seed Potatoes.—The potato grower may raise his own seed or buy them from his neighbor. Whatever the source of the seed may be, they should be selected at digging time and stored properly for the best results. The

FIG. 186.—Boys setting sweet potato plants.

seed should be from one and one half inches to three inches in diameter, uniform in size and color, free from cuts and bruises, and rot diseases. The best plan is to put the seed in potato baskets or hampers and store them in a potato house, cellar, or banks where they will not rot or freeze.

Source of Sets.—Many farmers prefer to raise their own potato sets while others had rather buy them. If the sets are to be grown at home a hotbed should be prepared (see Fig. 104) some time between February 20th and March 20th depending on climatic conditions. After the hotbed has been prepared and has reached a uniform

heat of 80 degrees F. the seed potatoes may be bedded out. The soil layer over the manure in the hotbed should be composed of sandy loam soil that has been screened. The potatoes are placed carefully in the bed so that they will not touch one another. They are then covered with three inches of loam soil that has been screened for the purpose. The bed is then slightly moistened and the glass or canvas covers placed on. On clear warm days the covers over the bed should be removed and the sets

FIG. 187.—Cutting sweet potato vines with a rolling cutter before digging.

aired and watered. If this work is carefully done, the sets should be ready for transplanting into the open field between April 15th and May 1st. The grower should bed out from 1 1-2 to 3 bushels of seed potatoes to produce enough sets to plant one acre of land. Many growers in the South plant out a small patch of sets and make cuttings or slips from the vines and set the remainder of their soil.

Laying Out Soil for Planting.—As soon as all danger of frost is over and the sets on the potato bed are large

enough for planting, the land should be freshly stirred to receive the sets. If the sets and slips are to be planted on flat land the rows should be laid off about thirty inches apart. In case they are planted in bedded rows, the rows should be prepared with a turning plow and thrown up several inches high. The distance between each row should be from 3 1-2 to 4 feet.

Drawing and Setting Sets.—The best time to plant sweet potato sets is just before or after a good rain. Be-

FIG. 188.—The sweet potatoes are turned out with a plow, and the boys sort them as they put them into baskets.

fore removing the sets from the bed, the bed should be watered thoroughly several hours before drawing the sets. In drawing the sets it is best to press down on the potato with the left hand and remove the sets having four or five leaves with the right hand. The sets are then tied in bunches of 100 and placed in the shade to prevent wilting. During dry weather it is a good plan to puddle the sets and slips before setting them. This is done by taking clay and a little decomposed manure and mixing

them with water forming a "mud dough." The roots of the sets are then placed in the mud mixture to receive a coating of the material.

Sweet potato sets are planted by hand and with a machine. If the area to be planted is small they are planted by hand. In planting, the sets are dropped about 14 to 18 inches apart in the row and are planted by opening a small hole in the bed with the hand and placing the set in the excavation and firming the dirt about the roots of

FIG. 189.—Packing and marketing sweet potatoes. The farmers bring in their crop in wagons. They are packed in standard baskets and shipped in carloads.

it with the fingers. Many growers drop the sets and push them into the soil with a stick having a notch or fork in the end. The soil is then tamped about the plant. If the weather is dry at planting time, it is a good plan to make openings in the rows where the plants are to be dropped. The set is placed in the opening, watered and some dry dirt is placed over the moist soil. Where large areas of potatoes are grown, they are planted by a horse drawn machine that drops, waters, and sets the slips.

Cultivation.—Sweet potatoes should be given timely and thorough cultivation. They may be hoed several

times during the period of growth to mulch them close up to the plants and free the land of grass and other harmful weeds. The cultivation should be shallow with some horse drawn implement such as harrows and cultivators. In turning the vines for plowing, exercise care not to bruise them.

Insect Pests and Diseases of Sweet Potatoes.—Cutworms are probably the most troublesome insect pest

FIG. 190.—Storing sweet potatoes. Corn stalks are placed over and under the pile. They are then covered with earth.

of the potato plant. They cut down the young sets as soon as they are transplanted into the open ground, which results in a poor stand. If the sweet potato crop follows a clean cultured crop they are not so harmful. Avoid planting sweet potatoes on sod land.

The sweet potato is also subject to several kinds of rots known as black-rot, stem-rot, soft-rot, and dry-rot. The best method of controlling these rots is to rotate the crop, select seed and plants that are free from the disease,

and fumigate the storage quarters with formalin or sulphur.

Time and Method of Harvesting.—Potatoes should be harvested before the first killing frost. If the vines are killed by frost, they should be removed from the potatoes, to make ready for digging.

Practical farmers often cut the vines from the potato by running a roller cutter on either side of the row on top of the bed. The potatoes are then plowed out with a turning plow or a plow similar to the turning plow with a section of the moldboard removed. As soon as they are plowed up they are picked up and piled in small piles in the field where they are left for several hours to dry out.

Grading and Hauling Sweet Potatoes from the Field.—Before removing the potatoes from the field they should be culled or graded into the following grades: baking potatoes, canning potatoes, seed potatoes, cuts and bruises, diseased potatoes, and small strings. This enables the producer to pick up all the potatoes of a given class at the same time.

Marketing.—If the potatoes are selling for a good price one may find it profitable to dig the crop before maturity and market it. The most common method of handling the crop in this case is to dig the potatoes and place them in barrels or hampers in the field and load them in wagons and haul them to market. Others prefer storing and marketing the crop later in the winter when prices are good.

Curing and Storing Sweet Potatoes.—If the farmer is growing potatoes only for his home use he will find it economical and practical to place first the potatoes in thin piles and allow them to dry for five or six days in

the sun. They may then be stored in hampers or in bulk in a potato house, cellar, or potato banks.

QUESTIONS

1. Give five uses of the sweet potato.
2. How long should the growing season be for sweet potatoes? What kind of soil is best for this crop?
3. How should soil be prepared for sweet potatoes?
4. Name five varieties of sweet potatoes. What is the most popular variety in your district?
5. What are the sources of seed potatoes? How do seed sweet potatoes differ from eating potatoes?
6. What is the source of sweet potato sets and slips in your section?
7. Tell how to prepare a hotbed for growing sweet potatoes.
8. State three important facts to be considered in drawing sets from the potato bed.
9. When is the proper time to set sweet potato plants in the open field? How many sets does it take to set one acre of land?
10. Tell how the slips may be planted in the field.
11. State five problems to be considered in harvesting and marketing sweet potatoes.
12. Describe a good potato house, cellar or bank.
13. Name the most successful sweet potato growers in your district.
14. How many pounds does a bushel of sweet potatoes weigh?
15. Name ten of the principal sweet potato producing states.

PRACTICAL WORK

Exercise 1

Object: To learn about sweet potatoes.

Material: Secure several varieties of sweet potatoes and study them in the school room.

Procedure: Learn the best size potatoes for baking and canning purposes.

2. Place a sweet potato in the mouth of a large-mouth bottle where it will be partly submerged in the water. See how the sets form.

3. Prepare a small hotbed on the school grounds and grow

sweet potato sets. Home project work in producing potato sets for the home garden should be encouraged.

4. Bake some of the moist-fleshed and dry, mealy varieties of sweet potatoes and test them by eating them.

5. Cure potatoes in the sun and cook them. Obtain newly-dug potatoes and cook them. Make a comparison in several ways.

REFERENCES

- "Vegetable Gardening," Watts-Orange Judd Co.
Farmers' Bulletins, "Home Storage of Vegetables," 879.
"Sweet Potato Growing," 999.

WORDS TO BE LEARNED

Climatic. Of or pertaining to climate.

Canvas. A strong cloth used for many things.

Denature. To render unfit for eating or drinking without impairing usefulness for other purposes.

Excavation. A hollow formed by digging out the earth.

Screened. To sift, as dirt or gravel, through a screen.

CHAPTER XXII

FAMILIAR FARM ENEMIES

What Kinds of Enemies Have We?—If there were no weeds growing in our field, if there were no molds or rots to destroy our plants, if there were no destructive insects or bacteria, farming would certainly be a very desirable occupation. We would need only to sow and reap. Unfortunately, all of the plants and animals which we raise upon the farm have either visible or invisible enemies. Crops growing in the field may be completely destroyed by the attack of insects. Molds, blights and wilts may destroy our garden and fruit crops. Cotton boll weevil is one of the many enemies of our great southern crop. Corn smut and wheat rusts have caused great losses. Weeds of all kinds crowd out our more valuable food plants. Rats and mice destroy enormous amounts of grain each year. Very few of our useful cultivated plants can be mentioned, which do not have some enemy in the form of an insect, animal or plant. Many of these are not visible and a careful study must be made to gain even a limited knowledge of so many enemies.

Weeds are those plants which grow where they are not wanted. Johnson grass might become a valuable plant for hay, but it has a habit of living for several years in the soil, crowding out other useful plants. Dog fennel was once cultivated as a medicinal plant, but it is now generally considered a weed. Foxtail and crab grasses have been grown in England for centuries as forage grasses. They never fail to harm the corn crop that

has not been thoroughly cultivated. Cockleburrs grow on almost all kinds of soil. The burs are very well adapted to sticking to animals, causing much inconvenience. Ragweeds are found everywhere, and they have such a disagreeable odor and taste that animals seldom eat them. All of these weeds and a multitude of others may be found in every community.

Dodder.—Certain weeds obtain their food directly from the plant which we are trying to grow. They twine

FIG. 191.—A. Crab grass. B. Cocklebur. C. Ragweed. D. Johnson grass. E. Pigweed.

around the stems of the plant, fastening themselves with little suckers and secure their food from the host plant. Dodder or “love vine” is the most common plant of this type. It is usually found on peas, beans and other leguminous crops. You may recognize it as a yellow, threadlike growth about the stems. Large amounts produce orange colored patches in fields.

Fungus.—Fungus is the name applied to a great group of low plant forms which do not have the green coloring

matter found in plants with leaves. (The plural is Fungi.) Toadstools, puff balls and mushrooms are well known types of fleshy fungi. We find them growing where there is a supply of organic food, such as may be

FIG. 192.—Dodder wraps about any kind of plant, taking nourishment from the stems.

found on old logs, decayed leaf material in the woods, or near stumps and piles of straw.

Another type of fungus includes the molds and mildews. You may recognize these as the mold on bread, moldy ears of corn, and moldy hay or straw. The rots

are usually caused by fungi which cannot be seen unless they are highly magnified. The brown rots of peaches and plums, as well as the rots of many vegetables are caused by fungi.

Wilts and blights do much damage to our crops. Cotton wilt has caused a loss of more than \$30,000,000.00 in

FIG. 193.—Fleshy fungi.

A. Bracket fungus.
B. Toad stool.
C. Sponge mushroom (edible).
D. Leathercup.

E. Puffball.
F. Staghorn fungus.
G. White rot fungus.

one year, in the United States. The fungus grows into the roots and causes them to decay. The result is the wilting of the cotton plant. Pear and apple trees are "blighted" by the attacks of bacteria in the tender stems. They are recognized by the black leaves and stems during the month of May or June. Cucumbers and watermelons wilt as a result of the fungi which grow upon them.

A

B

FIG. 194.—Diseases of wheat.
A. Smut blasted heads. B. Rust upon wheat stems.

Smuts and Rusts are the result of fungi which grow upon grains and grasses. The large balls of smut which grow upon corn stalks are the sacks containing the spores of the fungus. They become dry in July or August and the black powder is scattered when the puffs are struck. Oats and wheat have a smut which causes the blackheads noticeable at the time of heading. These heads are often called blasted. As much as ten per cent of the crop may

FIG. 195.—Stages of boll weevil.

be destroyed by this form of fungus. The very fine threads grow inside the stalks until the grain begins to head, and the black spores in the form of powder are produced. Rusts are usually found during a hot rainy season, in the form of little red pockets on the surface of wheat or oat leaves. These may be so thick that the red dust rises in clouds when the grain is cut, or the clothes will become covered when walking through a field infected with rust. The grain of rusted plants shrivels, and

entire wheat fields have been rendered worthless by severe attacks.

Galls and Knots are caused by fungi or bacteria in the woody parts of trees or shrubs. The infection is made possible through injuries. Black knot is a common disease of plum trees. These knots often grow so thickly that branches of the plum are killed. Galls are found upon the rose. Many young trees have a root gall, and a crown gall is a common disease of apple trees.

FIG. 196.—The effects of plant lice upon corn. Ants carry the lice and place them upon the young corn roots and care for them while they rob the corn plant. The larger corn in the background is not infected.

A large number of fungi grow upon wood after it has been made into lumber or posts. The white rot attacking railroad ties and fence posts causes rapid decay. There are many rots and cankers of trees which are caused by fungi.

A list of plants and diseases often attacking them, follows:

Alfalfa, leaf spot, root gall, root rot.

Apple, black rot, blight, canker, brown and pink rots, scab and mildew.

Apricot, black knot, crown gall, scab.

Barley, rust and smut.

Blackberry, caneblight, crown gall and rust.

Bean, blight, mildew, and rust.

Cabbage, black rot, club rot, and mildew.

Celery, blights.

FIG. 197.—Branch of maple covered by maple scale. The small insects live under the shells.

Cherry, black knot, crown gall, leaf spot, mildew and scab.

Corn, blight, rust, smut, root rot, and mildew.

Cucumber, wilt, mildew, and stem rot.

Eggplant, blight, leaf spot.

Elm, blister canker, white rot.

Grape, black rot, mildew, and crown gall.

Lettuce, mildew, drop, leaf spot, and rot.

Maple, heart rot, mildew, and white rot.

Muskmelon, blight and mold.

Oak, rots.

Oats, rust and smut.

Onion, mildew, rust and smut.

Pea, rust, root rot, and mildew.

Peach, brown rot, leaf curl, mildew, scab.

Pine, dry rot, rust.

Plum, black knot, brown rot, plum pockets, and scab.

Potato, blight, dry rot, and scab.

Radish, club root and white rust.

Rose, crown gall, mildew, rust.

Rye, ergot, rust, smut.

Sorghum, rust and smut.

Squash, mildew, wilts, and root rot.

Strawberry, leaf spot, mildew.

Sunflower, mildew, rust.

Sweet Potato, black rot, dry rot, soft rot, white rust.

Tomato, blight, fruit rot, leaf spot, mildew.

Violet, leaf blight, root rot, rust.

Watermelon, mildew, wilt, leaf spot.

Wheat, rust and smut.

Willow, mildew, white rot, crown gall.

It may be noted that many of the above plants have the same or similar diseases. Rusts and smuts generally attack grains. Fruit trees are most often infected with brown rots, crown galls, mildews, and scabs. Blights are most common on garden vegetables and smaller plants. Timber trees appear to be more subject to white rots and heart rots.

The Prevention of fungous diseases of plants is much more effective than curing them. It is very difficult to treat rusts and smuts in fields of grain. The best method of getting rid of these is to plant varieties that are resistant, or that do not have the diseases. Crop rotation does much to avoid fungi. Fruit trees have been very

effectively treated with sprays. Solutions of very poisonous chemicals are prepared and forced through a nozzle so that a mist is formed. This settles upon the branches of the trees, forming a covering which destroys the fungus.

Peach and Pear trees may be almost completely rid of the common diseases by spraying with Bordeaux mixture just before and just after blossoming, or by applying lime sulphur mixture while the trees are dormant. Garden vegetables and herbaceous plants may best be treated by a system of rotation and by planting at times in the year when fungi are not so active.

INSECTS

The study of insects as the enemies of farm crops began about 1870 with the Potato beetle. It began to eat the leaves of potatoes and threatened to destroy all the white potatoes. Poisoning with Paris green began about that time. Some interesting things were found out about the life of the potato bug. The hard shelled, striped-backed bug is called the adult. It flies about, laying eggs, but does not eat the leaves. The eggs are found on the under side of potato leaves, looking like little orange colored sacks. A small red larva hatches from these eggs and begins to eat the leaves. If the supply of food is ample, the red slug or larva soon develops into the hard shelled adult.

The Cotton Boll Weevil is perhaps the most destructive insect in the South. It lives upon the cotton plant entirely. The adult of the beetle is a hard shelled bug, with a light gray shell. Eggs are laid in May and June when the squares are formed on the cotton plants. These eggs hatch into a worm or larva which lives inside the boll. It eats the fiber, destroying the productiveness of

the plant. After a few weeks, the larva changes into a sort of ball known as a pupa or resting stage. The pupa remains in the bolls from three to five days, when it again hatches into the adult. Eggs are laid and the same forms are developed as those shown above. A few of the adults survive the winter and lay eggs the next spring. Many plans have been suggested for destroying the boll weevil, but none has been entirely successful. Poisons have been used at the time when the squares were forming. A heavy spray or dust of arsenic preparations seems to protect the cotton plants from serious injury.

The Cotton Boll Worm, the red spider, the leaf roller and many other insects attack cotton.

Plant Lice are very small insects found upon a great number of plants. They are often called aphids. You may find them on rose bushes or house plants, where the tender leaves begin to come out. The plant louse attacking cucumbers and melons is known as a melon aphid.

The aphid has a very interesting relationship with small red ants. During the fall, the ants collect the eggs of the plant louse and take them into their homes under the ground, where they are kept during the winter. In the spring, you may observe the ants carrying the aphid eggs up the stalks of corn or grass. When the plant lice hatch, they suck the sap from the plant and make a kind of honey which the ants use for food. These may be observed about the growing stalks of corn. Thus the two insects work together to secure food.

Scales.—Nearly all fruit trees and many kinds of shade trees are attacked by insects known as Scales. Dead branches of a tree often are covered with white, scale-like forms. These are the shells covering very small insects which suck sap from the tree. A great

many of these will soon destroy a tree. Spraying with a strong solution of lime sulphur during the winter will destroy scales.

Weevils are perhaps very destructive to stored grains and seeds. The larvae or worms live inside the seed coat, destroying the stored food. The pea weevils cause great losses to millers by spoiling flour and meal. Carbon disulphide in a closed bin will destroy weevil.

Butterflies and Moths of many kinds lay eggs which hatch into *caterpillars* and *worms*. Cabbage worms, cut-worms, army worms, bag-worms, caterpillars, and silk worms are common members of this group. Most of these worms eat leaves and may be poisoned by the use of arsenate of lead or Paris green.

Grasshoppers and crickets do much damage in the field by eating grass and growing crops. Such multitudes often appear that whole fields are devastated. These may be destroyed by mixing Paris green and bran, and broadcasting it over the field.

QUESTIONS

1. What is a weed? Insect?
2. Name eight enemies of farm crops.
3. Of what importance is the study of weeds and insects to practical farmers?
4. Why are weeds valuable to farmers?
5. Name four common weeds that you can identify and four insects in your community.
6. What are fungi?
7. Name six kinds of fungi.
8. What are bacteria? Spores?
9. Mention three methods of combating smuts and rusts.
10. Explain three ways of preventing the growth of fungi.
11. Give the life history of the cotton boll weevil.
12. How do plant lice feed?
13. What method may be used for killing plant lice?

14. What familiar crops are injured by plant lice?
15. How does a butterfly differ from a moth?
16. How may weevils be destroyed?
17. How are grasshoppers destroyed?

PRACTICAL WORK

1. Collect eggs, cocoons, larvæ and pupæ of insects. If these are placed under glass jars and studied during the year, the various stages may be studied as the changes take place. Caterpillars may be fed leaves until the cocoon is formed. It is very interesting to collect potato bug eggs and hatch the young red larvæ under a jar.

2. If the class has made a collection of weed seeds for the school room display (Fig. 10), some of these seeds should be germinated to study the method of breaking the seed coat. Note the young seedlings. Do they grow more readily than wheat or corn? Try to germinate cockleburrs without breaking the seed coat. Then open the bur and scratch the seed. Note how quickly these germinate. This may explain why cockleburrs remain so long in the soil.

3. Collect a number of fleshy fungi. Examine those growing upon the bark of dead trees and upon decayed logs. Find the white thread-like structure under them. Gather several dried and decayed peaches or plums that have remained upon the trees over the winter. Put these under a glass jar with moist cotton or paper. After a few days, note the different kinds of growths. This fungus growth was probably the cause of the brown rot of the fruit of the previous season. Keep corn moist, under a jar, and note the molds growing upon the grains.

WORDS TO BE LEARNED

Cankers. Any disease of trees causing slow decay of the bark and wood.

Devastated. To lay waste; desolate.

Herbaceous. Pertaining to or having the characteristics of herbs.

Medicinal. That which is useful for medicine.

REFERENCES

- "Fungous Diseases of Plants," B. M. Duggar, Ginn and Company.
"Civic and Economic Biology," Blakiston.
"Information for Fruit Growers About Insecticides, Spraying Apparatus, and Some Important Insect Pests," U. S. Dept. of Agri., Farmers' Bul. 908.
"Weeds Used in Medicine," U. S. Dept. of Agri., Farmers' Bul. 188.

CHAPTER XXIII

THE LOCAL CLUB ORGANIZATION

Why Boys and Girls Should Take Up Club Work.
“As a national organization, Field Crop, Livestock and Home Demonstration Club work has grown to such proportions that it now embraces a membership of more than 600,000 boys and girls of the rural districts. These questions are often asked: “Why do boys and girls join these organizations?” and “What do such organizations mean to the boys and girls?” These questions are answered as follows:

1. Club work is a means of acquiring more education.
2. Club work is a means of earning dollars and cents.
3. Club work increases one's independence by increasing one's wealth.
4. Club work breaks down lonesomeness and isolation by providing forms of organized associations.
5. Club work provides an avenue for the development of leadership.
6. Club work stimulates pride in the local community and makes life in the community more attractive.
7. Club work provides for play and recreation; isolated or individual play is not natural.
8. Club work develops the agricultural and livestock assets of the community.
9. Club work opens up visions of other things, other places, other institutions, other people.
10. Club work is doing its part right now in providing more and better food and feed at a lower cost.

11. Club work stimulates interest and cooperation among members of the family and the people of the community.

12. Club work makes better home-makers and better citizens.

How to Organize a Club.—Whenever there are ten or more club members legally enrolled in the Boys and Girls Demonstration Clubs, through the assistance of

FIG. 198.—A club meeting in a natural clubroom.

the county agents or teachers, a local club may be organized for the purpose of holding regular meetings and thus encourage and advance the value of the work.

A meeting of the enrolled club members should be called by the teacher or county agent, and the constitution printed in this chapter adopted. The next step will be the election of officers. After this, application should be made to the Boys and Girls Club Department of the A. and M. College, for a club charter, using the blank provided by the Club Department. After the receipt of the charter, the club is fully authorized to proceed with the year's work, as outlined in this chapter.

In counties where there are both men and women agents, it is advisable to form one organization for boys and girls. This plan is preferred where the local agents think it advisable. Since the boys' work is more closely connected with agriculture and field work than with canning, drying, and breadmaking, it will usually be satisfactory to have a general meeting for about an hour, then divide the forces so instruction can be given for each individual club. Where it is found advisable to form separate organizations for both boys and girls, the plans suggested in this chapter may be changed to meet local conditions.

FIG. 199.—Calf club members produce some valuable beef animals.

Membership and Duties of Officers.—The membership consists of boys and girls from ten to eighteen years of age who have made out official enrollment cards. Boys must agree to cultivate one acre or more of farm crops or grow livestock, according to the instructions of the county demonstration agent. Girls must agree to cultivate one-tenth acre garden, raise chickens or bake better bread, according to instruction given by home demonstration agent or supervisor.

The officers of each local club shall consist of president, vice president, secretary and supervisor.

When such a club is composed of boys and girls, the following sub-officers should be elected:

The Boys.—Plowman, Seedman, Tiller, Harvester, and Herdsman.

The Girls.—Minerva, Pomona, Fortuna.

When the club is composed of girls only, the sub-offices filled by boys should be omitted.

FIG. 200.—The results of good club work. Five years ago, the young lady started with one Jersey heifer. She now has five splendid cows.

The officers shall be elected to serve one year.

The president, or, in his absence, the vice president, shall preside at all meetings and take an active interest in the affairs of the club.

The secretary shall keep an accurate record of the business of the club in the secretary's book furnished by Office of Boys and Girls Clubs; he shall keep the demonstration agents informed as to the progress and conditions of the club work.

The supervisor or assistant supervisor shall have gen-

eral supervision of the local club and the power of exercising authority in its proper management.

The duties of the sub-officers are explained elsewhere in this chapter.

There are no fees or dues to be exacted from the club members, but there shall be no objection to the local club raising money for special purposes.

Each local club shall send one or more representatives to the county club rally or Short Course, which will be called by the county agents.

Suggested Constitution and By-Laws

ARTICLE 1. Name of Club.—This organization shall be known as the.....School Boys and Girls Demonstration Club.

ARTICLE 2. Objects of club.—The objects of the club shall be to make rural community life more attractive, to encourage interest and cooperation among people in the community, and to make farm home and life more interesting and farming more profitable.

ARTICLE 3. Membership.—Boys and girls from ten to eighteen years of age shall be eligible.

ARTICLE 4. Officers.—The officers of this club shall be a supervisor, president, vice president and secretary.

ARTICLE 5. Duties of Members.—Prescribed in the rules for contests in each club, such as: Follow instructions, attend club meetnigs, make exhibits at the school and county fairs, and keep a record of the expenses, income, observations and work.

ARTICLE 6. Duties of Officers.—The president shall preside at all meetings; the secretary shall keep the minutes and records of all such meetings; the vice president may act as president in the absence or disability of that officer. The supervisor shall have the general super-

vision of all local club work, and power of exercising authority in proper management of the club.

ARTICLE 7. There shall be eight sub-officers, namely; Plowman, Seedman, Tiller, Harvester and Herdsman; Minerva, Pomona, and Fortuna, whose duties shall be such as prescribed elsewhere in this chapter.

ARTICLE 8. Advisory Committee.—An advisory committee shall arrange for all public contests and exhibits, the procuring and awarding of prizes, and the reporting of statistics and other information to the county agents. This committee shall consist of the county agent, the home demonstration agent, if there is one, the county superintendent of schools, and one or two members representing the business interests of the county.

ARTICLE 9. Field Instruction.—The county and home demonstration agents shall have charge of all field meetings and practical instruction.

BY-LAWS

1. The members of the club shall agree to read all reference literature bearing upon home projects. This may include literature dealing with the growing of corn, grain sorghums, cotton, peanuts, poultry, pigs, calves, breadmaking, canning, etc.

2. A written plan of work of each member must be prepared for the teacher. They must do all the work connected with the particular contest or project entered upon.

3. The amount of yield by weight and measurement of land in the Crop and Canning Clubs, and the records in Livestock and Poultry Clubs must be certified to for the contestants by at least two disinterested witnesses, preferably members of the local school board.

4. Every member of the club should make an exhibit at the annual school fair, county fair, or club contest.

5. In order to determine profits, the general expense account for each club activity will be accurately kept.

6. All awards on club work shall be based upon the score cards listed in the Club Rules.

7. No local organization shall be formed with less than ten boys or five girls, nor less than ten members when the boys and girls club is organized together.

8. Upon passing their eighteenth year, club members will be eligible to membership in the local community club.

9. Each members's name should appear upon the program at least once during the year.

Suggestions for Holding Meetings.—Once a month is often enough to hold the meetings. If, for any reason, it is desired to hold the meetings oftener, there will be no objection.

The secretary shall keep a record of all meetings in the secretary's book, which is furnished by the Boys and Girls Club Department of the A. and M. College.

Those who are to take part in the meetings should have their topics given in advance so they can make preparation. It may be well to have a program committee.

The members should, when possible, get their parents and friends to attend the meetings.

If possible, have one progressive man or woman of the community talk ten minutes to the boys and girls at each meeting.

Parliamentary Practice.—Club members should be familiarized with the following suggestions:

1. Always address the president as Mr. or Madam President.

2. All remarks should be addressed to the president.
3. There should be no talking between members.
4. The president should recognize the person who seeks the floor by saying "Mr. (or Miss) (person's name)."
5. This indicates that the person thus recognized has the privilege of speaking and must not be interrupted.
6. The only interruptions allowable are (1) a call for point of order, or (2) a question.
7. A point of order applies to a member who has made a motion which is out of order because of another motion before the house, or to a member whose remarks are not on the subject under consideration, or to a person who is exceeding the time limit for discussion, etc.
8. Never offer a motion by saying: "I move you," but simply with "I move," etc.
9. Never offer a motion while another motion is still before the meeting.
10. Before any matter is voted upon, the presiding officer must state the motion fully and completely.
11. The ordinary form of voting upon the regular motion is as follows; Presiding Officer: "All favoring this motion will stand (a short pause to count); be seated; contrary, stand." The presiding officer then announces the result by saying; "The motion is carried" or "The motion is lost."

QUESTION.—A speaker may be interrupted by any member for the purpose of asking a question. This question may be one of personal privilege or may be for the purpose of gaining information about the subject under discussion. The execution of this motion may proceed as follows, member taking floor while another is speaking:

"Mr. President, I rise to a question of information."

PRESIDING OFFICER: State your Question."

12. Motions for question of privilege or point of order take precedence over all other motions.

13. Never attempt to place too many amendments to a motion. (Two are allowable; that is, an amendment to an amendment.) It is usually much better to offer a substitute motion.

14. A motion may not be put to a vote of the meeting until it has been seconded or supported by some member other than the one making the motion.

15. In case of a tie vote the president or presiding officer decides the motion.

16. A motion to adjourn the meeting is in order at any time.

In addition to these simple suggestions, which may serve for the beginning of the club's activities, each club should have a modern work on parliamentary practice.

Order of Business

PRESIDENT: "We will now proceed with the general order of business."

1. The secretary will now call the roll.

(Each member responds to his name by giving a brief history of his club activities since the last meeting.) If the enrollment of the club is large, it is sometimes advisable to have some one member of the club give the report of the entire club—as Poultry Club members would give totals for Poultry Club, as 1,000 chickens hatched, 2,000 eggs setting, 20 brooder coops made. All girls have made aprons.

2. Reading of the minutes of previous meeting; also any communications.

3. Receiving applications for membership.

4. Special program for the month can now be taken up.

(See program in this chapter. In case the program suggested for the month is fieldwork, the meeting should be adjourned to be continued in the field. If not, follow the program suggested under the proper month.)

5. General business and remarks.
6. Inspection of report books.
7. Report and suggestions by supervisor or agent.
8. Ten-minute talk by man or woman living in the community."

From—"The Local Club Organization,"
Oklahoma A. and M. College, Circ. No. 129.

Things To Do During—

September

1. Making the fall gardens, and growing such as; turnips, cabbages, and lettuce.
2. Selecting seeds and preparing exhibits, such as: corn, cotton, grain sorghums, and peanuts.
3. Collecting garden and field seeds for the next season's crop.
4. Picking cotton and selecting better bolls for seed.
5. Building seed corn racks.
6. Visit the club work and home projects of the community.

October

1. Picking cotton.
2. Digging sweet potatoes and peanuts.
3. Preparing for the county and state fairs.
4. Arrange a community poultry and products show.
5. Fall plowing and fertilizing.
6. Prepare winter quarters for the livestock.
7. Prepare winter feeds, and fuel supply.

November

1. Planting trees.
2. Pruning, mulching and plowing orchards.
3. Completing records of season's crops.
4. Starting records of weather (A Weather Chart).
5. Breed sows for spring litters.
6. Dispose of surplus poultry stock and culls.
7. Make things needed on the farm.

December

1. Repair and build fences.
2. Complete indoor repairing of farm equipment.
3. Feed the hens plenty of protein foods for winter eggs.
4. Grade and repair the roads.
5. Learn corn scoring and judging.

January

1. Make New Year's resolutions.
2. Prepare to keep a Farm Record for every day.
3. Learn what kinds of fertilizer will be needed the next year.
4. Prepare hotbeds.
5. Begin testing seed corn and other grains.
6. Visit farms and observe the methods of caring for livestock.

February

1. Plant the hotbed.
2. Prepare warm houses for the coming families of pigs.
3. Apply winter sprays to trees, for insects and diseases.
4. Prepare eggs for setting and set hens or incubators.

5. Complete seed testing and prepare seeds for spring planting.
6. Plant the early spring garden.
7. Market eggs in standard crates, graded.

March

1. Prepare soil for spring crops.
2. Plant corn and small grains.
3. Care for young pigs.
4. Clean poultry yards and houses.
5. Plant more garden and cultivate it.
6. Start club work.
7. Provide coops for hens and chicks.

April

1. Cultivate corn and gardens.
2. Spray fruit trees to destroy insects.
3. Rebuild terraces to prevent soil washing.
4. Prepare for cotton planting.
5. Plant forage crops.
6. Dust or dip hens to destroy lice.
7. Transplant tomatoes, eggplants and peppers into fields.

May

1. Market and can surplus vegetables.
2. Weed the flower beds and mow the lawn.
3. Sharpen hoes and chop cotton.
4. Pick berries.
5. Plant legumes to improve soil.
6. Sell roosters and produce infertile eggs.

June

1. Keep fresh water and shade for the chicks.
2. Destroy rats.

3. Start milk records; weigh milk and feeds.
4. Cultivate soil to hold moisture.
5. Bud fruit trees.
6. Keep ditches open.
7. Destroy insect pests by poisoning.
8. Threshing wheat.

July

1. Late cultivation of corn, grain sorghums and peanuts.
2. Prepare soil for wheat.
3. Provide shade and water for the pigs.
4. Cull the poultry; sell "boarder" hens.
5. Canning and preserving fruit.

August

1. Keep trees and flowers watered
2. Keep a record of money made during the year.
3. Prepare soil for the fall garden.
4. Put cultivating machinery in the shed.
5. Arrange for a camping trip.

INDEX

A

Aberdeen-Angus, 77
 Abrupt, 61
 Adulteration, 10
 Agriculture, 13
 Alfalfa, 241
 Alkali, 157
 Anchor, 73
 Annular, 73
 Annuals, 190
 Apricots, 51
 Apples, 51
 Arboriculture, 62
 Arbor, 197
 Architecture, 197
 Art, 1
 Avalanche, 157
 Ayrshires, 86

B

Bacon, 126
 Ballast, 47
 Barley, 230
 Barriers, 187
 Beauty, 189
 Belgians, 99
 Berkshire, 112
 Bermuda, 201
 Blackberries, 51
 Blotches, 32
 Bois d'arc, 69
 Boll, 14
 Boll-weevil, 279
 Boll-worm, 280
 Border, 189
 Breeds, 75, 98, 112
 Breeching, 108
 Broadcast, 231
 Broiler, 144
 Brood, 47

Brood coop, 36
 Broody hens, 133, 135
 Broom corn, 233
 Brown Swiss, 87
 Bulbs, 194, 197
 Burlap, 178
 Business, 2
 Butterflies, 281

C

Calcium arsenate, 259
 Cannas, 205
 Cankers, 282
 Canvass, 269
 Capsule, 126
 Capped, 231
 Carbon, dioxide, 67
 Carbon disulphide, 17
 Carcass, 126
 Care of Grounds, 208
 Cartons, 31
 Catalogue, 187
 Cattle, 75
 Chaff, 219
 Checked, 219
 Checks, 32
 Chemicals, 61
 Chester White, 113
 Chickens, 129
 Chicken pox, 139
 Chicks, 137
 Clabber, 144
 Classification, 9
 Clothing, 1
 Clover, 242
 Club constitution, 288
 membership, 286
 officers, 287
 organization, 284
 Clydesdales, 100
 Cockerel, 144

Cocks, 244
 Cold frame, 184
 Collecting, 11, 71
 Commercial, 10
 Commercial fertilizer, 165
 Commission, 144
 Community, 26
 Comparing, 21
 Competition, 22, 32
 Companion crops, 186
 Concrete, 40, 47
 Conform, 32
 Contour, 1
 Controlling diseases, 58
 Coppers, 126
 Corn, 12, 24, 213
 Cotton, 13, 27, 173, 246
 cultivation, 253
 fertilizers, 253
 chopping, 252
 ginning, 256
 harvesting, 256
 Cotton marketing, 257
 planting, 249
 states, 247
 pests, 254
 seed, 256
 types, 246
 soils, 248
 varieties, 247
 Cowpeas, 239
 Cranks, 38
 Creeps, 35
 Culling poultry, 140
 Cultivation, 55, 216
 Cylindrical, 32

D

Dairy cattle, 82
 Dappled, 108
 Deciduous, 73
 Denatured, 269
 Dent corn, 213
 Dewberries, 51
 Diameter, 212
 Disease, 61, 120
 Disease prevention, 278
 Disinfectant, 144
 Display, 18
 Dodder, 271

Dormant, 61
 Dormant seeds, 168
 Draft horse, 108
 Drainage, 162, 163
 Ducks, 129

E

Economical, 47
 Eggs, 29, 128
 Elements, 219
 Eliminate, 219
 Embryo, 178
 Environment, 61
 Equipment, 33
 Excavation, 269
 Exhibits, 21

F

Fahrenheit, 187
 Farm, 4
 Farm enemies, 270
 Farrowing, 47
 Feeders, 80
 Feeding, 78, 115
 Feeding horses, 100
 mules, 106
 Feed troughs, 33
 Fetlock, 108
 Flint corn, 214
 Fiber, 32
 Flowers, 189
 Forage crops, 28-232
 Forest, 62
 Formaldehyde, 231
 Freakish, 24
 Friable, 67
 Frier, 144
 Frisking, 3
 Fruit, 49
 Fumigation, 19
 Fundamental, 1
 Fungi, 178, 272
 Fungus, 61
 Furniture, 67
 Furrow, 244

G

Galloway, 78
 Galls, 276

Gardens, 179
 Gates, 43
 Geese, 129
 Glutinous, 231
 Grapes, 51
 Grain, 73
 Grouting, 41
 Green feed, 88
 Growing plants, 210
 Guernseys, 85
 Guide board, 47
 Guineas, 132

H

Hame, 108
 Hampshire, 112
 Handling fruits, 59
 Harrowing, 159
 Harvesting, 223
 Harvesting corn, 217
 wheat, 229
 Hatching eggs, 132
 Heeling-in, 53
 Herbaceous, 282
 Herefords, 76
 Herd, 126
 Heredity, 19
 Hinnies, 103
 Hogs, 110
 Hog house, 33
 cholera, 123
 Hogging off, 116, 217
 Holstein-Friesian, 84
 Horses, 97
 Hot beds, 183
 Home projects, 128
 Housing cattle, 88
 Humid, 157
 Humus, 157
 Hybrid, 108
 Husk, 19

I

Immunization, 126
 Incubation, 136
 Indentation, 32
 Infertile, 144
 Inherit, 19
 Inoculate, 244

Instinct, 145
 Institution, 197

J

Jerseys, 83
 Johnson grass, 237

K

Kernels, 32
 Kinds of poultry, 132
 Knots, 44

L

Larvæ, 178
 Lawns, 199
 Legumes, 239
 Leguminous, 244
 Lice, 122
 Linters, 32
 Lint, 259
 Livestock, 1
 Location, 49
 Loam, 61
 Lock, 19
 Luscious, 212
 Luxuries, 249

M

Making rope, 39
 Marketing, 118
 oats, 223
 poultry, 142
 Mash, 145
 Medicinal, 282
 Menace, 167
 Mold, 47
 Moths, 17, 281
 Mongrel, 126
 Miller, 231
 Mulches, 55, 61, 159
 Mules, 103
 Mule states, 104

N

Nitrogen, 61, 165
 Nodules, 73, 145
 Nursery, 50, 55

O

Oats, 15, 220
 Oblong flower beds, 206
 Observation, 32
 Orchard, 49
 Organic matter, 160
 Ornamental, 212
 Osage orange, 68
 Oxygen, 67

P

Parasite, 178
 Parental, 22
 Peaches, 51, 279
 Peanuts, 15, 240
 Pears, 51
 Pecans, 51
 Pelvic, 145
 Percheron, 98
 Perennials, 178
 Persimmons, 51
 Pets, 3
 Phase, 145
 Phosphorus, 165
 Pigs, 110
 Planting, 54
 corn, 214
 oats, 221
 orchards, 53
 trees, 207
 wheat, 227
 Plant lice, 280
 Plums, 51
 Plymouth Rock, 123
 Pods, 16
 Poland China, 112
 Portland Cement, 48
 Portray, 1
 Porous, 157
 Pop corn, 214
 Posts, 43
 Poultry, 128
 Poultry equipment, 129
 house, 35
 Preparing nests, 134
 Procedure, 6
 Propagation, 19

Property lines, 206
 Protein, 136
 Pruning, 55

Q

Qualities, 97, 113

R

Raising pigs, 119
 Razor-back, 110
 Rag doll, 170
 Records, 90
 Red polls, 78
 Reforesting, 62
 Refuge, 167
 Registration, 114
 Reinforced, 48
 Rejuvenating, 61
 Rhode Island red, 133
 Ribbon bed, 206
 Rope machine, 37
 Rope making, 36
 Rose garden, 204
 Rotation, 8, 220
 Rye, 229

S

Sappiness, 19
 Saw-dust box, 175
 Scale, 208
 Science, 1, 8
 Scours, 122
 Seeds, 9, 183
 Seed box, 175
 Seed germination, 168
 Seed bed, 181
 Selection, 12
 Shank, 32, 145
 Shade trees, 270
 Shires, 99
 Shocked, 231
 Shorthorns, 76
 Shrubs, 192, 212
 Shipping crate, 33
 Silage, 96
 Site, 179
 Slogan, 187

Small grains, 220
 Smut, 171, 275
 Snapped, 219
 Soil, 146
 alkali, 152
 buildings, 147
 classification, 148
 formation, 146
 heavy and light, 151
 particles, 150
 sour, 152
 water, 152
 sources, 147
 Solvent, 157
 Sorghum, 232
 Source, 50
 Soybeans, 239
 Species, 19
 Splices, 44
 Splicing, 48
 Spore, 170
 Spotted, Poland, 112
 Staple, 1, 259
 Standard, exhibits, 24
 Stanchion, 96
 Stifle, 108
 Storing, 15, 16
 Strain, 96
 Strawberries, 49, 51
 Stripped, 90
 Stump, 65
 Stubble, 231
 Subsoil, 146, 158
 Suburban, 200
 Succession crops, 186
 Sudan grass, 236
 Suffolk, 100
 Survey, 4, 5, 8
 Sweet corn, 214
 Sweet potato, 260
 cultivation, 265
 curing, 267
 enemies, 266
 harvesting, 267
 grading, 267
 marketing, 267
 planting, 263
 sets, 262
 varieties, 261
 Sweet sorghum, 244
 Switch, 96

T

Tamp, 61
 Tamworth, 113
 Tap, 67
 Tankage, 126
 Terracing, 163
 Tepid, 145
 Testing seed, 169
 Textile, 259
 Tendencies, 96
 Things to do, 293
 Tillage, 158
 Tilling, 8
 Torrent, 73
 Tree, 65
 Trellis, 198
 Triangular, 48
 Trip, 9
 Trunk, 65
 Tuberous, 198
 Turkeys, 129
 Twine, 39
 Type, 97
 Type of hog, 114

U

Udder, 96
 Undesirable view, 203
 Underline, 126
 Unfurl, 3
 Utensils, 75

V

Varieties, 19, 50
 Vegetable garden, 179
 Vent, 145
 Vermin, 18, 20
 Vetch, 243
 Virgin, 157

W

Wallow, 126
 Water, 89
 Water furrow, 219
 Water sprouts, 58, 61
 Weather, 157
 Weeds, 270

Wheat, 223
Weevil, 17
Wheat soils, 226
White diarrhea, 138
Wild grass, 238
Wild flowers, 195
Windrows, 244
Wood lot, 70

Worms, 123
Wyandotte, 133

Y

Yards, 34
Yolks, 30
Yorkshire, 123

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