PIETS | EDUCATIONAL | SERIES

ELEMENTS

AGRICULTURE

FOR THE

USE OF SCHOOLS.

BY

ALLEN BOWIE DAVIS.

PUBLISHED BY JOHN B. PIET & CO.
BALTIMORE

S
495
D25

P.

Presented by
Wm H. H. Harb.

ELEMENTARY AGRICULTURE.

FOR THE

USE OF SCHOOLS.

BY

ALLEN BOWIE DAVIS,

LATE PRESIDENT OF THE BOARD OF TRUSTEES OF THE MARYLAND AGRICULTURAL
COLLEGE.

BALTIMORE:
JOHN B. PIET & CO.,
174 W. BALTIMORE STREET.
1883.

COPYRIGHT.

JOHN B. PIET & CO.

1883.

S495
.D25

H. K. S. 42

Dedication.

To HENRY D. FARNANDIS, Esq.,

Harford County, Maryland.

My Dear Sir:—I beg leave to dedicate to you this work on the Elements of Agriculture, to be used in Schools as a preliminary training for the College, or for the field and the farm.

Having been associated with you for some years as a trustee of the Maryland Agricultural College, I was led to form so high an estimate of your character as a man and a citizen, as a farmer and a patriot, that I am induced to ask this permission. I am,

With great respect,

Your friend and obedient servant,

THE AUTHOR.

PREFACE.

IN a New Year's communication to the old *American Farmer* the first paper published in America on the subject of agriculture, the author advanced the idea that the best mode of teaching agriculture in the schools was to begin in the primary schools.

This suggestion drew out inquiry as to the proper mode of introducing the subject into the schools, and for suitable text-books for the use of teachers and pupils. To the surprise of all, such books were not to be found, and the author was called upon by his present publishers to compile a book that might be suitable.

The subject, though interesting, is foreign to the habits and time of life of the author; yet he has undertaken it, and this little work, the result of a few weeks' labor, for the use and instruction of children, is offered to the public exclusively on its own merits.

As a foundation for agricultural knowledge, the origin, mode of cultivation, and use of plants, have been sought out and kept in view. The catechetical form of instruction which has been adopted is believed to be the best suited to arrest the attention and convey lasting instruction to the tender minds of those for whom the work is intended.

It is not claimed that any theories or facts have been adduced in this work other than those well established and well known as the common property of all farmers.

A. B. D.

CONTENTS.

CHAPTER	PAGE
I. Definitions: The Earth; Rain; Mist; Fog	7
II. Definitions: Cultivation; Fertilizers; Plants	8
III. Definitions: Grain; Farms; Measurements	9
IV. Definitions: Farm Fertilizers	11
V. Definitions: Mineral Fertilizers	13
VI. Definitions: Tillage; The Plow and its Uses	14
VII. The Object of Plowing	15
VIII. Corn: When it may be Planted, and how it Originated	17
IX. Corn, continued: Its Indian Origin; its Uses	18
X. Corn, continued: Its Enemies; Development	19
XI. Corn, continued: Fodder; Corn Measurement, and History	21
XII. Corn, continued: Grinding to Flour	22
XIII. Corn, continued: Corn-tassel; Selection for Seed; Price per Bushel; Hominy	24
XIV. Wheat: Where Grown; Clover	26
XV. Wheat, continued: Plowing; Sowing; Harvest- ing	28
XVI. Wheat, continued: Elevators; Bolting; Malt	30
XVII. Rotation of Crops: Tobacco	31
XVIII. Tobacco, continued: Treatment	33
XIX. Rye: Ergot	35
XX. Oats	37
XXI. Potatoes	38
XXII. Cabbage	40
XXIII. The Carrot: A Useful Food for Consumptives	41
XXIV. The Parsnip: "It is Nerve and Brain Food"	43
XXV. The Onion: How Used in Ancient Times	44
XXVI. The Turnip: Its Medicinal Properties	45

CHAPTER	PAGE
XXVII. The Bean: Wholesome Food for Man and Beast	46
XXVIII. The Pea: Good for Scorbutic Humors . . .	47
XXIX. Lettuce: A Promoter of Sleep . . .	49
XXX. The Beet: Sometimes used to make Sugar . . .	50
XXXI. The Egg-plant: How Raised and Cooked . . .	51
XXXII. The Tomato: Anti-bilious, and a Preventive of Chills and Fevers	52
XXXIII. The Strawberry: The Best Way to Cultivate . . .	53
XXXIV. Berries: Their Healthfulness and Pecuniary Value	54
XXXV. The Grape: Beneficial for the General Health	56
XXXVI. The Horse-Radish and Common Radish: Ex- cellent for Digestion	57
XXXVII. Parsley, Celery, and Rhubarb	59
XXXVIII. Asparagus and Poke	61
XXXIX. The Barometer: Signs of Rain	63
XL. Review	65
XLI. The Horse, Cow, and Hog	68
XLII. Agricultural Machinery: Its Uses	69
XLIII. The Farm-house	74
XLIV. Flower Gardens	77
XLV. Sentiments of Plants and Flowers	78
XLVI. The Geranium	81
XLVII. Botanical Geography	84
XLVIII. Cereals	88
XLIX. Zones, Tropics, and Bread Lines	89
L. Raising Poultry	91
LI. Sheep Raising	94
LII. The Bee: Its Honey	100
LIII. Fruit-Trees	104
LIV. Canning	106
LV. Butter	108
LVI. The Weather.—The Moon	109
LVII. Tea and Coffee	111
LVIII. Thunder-Storms	112
LIX. Clover	114
LX. Remarks on Grasses	116
Appendix I.	118
Appendix II.	122

AGRICULTURE.

CHAPTER I.

DEFINITIONS: THE EARTH; RAIN; MIST; FOG.

Q. What is agriculture?

A. It is the art of cultivating the soil of the earth.

Q. What is the earth?

A. It is the planet on which we live.

Q. What is the surface of the earth?

A. It is the outside of the earth.

Q. Of what is the surface of the earth composed?

A. Of land and water.

Q. What is land?

A. It is the solid matter composing the surface of the earth.

Q. What is this solid matter usually called?

A. The ground or soil.

Q. What is water?

A. The fluid which falls from the clouds in drops.

Q. What are these drops usually called?

A. They are called *rain*.

Q. When water falls in very small drops, what is it called?

A. It is called *mist*.

Q. What is *fog*?

A. It is particles of water moving in the air, yet too small to be seen.

Observation.—Drops of rain are so large that they may be plainly seen. Fog is a motionless cloud lying near, or in contact with, the earth's surface. Like rain, mist and fog enrich the soil and furnish food for plants. Soil is sometimes called *mold* or *loam*.

Take your dictionary and find the meaning of the words—*Fluid, solid, composed, particle, observation, motionless, contact, enrich, mold* or *mould, and loam*.

CHAPTER II.

DEFINITIONS: CULTIVATION; FERTILIZERS; PLANTS.

Q. What is meant by cultivating the soil?

A. It is bestowing labor and care upon it, with a view to valuable returns.

Q. What else is meant by it?

A. It means, also, to devote time and thought in fertilizing it.

Q. What is it to fertilize the soil?

A. It is to supply it with food for plants, making it rich and productive.

Q. What is manure?

A. It is any *matter* which makes land productive, such as the contents of stables and barnyards, wood-ashes, and decaying animal and vegetable substances.

Q. What are natural fertilizers?

A. All kinds of vegetable matter, living or dead, rock, snow and ice, which serve as a covering for the soil.

Observation.—The dead seed feeds the living plant.

Q. What is a plant?

A. It is a vegetable, having, when complete, a root, stem, and leaves.

Q. What is a vegetable in the common sense of the word?

A. It is a plant used for cooking. Cabbage, potatoes,

turnips, peas, beans, and the like, are commonly called vegetables.

Q. What is a root?

A. All that part of a plant which grows under ground.

Q. What are some of the roots used for cooking?

A. Potatoes, turnips, beets, carrots, parsnips.

Q. What are rootlets?

A. They are small roots branching off from large ones.

Q. How do plants gather their food?

A. They gather it from the air through their leaves, and from the soil through their roots and rootlets.

Find the meaning of the words—*Valuable, devote, productive, vegetable, matter, substance, complete.*

CHAPTER III.

DEFINITIONS: GRAIN; FARMS; MEASUREMENTS.

Q. What is a cereal?

A. It is any edible grain.

Q. What is grain?

A. It is the fruit or seed of certain plants, such as wheat, corn, rye, oats, and the like.

Q. What is wheat?

A. It is a cereal which furnishes white flour for bread.

Q. What is corn—commonly called Indian corn?

A. It is a grain which grows on a cob in rows.

Q. What is rye?

A. It is a grain resembling wheat, and is also used for making bread.

Q. What is oats?

A. It is a seed of grass much used for feeding horses.

Q. What is grass?

A. It is a plant upon which cattle and other beasts feed.

Q. What is hay?

A. It is grass cut and dried for feeding horses, cows, and other animals.

Q. What is a farm?

A. It is a piece of ground devoted by its owner to the purposes of agriculture.

Q. How is a farm divided?

A. Into a number of divisions called fields.

Q. What is a small field sometimes called?

A. A lot.

Q. What is a field or lot called when fruit-trees are planted in it?

A. An orchard.

Q. How is land measured?

A. By acres and parts of an acre.

Q. What is an acre of land?

A. It is 160 square perches.

Q. What is a perch?

A. It is a line $5\frac{1}{2}$ yards long.

Q. How may an acre of land be laid out?

A. By measuring $69\frac{1}{2}$ yards square.

Q. How many square yards in one acre of land?

A. There are 4840.

Q. How many square yards in one-half acre of land?

A. There are 2420.

Q. How many square yards in one-quarter of an acre?

A. There are 1210.

Q. How many square yards in one-eighth of an acre?

A. There are 605.

Observation.—A lot 121 yards long and 40 yards wide makes one acre.

A lot 100 yards long and $48\frac{2}{5}$ yards wide makes 1 acre.

"	$74\frac{1}{2}$	"	"	65	"	"	"	"
"	88	"	"	55	"	"	"	"
"	$96\frac{1}{2}$	"	"	50	"	"	"	"

The territory of the United States contains about 590,000,000 acres of land, and about 51,000,000 acres of water. This territory has been recently enlarged by purchase and conquest.

Find the meaning of the words—*Edible, acre, square, territory, contain, million, recently, enlarge, purchase, conquest.*

CHAPTER IV.

DEFINITIONS: FARM FERTILIZERS.

Q. What is the first great requisite to farming?

A. It is manure.

Observation.—Scrape up all the litter from your door-yards, barnyards, and stableyards. Take the rotten chips and bark from your woodyard; collect the rich soil from holes and corners around your house, the barn, the hogpen, the henhouse, and all other out-buildings. Go to the roads, the woodlands, and your fence-sides, your swamps and ponds. Heap all this up in your barnyard or in some other convenient place; mix it with lime and let it decay, so that you may have a large supply of this *compost* on hand at all times. It is good natural food for all kinds of plants and roots. Leaves from the woods make good bedding for horses, cows, and hogs; and when mixed with the manure of these animals, it is a rich and excellent compost. Plaster is better than lime to mix with barnyard or stable manure. It holds the ammonia better.

Q. What is the use of lime?

A. It performs an important part in agriculture as a manure.

Q. Where is lime often found?

A. In all soils capable of sustaining vegetation.

Q. How is lime made?

A. From limestone, by the action of heat.

Q. What is limestone?

A. It is a rock quarried from the earth.

Q. From what other substance is lime made?

A. From oyster-shells.

Q. What is a limekiln?

A. It is a furnace in which limestone or shells are burnt into lime.

Q. What kind of soils are most improved by lime?

A. Those upon which has been a growth of black oak, walnut, and poplar trees.

Q. How much lime should be applied to such lands?

A. From fifty to one hundred bushels to the acre.

Q. If the land is very poor and worn out, how much to the acre?

A. From thirty to fifty bushels every five years.

Observation.—A good portion of barnyard manure greatly aids the action of lime upon soils, particularly clay and sand soils—hence manure from the barnyard or compost heap should be freely mingled with lime when first applied to the land. As poor land improves, the quantity of lime applied to it should be increased.

Q. In order that a soil may be fertile, what must it contain?

A. It must contain all the mineral matter found in the ashes of the plant to be grown upon it. It must also have its supply of manure or plant food renewed from time to time, which it has lost in form of crops. Supplying waste is prolonging life.

Q. What is an organ?

A. It is a natural part of a living being, as of an animal or plant.

Q. What is organic matter?

A. It is matter which proceeds from organic bodies, as plants and animals.

Find the meaning of the words—*Rotten, collect, convenient, decay, compost, natural, excellent, perform, capable, quarry, furnace, apply, quality, mineral, prolong.*

CHAPTER V.

DEFINITIONS: MINERAL FERTILIZERS.

Q. What is ammonia?

A. It is gas of a strong odor.

Q. What is alkali?

A. It is ammonia which destroys a sour taste.

Q. How is ammonia formed?

A. It is formed by decaying animal and vegetable matter, as in manure piles. Its odor can be detected in stables.

Q. Is ammonia a food for plants?

A. It is; it finds its way into plants through their roots and leaves.

Q. What is ammonia sometimes called?

A. It is called hartshorn.

Q. What does soil consist of?

A. It consists of small particles of rock mixed with organic matter.

Q. What is meant by subsoil?

A. The bed of earth that lies beneath the surface soil.

Q. What is meant by alluvium?

A. It is earth, sand, gravel, and other matter carried along by rivers, floods, and other causes.

Q. What is alluvial soil?

A. It is soil composed of alluvium, or deposits of sand, clay, or gravel, made by river action.

Q. What is the action of rain on plants?

A. It carries food to them through their roots and leaves.

Q. What is meant by decomposition?

A. A separation of parts, as by decay or death.

Q. What is meant by disintegration?

A. A reducing to small particles or powder.

Observation.—By the disintegration of rocks material for soils is made. By the addition of animal and vegetable matter the soil is complete.

Q. What is meant by atmosphere?

A. The air or fluid which surrounds the earth.

Q. How are the roots of plants attracted?

A. Towards their food in the soil.

Q. How are the leaves of plants attracted?

A. Towards their food in the atmosphere.

Q. What is their food in the soil?

A. It is organic matter.

Q. What is their food in the atmosphere?

A. It is organic matter in the form of gas, or air.

Find the meaning of the words—*Odor, detect, harts-horn, material, surround, attract, organic, gas.*

CHAPTER VI.

DEFINITIONS: TILLAGE; THE PLOW AND ITS USES.

Q. What is meant by tillage?

A. The operation, practice, or art of preparing the soil for seed, and keeping it in a condition favorable to the growth of plants.

Q. What is a plow?

A. It is a well known implement of agriculture used for turning up the soil.

Observation.—The plow is the main implement of agriculture. It is common to all ages and countries, and is almost everywhere the same. It has a beam, handles, coulter, and mold-board. The plowshare and coulter cut the soil, and the mold-board turns it upside down. The plow is drawn by horses hitched to the beam of the plow by means of a singletree or whiffletree.

Q. What is meant by a singletree?

A. The crosspiece to which the traces of a horse are fixed.

Q. When two or three horses draw abreast, how are the singletrees fixed?

A. They are fixed upon each end of another crosspiece, called a doubletree. The doubletree is attached to the end of the beam of the plow by means of a clevis.

Q. What is meant by sward?

A. It is that part of the soil which is filled with the roots of grass, forming a kind of mat.

Q. What is meant by the word stratum?

A. It means a bed of earth or rock of any kind.

Q. What is a layer?

A. It is a stratum, a body spread over another, as a layer of sand, or a layer of clay.

Q. What is meant by fallow?

A. It is land that has lain a year or more untilled or unseeded.

Q. What is a crop?

A. It is the product of what is planted in the earth.

Observation.—Never work more land than can be well worked and well fed. Never keep more cattle than the crops of the farm will feed and fatten. Farmers should never “overcrop” themselves, that is, plant more than they can work well and gather in.

Take your dictionary and find the meaning of the words—*Beam, coulter, mold-board, plowshare, clevis, turf, sod, and peat.*

CHAPTER VII.

THE OBJECT OF PLOWING.

Q. What is the object of plowing?

A. To break up the soil, and render it permeable to the agents of vegetable nutrition and growth, and the roots of plants.

Observation.—Plowing is intended to pulverize the soil, to destroy weeds and grass, and to bury the seeds of the intended crop.

Q. What is the proper depth of plowing?

A. This must depend upon the soil.

Q. What is the effect of shallow plowing?

A. It has the effect to exhaust the soil in a very few years.

Q. How may poor soils be improved?

A. By deep plowing.

Observation.—By plowing the soil sufficiently deep to cover all grass, weeds, or stubble, leaving the surface level and light, it is fitted for the production of good crops. It is well said “the best plowing is that which completely turns the soil and hurries beneath it the entire vegetable growth.” Heavy grass sods should be turned so as to lie flat; light stubble soils may be turned so as to lie edge up to a certain degree.

Q. Is there any danger in turning the greensward furrows too flat?

A. It is thought there is no such danger.

Q. What is effected by deep plowing and turning the soil flat?

A. It soon sets to fermenting the mass of vegetable matter turned under.

Q. What else is effected by deep plowing?

A. It destroys all noxious weeds.

Q. What is a harrow?

A. It is an implement made of pieces of wood crossing each other, and set with iron teeth.

Q. What is the use of a harrow?

A. It is drawn by horses over plowed land to level it and break the clods, and to cover seed when sown.

Take your dictionary and find the meaning of the words—*Permeable, agent, nutrition, pulverize, sufficiently, level, production, completely, furrow, effecting, fermenting, noxious.*

CHAPTER VIII.

CORN: WHEN IT MAY BE PLANTED, AND HOW IT ORIGINATED.

Q. At which season of the year is it proper to plant corn?

A. Between the 1st and 10th of May; not later than the 15th day of that month.

Q. At what time may corn be planted in the tide-water or lower counties of Maryland?

A. From the 15th to the 20th of April.

Q. What time may it be planted in the central counties?

A. About the 20th of April, in early seasons.

Q. At what season is it proper to plow sward lands for planting corn?

A. Late in the fall of the year, and through the winter when the frost is out of the ground.

Q. When should the land be harrowed?

A. In the spring, just before the time for planting.

Q. To what country is the world indebted for the valuable plant called corn, or *Indian corn*?

A. To our own country, America.

Q. Has any traveller, prior to the discovery of America, noticed the culture of Indian corn in any other part of the world?

A. There is no such notice on record.

Q. What is said of corn in the history of the West Indies?

A. It is said that corn was the only grain found there by Europeans.

Observation.—Corn was described as growing “upon a long reed with large grains, and sometimes two ears on a reed, on one of which seven hundred grains were counted; that they sow it grain by grain, and not scattering. It requires hot and moist soil. The leaves of it and also the reed are very good food for cattle; green and dry, it serves as well as straw. The grain is better for beasts than barley, and the Indians eat it hot, boiled, and sometimes toasted.”

Q. What is said in Robertson's History of America concerning corn in South America?

A. It is said that the chief thing raised there by the Indians was "corn, a grain extremely prolific, of simple culture, agreeable to the taste, and affording a strong, healthy nourishment."

Observation.—When the first settlement was made in Virginia, in 1607, that country, from the sea-coast to the mountains, and between the James and Potomac rivers, was occupied by more than forty tribes of Indians, and Mr. Jefferson asserts that when Europeans visited these Indians, they found them using the Indian corn; and when Lord Baltimore's colony first landed in Maryland, in 1634, they settled at an Indian village surrounded by fields of corn.

Take your dictionary and find the meaning of the words—*Discovery, history, prolific, extremely, nourishment, occupy, assert.*

CHAPTER IX.

CORN, CONTINUED: ITS INDIAN ORIGIN; ITS USES.

Q. What did the Leni Lenape Indians of North America say of themselves and their corn?

A. They called themselves "the original people" and their corn "the original grain."

Observation.—In an account of Lord Baltimore's settlement of Maryland, published in 1741, the writer says: "The infant colony supplied themselves with Indian corn at Barbadoes, which, on their first arrival, they began to use, to save their English store of meal and oatmeal. The Indian women perceiving that the servants of the English did not know how to dress it, made their bread for them."

Q. What is the use of corn?

A. It is used as food for man and beast.

Q. What is the use of corn-stalks?

A. By an expensive process, sugar is made from them; they are used in barnyard compost, and they are good for fuel.

Q. What are the leaves or blades used for?

A. They are used as fodder for cattle.

Q. What do the ashes of the corn-stalk produce?

A. They produce alkali.

Q. What are the *husks* used for?

A. They are used to make bedding and paper for man, and food for beasts.

Observation.—The grain or seed of corn is used for making bread, oil, and spirit. Corn ground with its cob makes good food to fatten cattle.

Q. What is the use of the cob?

A. It makes good fuel.

Observation.—The American Indians say, “that on a certain occasion the Great Spirit descended to the earth in the form of a beautiful squaw; that where she first touched the ground with her feet there the Indian corn sprang up; where she placed her right hand grew the bean; where she put her left hand pumpkins grew; and where she seated herself on the ground grew tobacco.”

CHAPTER X.

CORN, CONTINUED: ITS ENEMIES; DEVELOPMENT.

Q. After the soil has been turned up by the plow and harrowed, how is the corn planted?

A. The ground is “laid off” in furrows made by a plow, three and a half or four feet apart.

Q. What is next done ?

A. These furrows are crossed by other furrows the same distance apart, and at the place where they cross the seed-corn is dropped.

Q. What is the place where the seed-corn is dropped called ?

A. A corn-hill.

Q. How many grains of corn are dropped in a hill ?

A. Four or five grains, and sometimes more.

Q. How are these grains covered ?

A. About three or four inches deep, by the action of a hand-hoe, or by a machine drawn by a horse, known as a coarser.

Q. If corn land is not plowed in the fall of the year, when is the next best time for plowing ?

A. In the spring of the year, as early as possible.

Q. When the corn sprouts and the young shoot appears above the ground, what is to be done ?

A. Watch the attacks of insects, especially the cut-worm.

Q. What is a cut-worm ?

A. It is a ground worm that eats the young corn-sprout.

Observation.—When the young corn is growing, the great object is to prevent weeds and grass from growing with it. Frequent stirring up of the soil is necessary to keep it mellow and open, that the heat, air, and moisture may exert their influence upon the soil. When the young plants are from four to six inches high they must be thinned out, leaving only two or three in the hill. After the young shoots for forming the ears of corn appear, the soil should not be disturbed.

When the corn *shoots*, that is, begins to form ears on the stalk, it also begins to throw out what are called *air* or *spur* roots near the ground. These roots are thrown out first to gather food from the air, and secondly, to lay hold in the ground to make the plants steady in case of storm.

Q. In what time will corn planted in rich soil mature for gathering ?

A. In 100 or 120 days from the time of planting.

Q. When it matures, how is it gathered?

A. It is cut off near the ground and set up in parcels, called *shocks*.

Find the meaning of the words—*Furrow, machine, prevent, frequent, necessary, influence, mature.*

CHAPTER XI.

CORN, CONTINUED: FODDER; CORN MEASUREMENT, AND HISTORY.

Q. How long should the shocks of corn remain in the field?

A. Until they are perfectly dry.

Observation.—When the ears of the corn, the stalks and the blades, called fodder, are perfectly dry, the shocks should be thrown down, the corn husked out, and the fodder shocked again, or hauled into the barn or barnyard, for feeding cattle in the winter time.

Q. How is corn bought and sold?

A. By the *barrel* and *bushel*.

Q. What is a barrel of corn?

A. It is a quantity of ears estimated to make five bushels of grain.

Observation.—For measuring corn, a barrel to hold five bushels of ears is made, and this barrel twice filled is called “a barrel of corn,” or five bushels of grain.

History.—In the year 1639, the legislature of Maryland passed an act relating to measuring corn in a barrel. The act provided that all corn bought or sold “before the fifteenth of October in any year shall be twice shaken in the barrel and afterwards heaped as long as it will lie on; and at or before Christmas it shall be twice shaken and filled to the edge of the barrel, and after Christmas it shall not be shaken at all, but delivered by strike.”

The custom established by this old law is still observed in the present day, and, such has been our respect for this custom established by an early law of Maryland, we have not often departed from this manner of measuring corn.

Q. How many pounds of corn make a bushel?

A. Fifty-six pounds.

Q. What is a cubic inch?

A. It is a block, for example, one inch square—or one inch high, one inch wide, and one inch thick.

Q. How many cubic inches in a bushel?

A. There are 2150+.

Find the meaning of the words—*Remain, perfectly, estimate, legislature, custom, establish, observe, cubic, example.*

CHAPTER XII.

CORN, CONTINUED: GRINDING TO FLOUR.

Q. How is corn prepared for bread?

A. By grinding and sifting.

Q. Where is corn ground and sifted?

A. In a mill built for the purpose.

Q. What power drives the mill?

A. Water- or steam-power.

Observation.—In the olden time, mills were driven by horse-power and the power of the wind. Where corn is ground by water-power, a mill-house is built near a stream of water. Above the mill on the stream a dam of wood and stone is built across the stream, above which a large body of water collects. From this body of water a ditch is dug to the mill. This ditch is called a mill-race. In this race the water runs from the dam to the wheel at the mill, called a water-wheel. Over this water-wheel

the water rushes and turns the wheel as it goes, and this wheel turns other wheels inside the mill-house.

Q. What is the first large wheel in the mill-house called ?
A. It is called the master-wheel.

Q. Does the master-wheel turn any other wheel ?
A. It does.

Q. What is that wheel called ?
A. It is called the counter-wheel.

Q. Does the counter-wheel turn any other wheel ?
A. It does.

Q. What is that wheel called ?
A. A spindle-wheel.

Q. Does the spindle-wheel turn something ?
A. It does. It turns a stone called a bur.

Q. What are mill-burs ?
A. They are large stones in the form of a circle between which corn is ground.

Q. What is commonly the diameters of burs ?
A. From three and a half to five feet.

Observations.—One bur lies flat and motionless on the mill floor ; the other is balanced above it on the point of the spindle. The spindle is turned by the spindle-wheel carrying the upper bur rapidly around with it. This rapid motion of the upper bur crushes the corn between the two burs. The crushed corn runs from the burs down through a spout into a sifter. The sifter is made of fine wire, through which the ground corn is shaken, and the husks or bran is shaken out at the end of the sifter.

Q. What is that part of the corn shaken through the sifter called ?

A. *Corn-meal*, or corn-flour.

Q. How is corn-bread made ?

A. The meal is mixed with lard and water.

Q. What is the mixture called ?

A. It is called *dough*.

Q. What is done with the dough?

A. It is baked in a stove, range, or oven.

Q. When baked, what is it called?

A. It is called *corn-bread*.

Observation.—Corn-bread well made is healthy food for man. Ears of corn crushed in a mill is excellent food to fatten cattle and hogs. Horses, cows, hogs, sheep, chickens, ducks, geese, turkeys, and Guinea fowls, all eat corn and fatten on it. Without corn, the meat and poultry we eat would not be good; for animals and fowls do not fatten so well on other food.

Find the meaning of the words—*Ditch, spindle, circle, diameter, motionless, meal, flour, lard, mixture, dough, excellent, poultry.*

CHAPTER XIII.

CORN, CONTINUED: CORN-TASSEL; SELECTION FOR SEED;
PRICE PER BUSHEL; HOMINY.

Q. What is meant by corn-silk?

A. It is the female flower of the corn.

Q. What is corn-tassel?

A. It is the male flower of the corn.

Q. What did the poet Longfellow say about corn?

A. He said—

“And the cornfield grew and ripened,
Till it stood in all the splendor
Of its garments green and yellow
Of its tassels and its plumage.”

Observation.—In selecting corn for seed, select the largest ears on the stalk. Husk them, and make a re-selection from the ears, taking only those which appear sound and ripe. This must be done in the fall, and in the field. In the spring select again, and in shelling the corn throw out the small and badly shaped grains at each

end of the ear. The grains in the middle of the ear are the best seed.

Q. How many rows of grains are generally on an ear of corn?

A. From eight to twenty-four.

Observation.—The rows of grains on a cob or spike of corn are always *even*. An *odd* number of rows is unknown in the history of corn. It has been held that corn is the least impoverishing to land of all crops, for it returns more plant-food to the earth than any other, and the quality of the food returned to the earth is more nourishing to plants than the food from any other vegetable.

Q. What is the highest product of corn in the United States?

A. Twenty barrels, or one hundred bushels to the acre.

Q. How many barrels of corn to the acre are generally produced by land well manured and cultivated?

A. Ten barrels, or fifty bushels; and this number, by superior cultivation, is now often exceeded.

Q. What is generally the price of corn per bushel?

A. From 80 cents to \$1.25 per bushel.

Q. Where is corn generally sold?

A. In all the cities of the United States, and it is shipped to nearly all the large cities of Europe.

Q. How is it often treated before shipping?

A. It is kiln-dried, to prevent heat and germination in the ship.

Observation.—Large quantities of corn are shipped from Baltimore to England and Ireland, as well as to other European countries.

Q. What is hominy?

A. It is corn which has been hulled.

Q. How is corn hulled for hominy?

A. It is hulled by beating in a vessel called a hominy-mortar.

Observation.—Hominy is extensively manufactured this time in mills constructed for the purpose. It is healthy and nourishing food.

CHAPTER XIV.

WHEAT: WHERE GROWN; CLOVER.

Q. In what country was wheat first grown?

A. In Syria.

Q. In what other countries was it next grown?

A. In Egypt, Greece, and Italy.

Q. What did the poet Homer say of wheat in Egypt?

A. He said—

“The soil untilld a ready harvest yields,
With wheat and barley wave the golden fields.”

Q. What does the historian Pliny say of wheat in Africa?

A. He says, “Nature has gifted wheat with wonderful fruitfulness, because it was intended to be the principal nourishment of mankind.”

Observation.—Wheat in Africa has been known to produce 400 straws from one grain planted in the soil of the country. In Egypt, when the land is enriched by the overflowing of the river Nile, wheat has borne 100 grains in one head. It derives advantages from frost, as it is well known that the harvest is generally more abundant after a severe winter. It is observed that wheat which has passed the winter beneath the snow, yields the finest and most abundant harvest.

Q. What soils are best suited to the growth of wheat?

A. Stiff or clayey soils; but it is generally cultivated on all classes of soils.

Observation.—Soils of the lighter class are not the best suited to wheat; they are better for corn and garden

vegetables. Rich, heavy loams, and stiff clays with a proper portion of sand, always produce the heaviest wheat.

Q. How should land be prepared for wheat?

A. First carefully plow it.

Q. What second?

A. Carefully harrow it.

Observation.—Land intended for wheat should be put in the best condition with respect to cleanliness and fertility. As it receives no farther culture after it is sown, the soil intended for its growth should be brought in as fine a condition as possible.

Q. Can soil be too rich for the proper growth of wheat?

A. It can be. Land highly manured is apt to produce too rapid a growth of straw, and but little grain.

Q. What is an established law respecting the growth of plants?

A. That an extraordinary growth of the stem and leaves is always at the expense of the fruit or seed.

Observation.—As it is during the heat of summer that wheat matures its seed, it is more liable on this account to suffer from a too vigorous growth of straw than other plants that ripen later.

Q. What crop should wheat follow?

A. A crop of clover.

Q. At what time should clover be turned under by the plow?

A. In August and the early part of September.

Observation.—Years of practice have confirmed the opinion that clover is the best preparative of the ground for wheat.

Find the meaning of the words—*Derive, abundant, condition, fertility, establish, extraordinary, vigorous, preparative, opinion.*

CHAPTER XV.

WHEAT, CONTINUED: PLOWING; SOWING; HARVESTING.

Q. What should be strictly observed in plowing the land for wheat?

A. See that the sward is turned *flat*, and all the vegetable matter turned under or buried.

Q. When should the wheat be sown?

A. In ten or fifteen days after the plowing.

Q. Why so?

A. Because the plowed soil, in this time, will be settled, and decomposition of the sward commenced.

Observation.—Some farmers contend that the operations of plowing, harrowing, and sowing should immediately follow each other; but this is not generally approved.

Q. What has an eminent English farmer said on this subject?

A. He said the best way of sowing clover lands with wheat, is to plow the land ten or fifteen days before you sow it, that it may have time to get dry, and after rain to make it dress well.

Q. What do other distinguished farmers say?

A. They say, "plow the land at least a month before the time of seeding, that time may be allowed for the soil to settle."

Observation.—Good crops of wheat are raised in stiff soils, after crops of corn, oats, tobacco, peas, beans, etc. Seed wheat should be selected from the earliest and most perfect crop of the preceding year. When wheat lands are rough on account of hard clods of earth they should be rolled by a heavy roller, and harrowed before seeding.

Q. How is wheat sown?

A. Broadcast by hand, or in drills by a machine.

Q. When should wheat be sown?

A. In time for its roots to take deep hold on the ground before frost sets in.

Q. What time is generally named?

A. From the middle of September till the first of November.

Observation.—Wheat sown early throws out a greater number of branches from one grain than that which is sown late.

Q. How many bushels of wheat to the acre ought to be sown?

A. From two to two and one-half bushels, broadcast, and one bushel and a half if drilled.

Q. When is wheat harvested?

A. From about the 25th of June to the 10th of July.

Observation.—On the eastern shore of Maryland, it ripens earlier than on the western shore.

Q. How is wheat harvested?

A. It is cut off when ripe close to the ground, and bound up in sheaves by a machine drawn by horses.

Q. How is the grain separated from the straw and chaff?

A. By a machine moved by horse- or steam-power.

Q. When separated from the straw and chaff, what is done with the grain?

A. It is put in bags or sacks, about two and one-half bushels in each one.

Q. Is it then ready to be manufactured into flour?

A. It is.

Q. Where is this done?

A. In a mill called a merchant-mill.

Q. How is it ground?

A. Between two stones called burs, as described for grinding corn.

Q. How is a merchant-mill driven?

A. Generally by water-power in the country, and by steam-power in a city.

Find the meaning of the words—*Contend*, *eminent*, *distinguished*, *select*, *machine*, *separate*, *manufacture*, *merchant*, *describe*.

CHAPTER XVI.

WHEAT, CONTINUED: ELEVATORS; BOLTING; MALT.

Q. When wheat is ground or crushed between the burs, where is it carried?

A. It is carried down through a spout to a chest or box below the burs.

Q. What next?

A. It is dipped up by tin boxes and carried up a spout to the second or third story of the mill.

Q. What are these tin boxes called?

A. They are called elevators.

Observation.—These elevators are so arranged as to come down the spout empty, pass through the chest, dipping themselves full of ground wheat, and pass up another spout, emptying their contents into a place called a hopper-boy. The ground wheat, heated by the rapid motion of the burs in grinding, is spread out on a floor of the mill to cool. When cool, the hopper-boy carries the ground wheat to a spout, down which it falls into another machine called a *bolt*. This machine bolts the ground grain, or, in other words, separates the hull of the wheat or bran, as it is called, from the flour.

Q. What is the fine cloth through which the flour is sifted called?

A. Bolting-cloth.

Q. When and by whom was the hopper-boy invented?

A. About the year 1786, by Oliver Evans, of Delaware.

Q. After bolting, what is done with the flour?

A. It is put in barrels made of wood, 196 pounds in a barrel, or in small bags, one-eighth of a barrel, or $24\frac{1}{2}$ pounds in a bag.

Q. What is *malt*?

A. It is grain steeped in water till it germinates, or sprouts, and then dried in a kiln.

Q. What is yeast?

A. It is the foam or froth of beer or other liquor in fermentation.

Q. What is malt yeast?

A. It is the foam of malt used for raising dough for bread, making it light or puffy.

Q. How is wheat bread made?

A. The wheat flour is put in a pan mixed up with malt, or another kind of yeast, and water,—this is called *dough*.

Q. What is done next with the dough?

A. It is put in a warm place until it ferments, or rises, by the action of the yeast.

Q. What is done when the dough rises?

A. It is baked in a range or oven, and when baked, it is called bread, the food of mankind, and often called “the staff of life.” To get bread implies sufficient food for the support of man without luxury. So you see the great importance of the grain called wheat, the art of grinding it into flour, and making it into bread.

Find the meaning of the words—*Elevator, rapid, bolt, hull, bran, fermentation, imply*.

CHAPTER XVII.

ROTATION OF CROPS: TOBACCO.

Q. What is meant by rotation of crops?

A. It is a frequent change, on the same land, from one crop to another.

Observation.—For instance, plant your land one year in corn; the next, wheat; the third, clover; or, first three years, grass; fourth year, wheat; fifth year, corn, and so on.

Q. What is to be observed in relation to rotation of crops?

A. Crops that require the same kind of soil-food,

should not follow each other, nor those that are similar in their mode of growth.

Q. What does rotation in crops do in respect to plants?

A. It enables one plant to prepare food for another.

Observation.—One crop continued on the same ground for many years, consumes the plant-food of a particular kind faster than it can be supplied by natural or artificial agencies.

Q. What kind of soil produces the best tobacco?

A. The soil of woodland, called new ground.

Q. When may woodland be cleared for tobacco?

A. In winter time, when little else can be done on the farm.

Q. How is tobacco raised?

A. From the seeds, the smallest and tenderest of all seeds handled by the farmer.

Q. When ought tobacco seed be sown?

A. In the month of February.

Q. Where should they be sown?

A. In fresh woodland soil, known as a tobacco-bed.

Q. How is a tobacco-bed prepared for the seed?

A. By burning a large quantity of waste-wood, brush, and leaves on the ground chosen for the purpose.

Observation.—Select a piece of rich woodland soil, say fifty feet square, cut down all the wood and undergrowth found upon it, raking off, at the same time, all the leaves and litter of every kind, so as to expose the clean surface of the soil. Then gather waste-wood, brush, and leaves, and cover the ground well, so that fire, consuming the wood, will produce a heat sufficient to kill all roots and wild seeds in the soil. Set all this combustible matter which you have placed on the tobacco-bed on fire, and if, at any place, the fire is dull, throw on more brush, etc., that the whole bed may be well heated. Wait for all the fire to go out, and then spade or dig the ground to a depth of five inches, mixing well the wood ashes with the soil. Then rake the soil well, until it is well pulverized.

Mix the tobacco seed with dry ashes or fine sand, and sow sparingly two or three ways over the ground, so that the seed may fall regularly upon it. Then roll (not rake) or tramp the ground under foot, so as to make a smooth, hard surface. The germ of the tobacco seed is so small and tender, that if buried too deep it cannot "come up." After the seed is sown, cover the bed again with brush and leaves to prevent it from freezing. When the spring is fairly open, remove the covering from the bed, rake off all litter, and expose the surface of the bed to the sun. The seeds will soon "come up," and plants will be ready for transplanting about the first of July, or sometime before, in the tide-water counties of Maryland and Virginia.

Q. How is land prepared for tobacco?

A. It is plowed and harrowed, then "scraped" into hills, or generally at this time, after opening a furrow for the fertilizer, the soil is thrown into ridges by the plow passing up one side of the open furrow and down the other, forming a ridge of light soil directly over the manure or fertilizer.

Q. What is meant by "scraping tobacco hills"?

A. It means scraping up the soil with a hoe into little hills about three or four inches apart.

Find the meaning of the words—*Rotation, frequent, instance, relation, observe, require, mode, similar, enable, respect, artificial, agency, litter, combustible, pulverize, prevent, transplant.*

CHAPTER XVIII.

TOBACCO, CONTINUED: TREATMENT.

Q. How are tobacco hills scraped with respect to height and distance apart?

A. They are scraped in rows about two or two and

one-half feet apart, three or four inches high, and flattened off on the top to make a smooth place for the plant.

Q. When is the tobacco plant transplanted?

A. As soon as the plants raised in the tobacco-bed are large enough to be handled.

Q. How is the plant planted in the hill?

A. Its roots are placed in a small hole, made soon after a rain, on the top of the soil or ridge, and the soil pressed around them.

Observation.—If the plant is well set in the hill, it will soon grow vigorously. As it grows, all weeds and grass must be kept down, so that the whole surface of the ground may be clean.

Q. When is tobacco cut down and housed?

A. In the fall of the year, before frost comes.

Q. Why so?

A. If the plant is "nipped" by the frost it is worthless, and has no commercial value.

Observation.—Tobacco, like corn, requires almost constant attention when growing. It is subject to the attack of worms, hatched on the plant from the eggs deposited there by an insect known among farmers as the "horn-blower." One of these worms when full grown can eat a whole plant of tobacco in twenty-four hours, and they at times become so numerous as to threaten the whole crop of tobacco with destruction.

Q. When tobacco is first cut in the fall, how is it treated?

A. It is placed on the ground in small heaps called "sun-heaps," if the weather is warm; if cool, they are called "frost-heaps."

Q. How long ought green tobacco lie in these heaps?

A. About twenty-four hours, to wilt or wither.

Q. Why wither?

A. When first cut, the plant is too brittle for the rough handling in housing.

Observation.—From twenty to fifty plants make a heap.

If the plant, after cutting, gets sun-burnt, it is spoiled; but it takes a hard frost to spoil it after it is withered in the frost-heap. Nothing short of a *freeze* will injure it. The plant is taken from the heaps and hung up in the tobacco barn to cure or dry. Sometimes fire is used to hasten the curing. When cured, it is, on damp, rainy, days during winter, taken down, the leaves stripped off, the stalk tied up in bundles and "bulked," or heaped up on the barn-floor. In this bulk the tobacco leaves acquire a sweet and pleasant flavor. It must be taken down, however, and rebulked occasionally, for fear it might ferment. In the spring, when perfectly *cured*, it is packed in hogsheads for market.

Q. What is meant by staple?

A. The principal commodity or production of a country.

Q. What was the original staple of Maryland?

A. Tobacco. It was also a currency, passing from hand to hand like money.

Observation.—Tobacco is prepared in manufactories for chewing, smoking, and snuffing. It is smoked in pipes made of clay, and in small rolls called cigars and cigarettes.

Find the meaning of the words—*Vigorously, commercial, destruction, heap, injure, acquire, flavor, original, currency.*

CHAPTER XIX.

RYE: ERGOT.

Q. Of what country is rye a native?

A. It is said to be a native of the island of Crete.

Q. Where is rye extensively grown?

A. In most parts of the continent of Europe.

Q. Of what countries is it principally the bread grain?

A. Of the countries in the north of Europe.

Observation.—With respect to the mode of culture, rye resembles wheat. Rye requires a rich soil. It ripens earlier than wheat, and both its green and dry straw are extensively used for feeding horses and cattle, and particularly for feeding milch-cows in the spring, before the other grass is high enough to be cut or pastured. This is called *soiling*, a most important part of farm economy. Rye stands dry weather better than wheat; but is more apt than wheat to suffer from wet. It is a hardier plant than wheat, and less subject to disease. Rye grows much higher than wheat, and its grain is distilled into spirit. When this grain is intended for bread, it should be harvested early, even before the milk has departed from the grain.

Q. What is ergot?

A. It is diseased rye.

Q. What is this diseased rye generally called?

A. It is called spurred rye, blasted rye, and poison rye.

Observation.—Some grains in the rye-head become diseased, and grow out, looking like the spurs of a chicken, only, unlike the color of the chicken's spurs, it is black. Rye, with those blasted grains in it, is poisonous in bread and spirit. It is sometimes called "*horned rye*."

Q. For what other purposes is rye-straw used?

A. For the beds of horses, the thatching of roofs, and making hats.

Q. What did Shakespeare say about straw hats?

A.

"You sunburnt sicklemen of August weary,
Come hither from the furrow, and be merry;
Make holy-day; your rye-straw hats put on."

Find the meaning of the words—*Cattle, milch, imported, economy, principally, resemble, extensively, disease, distil.*

CHAPTER XX.

OATS.

Q. Of what place is oats supposed to be a native?

A. Of the island of Juan Fernandez.

Q. From what grain is it supposed that oats sprang?

A. From barley.

Q. What has an English poet said on this subject?

A. He said—

“Who soweth his barley too soon or in rain,
Of oats and of thistles shall after complain.”

Q. What did Virgil say of oats?

A. He said—

“Flax, oats, and poppies burn the tender-soil,
Yet sown by turns, they recompense your toil.”

Observation.—Pliny notices the cultivation of oats in Italy. Oats, as food for horses, was known in Rome as early as the Christian era.

Q. How is the ground prepared for oats?

A. Plow and harrow it, as for corn.

Q. At what time of the year?

A. As early in the spring as possible, say the latter part of March or first of April.

Q. How many bushels to the acre should be sown?

A. From one and a half to two and a half bushels. Sow broadcast, or in drills, like wheat.

Observation.—Oats is a nourishing food for horses and for mankind. A poet says—

“Oats for their feast the Scottish shepherds grind.”

A diet drink of oats was used in the olden time, and the inventor of this drink kept himself alive by it to the age of 120 years without disease. Oats as food for man is now extensively used in this country as a healthful article

of diet. This diet is found in hotels and in many private families as the first course at the breakfast table.

Q. What has an English physician said of oats?

A. "A famous remedy for acute distempers is made of oatmeal boiled in water."

Q. What is the use of the chaff of oats?

A. It is good to pack dried meat in for shipping to warm climates.

Observation.—Oat straw is good for feeding cows, and they eat it with pleasure and avidity; but it is not so good for horses.

Find the meaning of the words—*Subject, recompense, thistle, era, inventor, famous, remedy, climate, avidity.*

CHAPTER XXI.

POTATOES.

Q. What are potatoes?

A. It is said "they are the rich man's luxury and the poor man's bread."

Q. Of what country is the potato a native?

A. Of South America.

Observation.—In the year 1693, potatoes were sent into Ireland by Sir Walter Raleigh. He planted them in his garden, and thinking the "potato-apple" on the tops was all the fruit they bore, he ordered them to be dug up as worthless. The digging exposed firm potatoes in great abundance, and Falstaff is made to say, "Let it rain potatoes."

Q. What did Lord Bacon say of potatoes?

A. He said, "Put potato roots in a pot with earth; set the pot in the ground, and a new variety of roots will grow."

Q. How are new varieties of the potato generally produced?

A. From the seed-balls on the vines.

Observation.—New varieties have been produced from the roots. In Van Dieman's Land a half bushel of roots was planted, and when digging-time came, five new varieties were dug up, viz., the white champion, the round red, the kidney, the long red, and the miller's thumb.

Q. When should the land for planting potatoes in the spring be plowed?

A. Early in the preceding autumn.

Q. How should they be planted?

A. Either in hills or drills, twenty-five inches apart.

Observation.—Lay off the ground in furrows twenty-five or thirty inches apart, and about four inches deep. Drill the potatoes in the furrow, each piece of seed potato from seven to thirteen inches apart. Throw in stable manure or commercial fertilizer, not less than 500 lbs. to the acre, and cover all about three inches deep.

When planted in hills let the furrow be crossed, and plant at the crossing, as in the case of corn. Covering may be done with the hoe or plow.

Q. When should potatoes be planted?

A. As early in the spring as possible.

Q. What is the time for late planting?

A. From the middle of June to the middle of July.

Q. How should they be worked?

A. Plow between the hills or drills, deep and often. Let no weeds grow.

Q. What does the poet Gay say of potatoes?

A. He says—

“Leek to the Welsh, to Dutchmen butter's dear;
Of Irish swains potato is the cheer.”

Observation.—The sweet potato is extensively raised in the States on the south Atlantic. These have been planted much like common potatoes. Break up the ground in the fall; harrow it well in the spring; then with a bar-share plow throw three furrows together. To

complete the ridge, take a hoe or fine rake and draw the dirt up first from one side then the other, to about the height potato hills are made. Open a furrow on the top of the ridge, and drop the potato cuts five or six inches apart, and cover two inches deep. Let these ridges be made thirty inches apart.

It is best to sprout the roots in a hot bed, and when the sprouts are large enough, draw and plant like cabbage.

About 100 years ago, an English gentleman advertised for a cook, and used the words, "None need apply who cannot cook a potato well."

Find the meaning of the words—*Luxury, abundance, variety, preceding, autumn, complete.*

CHAPTER XXII.

CABBAGE.

Q. What is cabbage?

A. It is an ancient and well-known garden vegetable.

Q. By whom was cabbage held in great esteem?

A. The Greeks.

Q. What did the ancient Romans think of cabbage?

A. It is said that, having expelled physicians from their country, they preserved their health for six hundred years by using cabbage as their only medicine in every disease.

Q. What did Columella say of cabbage?

A. He said—

"That herb which o'er the whole terrestrial globe
Doth flourish, and in great abundance yields,
To low plebeian and haughty king,
In winter, cabbage, and green sprouts in spring."

Q. What kind of soil is adapted to cabbage?

A. Any very rich soil, but a strong loam is preferable.

Observation.—The preparation of land for cabbage is similar to that for potatoes.

Q. How is the ground prepared for raising the plants?

A. It is well to prepare it as in the case of tobacco.

Q. When should the seed be sown?

A. Early in April.

Q. When ought the plant to be transplanted?

A. After a rain, from the first of April to the first of July.

Observation.—Lay off the ground, and plant in ridges or hills from two to two and one-half feet apart. Work the ground well while the plant is growing, with hoe or plow, and keep down all grass and weeds.

Bacon and cabbage boiled together make a strong and healthy food for man. Cabbage is made into kroust for winter use, and when boiled with pork the food is lighter and healthier than bacon and cabbage, the strong food of the laboring man.

Find the meaning of the words—*Expel, ancient, physician, preserve, terrestrial, flourish, yield, adapt, preferable, kroust, bacon.*

CHAPTER XXIII.

THE CARROT: A USEFUL FOOD FOR CONSUMPTIVES.

Q. Where was the carrot first found?

A. A very old writer says it was first found on the mountains of Germany.

Q. When were carrots introduced into England?

A. In the reign of Queen Elizabeth.

Q. What does Dr. James say of carrots?

A. He says, "they strengthen and fatten the eater, and are a very proper food for consumptive persons."

Q. What soil is best suited to carrots?

A. A rich sand, a sandy loam, a dry warm loam, or rich gravelly loam.

Q. How should the ground be plowed?

A. As deep as possible.

Observation.—The ground should be well plowed and pulverized, and all weeds, stones, and other obstructions removed.

Q. When should the ground be plowed?

A. In the fall of the year.

Q. When should manure be applied?

A. At the time of plowing.

Q. If commercial fertilizer is used, when should it be applied?

A. At the time of sowing the seeds.

Q. When should the seeds be sown?

A. In early spring, as soon as the ground can be put in order.

Q. How is the land prepared for carrots?

A. Form it into ridges, and sow the seed upon the top of them.

Observation.—The seed may also be sown in rows. In this case the ground must be worked deep and well manured. After-cultivation consists in hoeing and weeding with the horse and hand hoe. The carrot is very nutritious as food for man and beast. It fattens animals and is excellent for milch-cows.

Q. What quantity of carrots to the acre may be raised?

A. As many as from 500 to 1000 bushels.

Q. What is the average crop from careful tillage?

A. From five to eight hundred bushels.

Q. How many pounds of carrot seed will seed an acre of land?

A. About four pounds.

Observation.—An English writer says, "Carrots are

generally served at table with boiled meats; they make an excellent soup and an agreeable pudding."

Q. What are the seeds of the wild carrot used for?

A. A tea made of the seeds is used for diseases of the breast and lungs, and in cases of stone and gravel.

Find the meaning of the words—*Introduce, consumptive, obstruction, nutritious, relish.*

CHAPTER XXIV.

THE PARSNIP: "IT IS NERVE AND BRAIN FOOD."

Q. Whence came the parsnip?

A. It was first found in Germany.

Q. What is said of it?

A. It loves cold regions.

Q. What is said of the parsnip as a medicine?

A. "It restores vitality to the eater. It is nerve and brain food."

Q. What soil is best suited to the parsnip?

A. A deep, rich, and sandy loam.

Q. How is the land prepared for the parsnip?

A. It is plowed in the fall that it may be pulverized by the frosts of winter.

Q. How is it prepared for seeding?

A. It is prepared in rows, as in case of the carrot.

Observation.—All animals are fond of parsnips. For milch-cows they are in high degree favorable, giving a good flavor and richness to their milk. It may be cultivated in ridges or drills like the carrot. The distance between the drills should be no wider than will admit the cultivator, and the plants in the rows should stand from eight to ten inches apart. This root is not good for the table until it has been touched by the frosts of winter. In this climate it is thought best to sow parsnip seed

in the fall, about November, that they may escape the drought of April and May, which often comes in this latitude. Some gardeners recommend the sowing of a few radish seeds with the parsnip seed to assist it in breaking the crust of the earth when "coming up." The parsnip is nutritious on account of the large amount of sugar it contains.

Find the meaning of the words—*Regions, admit, escape, drouth or drought, latitude.*

CHAPTER XXV.

THE ONION: HOW USED IN ANCIENT TIMES.

Q. Of what country is the onion a native?

A. Of Asia.

Q. Where do the best onions grow?

A. In Egypt.

Observation.—The onion was one of the divinities of Egypt. The ancient people of that country swore by the onion, solemnly calling it to witness their oaths.

Q. What did the ancient Romans think of onions?

A. They said they were wholesome, strengthening, good to cleanse the stomach, and beautify the complexion.

Q. What soil is best suited to the growth of onions?

A. A mellow, dry soil, and the cleaner and richer the better.

Q. When should the soil be plowed?

A. Late in the fall of the year.

Observation.—In April, or as soon as the soil is dry enough to pulverize well, lay it off in rows a foot apart, and, after fertilizing well, place the onion sets in the row, and cover them shallow, with hand or hoe. Planting onions in the fall is highly recommended in this climate.

Q. How are onion sets raised?

A. Sow the onion seeds in drills made in very rich soil, work the ground well, keeping down all weeds and grass. As soon as the tops of the young onions die, take up the roots and keep them for planting in the next fall or spring-time. This crop is valuable, and pays the farmer well for his trouble.

Observation.—Many persons shun onions on account of the strong smell they impart to the breath. This may be remedied by eating *walnuts* or a few parsley leaves immediately after the onions.

Find the meaning of the words—*Divinities, solemnly, beautify, complexion, mellow, shallow, valuable, remedied, immediately.*

CHAPTER XXVI.

THE TURNIP: ITS MEDICINAL PROPERTIES.

Observation.—The native country and the origin of the English name of this vegetable are unknown. Under the careful management of the farmer, however, it not only affords food for man, but becomes a valuable crop to the farmer by affording him winter food for his cattle.

Q. What is the use of the leaves of turnips?

A. The leaves serve as food for cattle in autumn; in winter the roots are good food for man and beast.

Q. What is an average crop of turnips to an acre of land?

A. About six hundred bushels.

Q. What is the time for sowing turnips?

A. The time for sowing varies according to climate, season, and circumstances.

Q. What is the usual time?

A. From the middle to the last of July; some sow as late as the 10th of August. Ruta-baga early in June.

Q. How is the ground prepared for turnips?

A. Plow it deep immediately after grain harvest; when seeding-time comes, harrow it well.

Observation.—Gather all the weeds and grass collected by the harrow, that no litter be left on the ground.

Q. What quantity of seed is sown to the acre?

A. A quart of seed is sufficient.

Q. How are they sown?

A. Either broadcast by hand, or in drills by a machine.

Q. How does this machine work?

A. It lays out the land in drills, drops the seed in the earth, covers, and rolls them down.

Q. What produces the largest roots?

A. Rich soil and early sowing.

Q. What are the medicinal qualities of turnips?

A. They were used by the ancients to restore frozen feet, being first boiled in water and then applied as a fomentation.

Find the meaning of the words—*Origin, afford, average, climate, season, circumstances, fomentation.*

CHAPTER XXVII.

THE BEAN: WHOLESOME FOOD FOR MAN AND BEAST.

Q. What is said of the bean?

A. It is a field and garden plant, affording food for men and animals.

Q. What soil is preferable for beans?

A. Light, sandy soil.

Q. How are beans planted?

A. In hills or drills.

Observation.—The bean known as the Lima bean is, perhaps, the most valuable of all beans. It is good green or dry, affording a desirable and wholesome food for man.

Q. How is this bean generally planted?

A. In hills, in a very rich soil. Poles ten or twelve feet high must be planted in the ground for the bean-vines to run on.

Observation.—There are many varieties of the field and garden bean. They are often sown in drills or broadcast in the field. All require a rich and light soil. Forty or fifty bushels to the acre of land may be harvested, and they generally sell for about a dollar a bushel.

Q. What did the ancients say of beans?

A. Virgil said, “If beans be soaked in dregs of oil and nitre before being planted, they will produce beans of a far greater size.”

Q. What was said of the meal or flour of beans?

A. The Romans said it was a celebrated cosmetic for the ladies, smoothing the skin and taking all wrinkles away.

Q. What is said of green beans?

A. They are, when boiled with bacon, an elegant food for man, because they purify and enrich the blood. Pork and beans is a favorite dish in New England.

Find the meaning of the words—*Dregs*, *nitre*, *cosmetic*, *purify*, *enrich*.

CHAPTER XXVIII.

THE PEA: GOOD FOR SCORBUTIC HUMORS.

Q. Of what countries is the pea a native?

A. Of France and Italy.

Q. What is said of the pea?

A. It is very extensively cultivated for use in the green state.

Q. How is land prepared for the pea?

A. Plow it in the fall, that it may be pulverized by the rains and frosts of winter.

Q. What kind of soil should be chosen?

A. A loose, warm soil, moderately rich.

Q. How are peas planted?

A. In drills.

Observation.—After the land is prepared by the liberal use of the harrow, lay off the ground in drills from two and a half to four feet apart. Distribute the peas in the drill as near to each other as the judgment of the farmer may dictate.

Q. What quantity of peas is seeded to an acre of ground?

A. From a bushel and a half to two bushels.

Q. When should peas be planted?

A. As early as possible after the frost is out of the ground, in spring.

Observation.—This crop is very profitable to the planter. Peas are used as an early vegetable for the table, and they are dried for shipping to other countries, as well as extensively packed in tin cans for winter use.

Q. What is said of the medicinal properties of peas?

A. "They sweeten the blood, and correct scorbutic humors."

Q. How are peas prepared for packing in cans for winter use?

A. They are picked from the vine in the field by girls and boys, and shelled in packing-houses. Persons old and young of both sexes are the shellers, and sometimes whole families, consisting of father, mother, and children. They begin work at four o'clock in the morning, and continue until six in the evening, stopping at their convenience for dinner. For this work they are paid five cents a pot, which holds two quarts and a pint of shelled peas. Payment is made as soon as the peas are measured. Good shellers can earn from one to two dollars per day; little girls and boys, from twenty-five to fifty cents per day.

Find the meaning of the words—*Liberal, distribute, dictate, scorbutic.*

CHAPTER XXIX.

LETTUCE: A PROMOTER OF SLEEP.

Q. At what time was lettuce first served at tables?

A. About five hundred and fifty years before the Christian era.

Q. How was it served?

A. In its natural state.

Q. Where was it thus first served?

A. At the royal tables of the Persian kings.

Q. What does Pliny say of lettuce?

A. He says, "black lettuce yielding a great quantity of milky juice causing sleep" was known to the Romans.

Observation.—It is said that the Romans, being convinced of certain medicinal properties which this plant possessed, devised means to grow it at all seasons of the year.

Q. What did Columella write about lettuce?

A. "And now let lettuce, with its healthful sleep,
Make haste, which of a tedious, long disease
The painful loathing cures."

Q. How was this vegetable esteemed by the Romans?

A. As "a clearer of the senses," and "a promoter of sound sleep."

Q. When was lettuce first cultivated in England?

A. About the year 1562.

Q. What did Gerard, an English botanist, think of lettuce?

A. In 1597, he wrote, "Lettuce makes a pleasant salad, being eaten raw with vinegar, oil, and salt; but if boiled, it nourishes more."

Observation.—Gerard further says that "lettuce taken before meat stirs up appetite, and eaten after supper it keeps away drunkenness from wine, because it stays the vapors from rising up to the head."

Q. What does ancient medical authority say of this plant?

A. It says, "Lettuce cools a hot stomach called heart-

burning." "It is emollient, cooling, laxative, and aperient."

Q. What did Galen think of lettuce?

A. He says, "In the decline of age, I am naturally wakeful. I suffer much from want of sleep, and to eat lettuce in the evening is my sovereign and only remedy."

Observation.—Lettuce is raised for early use in hot-houses. Hot-house plants may be set out in a rich soil in the open air. For later use, the seeds are sown in rich garden soil. Let no weeds grow with it. They spoil its flavor.

Find the meaning of the words—*Convince, possess, devise, botanist, salad, appetite, vapors, emollient, laxative, aperient, sovereign.*

CHAPTER XXX.

THE BEET: SOMETIMES USED TO MAKE SUGAR.

Q. Of what country is the beet said to be a native?

A. Pliny says it is a native of Sicily.

Q. When were beets introduced into England?

A. About the year 1548.

Q. What is the nature of the beet?

A. Its nature is to penetrate low into the ground, and it therefore prefers a deep, loose soil, in which it can vegetate freely.

Q. When should the soil be broken for beets?

A. In the fall or winter.

Observation.—The importance of thorough plowing, harrowing, rolling, and all other means of pulverizing soils, is now well understood. This must be well done for raising beets of every kind.

Q. When is a good time to sow beet-seed?

A. As soon in the spring as the frost is entirely out of the ground, say from the middle of April to the middle of May.

Q. What should be done before sowing beet-seeds?

A. Pour moderately warm water over them, and let them soak one or two days.

Q. How should the seeds be planted?

A. In drills or rows, by means of a drill machine.

Q. How many seeds are sufficient to plant an acre?

A. From three to four pounds.

Observation.—The beet crop is a valuable one; both tops and roots for animals, and the roots for man. All animals eat them with avidity and fatten on them. They are excellent winter food for all kinds of cattle. Beets are sometimes used for making sugar. Two thousand bushels have been raised on an acre of good land. Every variety of beet requires the same mode of cultivation.

Find the meaning of the words—*Introduce, penetrate, vegetate.*

CHAPTER XXXI.

THE EGG-PLANT: HOW RAISED AND COOKED.

Q. What is an egg-plant?

A. It is a species of nightshade.

Q. Of what country is it a native?

A. Of the East Indies.

Q. How is this plant raised?

A. From its seed, sown in a hot-bed in March.

Q. At what time should the plant be transplanted in the open air?

A. In the month of May, as soon as the plants are large enough to handle conveniently.

Observation.—This plant, like potatoes, requires a rich, sandy soil or light loam. The plant will ripen in July, and it is a valuable crop for market.

Q. What is said of the medicinal virtues of the egg-plant?

A. "They furnish excellent nerve- and brain-food."

Q. How are they cooked in the West Indies?

A. "Scoop out the inside or seedy part and fry it in lard. Boil the outside in water moderately salt, and, when drained of water, fill it with the fried part, and let it appear whole on the table."

Q. How are they usually cooked?

A. They are cut in thin slices and fried in lard; or, after lying in salt and water for a few hours, sliced: they may be boiled, and served as mashed turnips.

Find the meaning of the words—*Nightshade, nerve, scoop.*

CHAPTER XXXII.

THE TOMATO: ANTI-BILIOUS, AND A PREVENTIVE OF CHILLS AND FEVERS.

Q. What can be said of the tomato?

A. It is an excellent vegetable, of American origin.

Q. By what other name has it been called?

A. The love-apple.

Q. What medicinal property has it?

A. It is anti-bilious, and operates as a preventive of chills and fevers.

Q. How are tomatoes raised for early use?

A. The seeds are sown in a hot-bed, where the plant grows till it is large enough for transplanting.

Q. What is the stem on which it grows called?

A. It is called a vine.

Observation.—The young vine may be raised quite early by sowing the seed in a rich, sandy soil, well exposed to the sun. The plants may be transplanted any time in June or July. The soil for this vegetable must not be very rich, for in this case “it will produce vines at the expense of the fruit.”

Q. What kind of plowing is best for the tomato?

A. Deep plowing.

Q. How may the tomato be raised from the seed in open air?

A. In May, plow and harrow the land, and throw up ridges by two furrows thrown together by a bar-share plow. Sow the seeds sparingly on the top of the ridges and lightly rake them in.

Observation.—A late crop of the tomato may be raised in this manner. The crop is valuable. This vegetable is extensively packed in tin cans for winter use, and shipped to all parts of the world. Early tomatoes bring a high price in market for table use.

Find the meaning of the words—*Tomato, origin, antibilious, preventive, bar-share, sparingly.*

CHAPTER XXXIII.

THE STRAWBERRY: THE BEST WAY TO CULTIVATE.

Q. What soils are best for the strawberry?

A. New forest land, a deep, gravelly loam, or a sandy loam.

Q. How is the soil prepared for this plant?

A. By clearing it of all weeds and seeds.

Q. How should it be plowed?

A. Very deep—a foot, if possible.

Q. Why so deep?

A. That the roots of the plant may penetrate below the effects of a dry season.

Q. How far have strawberry-roots been known to run?

A. To the distance of four or five feet.

Q. What kinds of manure is good for the strawberry?

A. A compost made of bog-earth, leaf-mold, or new forest soil, mixed with wood-ashes, and a little lime and salt.

Observation.—Use as a manure for this plant all the wood-ashes you can possibly procure, rejecting, if you can, every class of highly stimulating manures. These will produce runners and leaves at the expense of the fruit. When runners predominate, flowers and fruit disappear.

Q. How many strawberry-plants ought to occupy a square foot of ground?

A. Not more than two or three.

Observation.—It is better if the land be planted in corn or potatoes a year or two previous to planting it with strawberry-vines, so as to bring the land into a good, light condition. The plants must be worked and kept clean by the hoe or cultivator, but be careful, in the case of full-grown plants, that the hoe comes not too near them. The value of the crop of strawberries produced on one well-cultivated acre of land is known to be from \$100 to \$800; but if skill and labor are spared, no very valuable returns can be looked for. Select your plants from the most vigorous runners.

Find the meaning of the words—*Penetrate, effect, forest, stimulate, reject, disappear, predominate.*

CHAPTER XXXIV.

BERRIES: THEIR HEALTHFULNESS AND PECUNIARY VALUE.

Q. What are blackberries?

A. They are the fruit of plants commonly called briars.

Observation.—Briars are very troublesome to farmers; but, with all this, they bear an excellent fruit, and on this account should be cultivated like other fruit-bearing plants.

Q. What kind of a soil is good for blackberries?

A. A moist, loamy soil; and in such a soil this berry will sometimes prolong its bearing from four to six weeks. Once properly planted, they require little or no after-cultivation.

Q. How many plants will set an acre of ground?

A. About 500.

Q. How many quarts of berries have been produced from a single plant?

A. From six to eight quarts; and from one acre of land, 2,000 quarts have been gathered, worth 15 cents per quart.

Q. Are gooseberries profitable to the farmer?

A. They are, because they require but little time in their cultivation.

Q. Where should gooseberry bushes be planted?

A. In waste land along walls, fences, or in fence corners.

Q. What is the use of this fruit?

A. It is used for pies and tarts in the green state, and for the table when ripe.

Q. What of the currant?

A. It is one of the most valuable of all small fruits.

Q. What is the use of the currant?

A. In the green state, it is used for pies and tarts, like the gooseberry.

Observation.—The currant can be used to such advantage in a variety of ways, whether green or ripe, that it is indispensable on every farm. It makes good wine.

Q. What of the cranberry?

A. It grows and produces fruit in any damp situation.

Observation.—The surface of a low, damp meadow, covered with a few inches of sand, makes good soil for

cranberry bushes, and they will soon bear from 150 to 300 bushels to the acre.

Q. What of the raspberry?

A. It is one of our most excellent and wholesome fruits.

Q. What kind of soil suits the raspberry?

A. A rich soil, in the shade of a fence or wall. A deep loam is preferable. Break up the ground two feet deep, and enrich it with well-rotted compost.

Observation.—The above-mentioned berries are so well known to the farmer, that it is not necessary to dwell upon the particulars of their cultivation. They are mentioned to call attention to their great healthfulness and pecuniary value.

Find the meaning of the words—*Briar, tart, currant, indispensable, pecuniary.*

CHAPTER XXXV.

THE GRAPE: BENEFICIAL FOR THE GENERAL HEALTH.

Q. How is the grape propagated?

A. From cuttings, or short pieces of the stem or vine.

Observation.—The grape is easily and cheaply raised. It is best to prune off the cuttings in February, about two feet in length; bury them in the ground four or six inches deep. Leave them in the ground till warm weather in May; then take them up and plant them in a sloping position, leaving a bud an inch or two above the ground. After a year or two transplant them.

Q. How are they transplanted?

A. Make a ditch ten or twelve inches wide, from two to three feet deep, and as long as you wish it to be. Make a mixture of lime or old mortar, bones, old leather, decayed wood, hair, ashes, and barnyard compost, and mix with the soil, filling up the ditch. In this soil plant the rooted cuttings. The best kinds of grape are now

well known to the farmer, who can easily make his choice from the nurseries.

Q. Where should the grape be grown?

A. In the warmest and most sheltered situation, say the south side of a house, or the southern slope of a hill-side.

Q. To what disease is the grape subject?

A. To mildew; but sulphur sprinkled upon it on its first appearance will check it.

Q. How can insects troublesome to grapes be destroyed?

A. Sprinkle the vines with alkaline soapsuds.

Observation.—Prune the vines every year in February. If pruning is done too late in the spring, the vines will “bleed,” and grow weak from it.

Q. What has been said of the vine districts in France?

A. It is said that lung diseases are unknown to the people there.

Q. What is well known of the grape?

A. That the free use of well-grown and well-ripened grapes is decidedly beneficial to the general health.

Q. What kind of spirit is made from grapes?

A. A mild alcoholic spirit called wine.

Q. Is wine-making profitable to the farmer?

A. It is said to be; but the sale of the ripe grapes is more so, and more convenient to him.

Find the meaning of the words—*Propagate, vine, slope, position, mortar, mildew, sulphur, prune, beneficial, alcoholic.*

CHAPTER XXXVI.

THE HORSE-RADISH AND COMMON RADISH: EXCELLENT FOR DIGESTION.

Q. Of what country is the horse-radish a native?

A. Of England.

Observation.—The horse-radish is too valuable a plant to escape notice, even in these few pages. Gerard says, "it causes better digestion than mustard." It found its way to the English tables about the year 1597, but was first cultivated for its medicinal qualities.

Q. What did Fernel say about the horse-radish?

A. He said he discovered in it "a true friend to the stomach," a preventive of dyspepsia.

Observation.—Horse-radish root has a sharp, pungent smell, and a penetrating, acrid taste. It also contains a sweet juice, which sometimes exudes on the surface.

Q. For what did Sydenham recommend it?

A. For dropsies that follow intermittent fevers.

Observation.—It creates appetite and assists digestion. Scraped and infused in cold milk, it makes one of the best and safest cosmetics.

Q. What kind of a soil is favorable to its growth?

A. A moist, deep soil, very rich, and it well rewards the cultivator for the time required to mature the root. Prepare the ground as for carrots, and thinly sow the seed; or, if roots can be had, cut them in small pieces and plant like potatoes.

Q. Was the common radish known to the ancients?

A. It was; for the Greeks esteemed it above most other roots.

Observation.—A Greek writer thought so well of this root that he compiled one whole book on it alone.

Q. How did some of the ancients use it?

A. It was eaten boiled; but the Roman physicians recommended that it be eaten raw in the morning with salt, before taking any other food.

Q. How is the radish raised for early use?

A. In hot-beds; but for later use it is sown in the open air, like turnips.

Q. What kind of soil suits the radish?

A. A light, rich soil, inclined to sand.

Q. When are radish-seeds sown in hot-beds?

A. In the month of January.

Q. When in the open air?

A. In the spring, as soon as the frost leaves the ground.

Observation.—This much desired vegetable is welcome to the table in early spring. It commands a good price in market. It has become one of the leading articles in the early spring markets, and later it is heaped up on the stalls of the markets, often as high as the heap of potatoes. It is relished by all, old and young; and the roots, when boiled, are thought by some to be an excellent dish, and the leaves or tops are sometimes used for greens.

Find the meaning of the words—*Digestion, pungent, acrid, exude, intermitting, cosmetic, compile, ancients, physician.*

CHAPTER XXXVII.

PARSLEY, CELERY, AND RHUBARB.

Q. Where was parsley first observed to grow?

A. In the island of Sardinia.

Q. When was it first cultivated in England?

A. In the year 1548.

Q. How was it at that time described?

A. As delightful to the taste and agreeable to the stomach.

Observation.—Parsley endures both cold and heat, if it is grown in a rich, damp soil. It should always be brought to the table with any dish seasoned with onions, for it prevents the after-taste and smell of that root.

Q. What have ancient authors said of this plant?

A. "When fish become sickly in ponds, parsley thrown in will revive them."

Q. When should parsley-seed be sown?

A. In the spring, as early as the ground can be prepared.

Q. How should the ground be prepared?

A. Choose a rich garden soil, work it deep, and pulverize it well. Sow the seeds sparingly, and rake them in.

Q. How long do the seeds remain in the earth?

A. About 40 days. They take a longer time to vegetate than perhaps any other seed.

Q. What is celery?

A. It is a strong-scented parsley.

Q. Where does it naturally grow?

A. In marshy grounds.

Q. How is this plant raised?

A. Sow the seeds in March, in low, rich ground, or in a hot-bed.

Q. How are they transplanted?

A. Prepare ditches, 18 inches deep and 10 inches wide, with a soil in the bottom enriched by stable manure. In this set the plants, and gradually fill up the ditch as they grow, taking care not to cover the buds with the earth.

Q. What is rhubarb?

A. It is a plant of the dock kind.

Q. For what medicinal purposes did the ancients recommend this plant?

A. For diseases of the liver.

Q. When should the seed be sown?

A. In March or April.

Q. In what kind of soil?

A. In a soil light, loamy, and rich.

Q. When should the plants be transplanted?

A. In the fall of the year.

Observation.—The plants cannot well have too much room. Set them five feet apart in a dry soil. They do not need much moisture. It requires several years for

the root to mature. The stems make the best of pies and tarts.

Find the meaning of the words—*Gradually, dock, mature, tart.*

CHAPTER XXXVIII.

ASPARAGUS AND POKE.

Q. What is the meaning of the word *asparagus*?

A. It means *sprout* or *shoot*.

Q. What part of this plant is used for food?

A. The young sprout or shoot.

Q. What is said of its qualities?

A. It is agreeable to the taste, but affords little nourishment.

Q. How is the ground prepared for asparagus?

A. Work it very deep, say two feet or more, if possible.

Observation.—Enrich the soil with stable manure, liberally applied. Sow the seed on a well-pulverized surface. Space will not serve for describing all the particulars of making asparagus beds and nursing them; but, when properly made, they last nine or ten years, provided the young shoots are not cut oftener than once a year.

Q. What is *poke*?

A. It is a North American plant, bearing dark-red berries, inclined to purple.

Q. What is the use of the berries?

A. They are used for coloring wine, and as a medicine for birds.

Q. What are the young shoots used for?

A. They are used as a substitute for asparagus, and are much more nourishing.

Q. What are their medicinal qualities?

A. When served as asparagus, they act as a soothing poultice for a disordered stomach, and convey the most enriching form of iron to the blood.

Q. How is poke generally served at table?

A. Being boiled with bacon, it is served as greens.

Q. When are the young shoots of this plant gathered?

A. In the month of May or June, when they are about six or eight inches above the ground.

Q. How should the young shoots be cut for use?

A. Cut them near the ground, taking but little of the white part next to the root.

Observation.—Poke greens, or poke served as asparagus, stands unrivalled as a purifier of the blood and a remedy for dyspepsia. It should not be eaten in large quantities at a time, but often, before it grows too large. It often remains easy on a weak stomach when every other form of nourishing food is painful. It must be well cooked, and in this case it is far more tender than asparagus.

Poke grows wild in such large quantities as to make it evident that nature intended it for some valuable purpose. It is generally regarded as a noxious weed, and has been pursued by the farmer with destructive weapons until it has been destroyed or driven away to uncongenial soil, and its cultivation as food for man has scarcely been thought of.

Q. What is said of the root of poke?

A. It is said "it has active properties, and is used in medicine."

Q. How ought the ground be prepared for the cultivation of poke?

A. Choose a light, rich soil, and plow it one or two feet deep, if possible.

Observation.—Throw three or four furrows together with a large bar-share plow. Level off the ridge on the top, sow the seeds, and rake them in. No cuttings can be taken the first year, for time must be allowed for the root to mature. Gather the berries of the wild plant in

the fall, when they are fully ripe. These contain the seeds. Let them dry in winter in a warm place. The dry berries containing a number of seeds should be planted on the ridge, about three or four inches apart; and if the plants come up too thick, weed them out, so as to leave others standing about three inches apart. The plants grow vigorously, mat their roots together, and, unlike any other plants, they enrich the ground as they grow. One-half an acre of mature roots will yield a thousand bundles of sprouts annually, at 10 cents a bundle = \$100.

Find the meaning of the words—*Incline, substitute, poultice, bacon, purifier, evident, noxious, pursue, weapon, uncongenial.*

CHAPTER XXXIX.

THE BAROMETER: SIGNS OF RAIN.

Q. What is a barometer?

A. It is an instrument for indicating the coming changes in the weather.

Q. Of what does a barometer consist?

A. It consists of a narrow glass tube, upwards of 30 inches in length, open at one end and closed at the other.

Q. What does this glass tube contain?

A. It contains quicksilver.

Observation.—When the pressure of the air on the quicksilver at the open end increases or decreases, it rises or falls in the tube.

Q. How are the indications of the barometer explained?

A. If, in very warm weather, the quicksilver falls, it denotes a thunder-storm.

Q. What does the fall of the quicksilver in frosty weather denote?

A. It denotes a thaw.

Observation.—If wet weather happens soon after a fall of the quicksilver, there will be but little of it. In wet weather, if it continues to fall, there will be a long rain, and in fair weather, if it falls much and remains low, look out for plenty of rain. It falls lowest of all when wind and rain together are coming.

Q. What does the rise of the quicksilver in winter-time denote?

A. It denotes dry, frosty weather.

Q. When dry, frosty weather comes, and it continues to rise, what is coming?

A. Snow.

Observation.—If fair weather happens very soon after the rise, not much of that fair weather can be expected. If it rises high in wet weather, and remains so, look out for continued fine weather in a day or two. If it suddenly rises very high in wet weather, the following fine weather will not last long. Every farmer should have a good barometer, and study well its indications.

Q. What does a circle around the moon denote?

A. In summer, rain; in winter, snow.

Q. What are other signs of rain?

A. It is said—

“If in deep red the sun doth rise,
And wade through clouds to mount the skies,
Look out for rain, with joy or sorrow,
No working in the fields to-morrow.”

Q. What are other reliable signs of rain or “wet weather”?

A. “The leaves turn up, the grass lies low,
And sighing winds begin to blow;
The crickets crawl, and toads will leap,
And spiders from their cobwebs peep;
When loud the chairs and tables crack,
And house-flies fall upon their back;
When stars at night are seen no more,
And railroad trains do loudly roar;
And restless dogs howl out at night,
Prepare for rain with all your might.
When low o’er earth the swallows wing,
And ‘Katydids’ do sharply sing;

When Puss in earnest licks her paws,
And wipes them on her whiskered jaws,
The sun behind a cloud will set,
Denoting a long spell of wet."

Find the meaning of the words—*Instrument, consist, indicate, quicksilver, indications.*

CHAPTER XL.

REVIEW.

Q. From what does all animal life derive its food?

A. From vegetation, directly or indirectly.

Q. How indirectly?

A. Some animals live on flesh which is the flesh of other animals that live on vegetation.

Q. What is the use of trees?

A. They supply man with ripe fruits, and afford shade during the warm seasons; some are cut down and sawed into lumber for building purposes and for fuel.

Q. What have you learned of the use of plants?

A. From them man derives food for himself and for the animals which are useful to him.

Q. From what do plants derive their own food?

A. Principally from the water, which they receive from the soil through their roots, and from the air through their leaves.

Q. With what are plants naturally provided?

A. With cells or tubes, through which the water circulates.

Observation.—Those plants which have the largest cells, roots, and leaves require most water.

Q. What does water hold in solution?

A. Substances contained in the soil.

Q. What are these substances?

A. They are chiefly carbonic acid, with earthy, vegetable, and animal substances.

Q. How is carbonic acid gas exhaled?

A. From the lungs of animals.

Observation.—Carbonic acid gas is poisonous to all living creatures, yet it furnishes the material which enters largely into the formation of trees, flowers, and vegetables. Vegetation sustains animal life, and animal life and animal substances sustain vegetation. Vegetation extracts from the air that which would be destructive to animal life, and it is therefore the means of preserving the air in a pure state for the health of man and beast.

Q. What has been said of snow?

A. It keeps the heat of the ground from passing out into the air, and protects the roots of plants.

Observation.—The soil should contain ingredients necessary to the life of every plant, whether it be small vegetable or large tree. The animal body is so constituted as to draw from the earth all the elements necessary to the growth of flesh and bone, and the plant draws from water, air, and soil all the substances necessary to the growth of leaves, wood, bark, flowers, and fruit.

Q. What is said of the light of the sun?

A. It assists in preparing the food of plants, gives them their green color, causes their leaves and blossoms to open, and their fruit to ripen.

Observation.—All animals do not eat the same kind of food, nor do different plants draw from the soil the same kind of food; therefore each variety of plants must be supplied with food adapted to its nature, or it will not grow vigorously. This is why the farmer does not sow the same seed in the same field every year.

Q. Where do plants thrive most?

A. Where the soil allows the roots to spread, and the air and water to penetrate to them.

Observation.—Vegetation prevents the soil from being

washed away by rains, and the winds supply moisture to plants, as well as remove it when the quantity is more than sufficient.

Q. What is the meaning of the word "impalpable"?

A. It means *not coarse* or *gross*, but very fine,—so fine as not to be felt.

Q. What is meant by azote?

A. It means a gas unfit for breathing; the same as nitrogen gas.

Q. How is the word "nitrogen" defined?

A. "A gaseous element without taste, odor, or color, forming nearly four-fifths of common air, and incapable of supporting life."

Q. What is hydrogen?

A. It is a gas which forms one of the elements of water.

Observation.—This gas forms the ninth part of water, and oxygen eight-ninths. It is an inflammable, colorless gas, of extreme lightness. It enters as an element into the composition of nearly all organic bodies.

Q. What is oxygen?

A. It is a gaseous element, destitute, in its ordinary condition, of taste, color, and smell. It serves to support life, and, by composition with hydrogen, it forms water.

Q. What is the meaning of the word "annual"?

A. It means yearly, or returning every year.

Q. What is an annual plant?

A. It is a plant which lasts or lives but one year or season.

Q. What is a biennial plant?

A. It is a plant which lives two years and then perishes.

Q. What is a perennial plant?

A. It is a plant which continues longer than a biennial. It continues without cessation. It is perpetual, or never-failing.

Find the meaning of the words—*Element, define, gaseous, incapable, inflammable, extreme, composition, destitute, season, perish, cessation, perpetual, review, directly, indirectly, lumber, fuel, derive, principally, circulate, cell, carbonic, exhale, lungs, sustain, ingredient, constituted, variety, adapted, penetrate.*

CHAPTER XLI.

THE HORSE, COW, AND HOG.

Observation.—But for the services of the horse, we should have yet been far behind in even civilization, and hopelessly behind in agriculture. Without him, our luxuries and comforts would have been vastly limited. He has greatly lessened the labor of agriculture, facilitated commercial intercourse, and the transportation of men, and the produce of the farm to market. He is a willing and obedient servant to man, and therefore should be well housed and fed. Without good and well-fed horses, no farmer can prosper. The horse returns to the farmer all the care and food bestowed upon him with more than compound interest. He requires merely to be kept in good order, never to be worked beyond his power, and never to be allowed to fall, in condition, below the work he is to perform. Give him a clean stable, well-ventilated in summer and warm in winter. Speak kindly to your horse, for harsh words confuse him and make him *false*. The young horse, or colt, as it is called, is a pleasing and playful little animal, in which little girls and boys take great interest and delight. When you go out on a farm, inquire for the little colts.

THE COW.—The rearing and feeding of cows is an important branch of agricultural industry. The cow is, in a most remarkable degree, useful to mankind. She is docile, patient, and humble. Her milk forms a rich food for the human race, and boys and girls will talk joyfully over a glass of cool milk. Milk makes cream, and cream

makes the delicious ice cream so much admired by every one. Cream is churned into butter, that delightful article that should adorn every table. The little calf is the young cow. It is mischievous and playful, and will often playfully butt like a goat, but is never harmful. When you go on a farm, inquire for the little calf, and see how playful it looks. Its large eyes look you in the face, but when it is done looking, it will scamper off to a distance, as much as to say, "Catch me if you can."

THE HOG.—Among his live stock, few are more profitable to the farmer than the hog. Like the horse and cow, the hog pays back to his owner all the care bestowed upon it with a heavy interest. The food of hogs is every kind of refuse from the kitchen, as well as vegetables and cereals. When well fed, he grows and fattens in a very short time, bringing in quick returns for the expense in feeding. Sometimes twelve or fifteen little playful pigs appear in their bed. They are roguish little fellows, and will creep through the garden fence and steal nice fruits and vegetables. Boys and dogs chase them out, but if one little prisoner is made, he squeals till he gets free. He soon forgets his trouble, and comes back again to steal; but if caught again, perhaps he will have a yoke put on his neck, which prevents the little fellow from getting through the fence. A pen of pretty hogs in the fall of the year is the pride of the farmer. They are killed in December, generally, for their flesh, which affords us the delicious ham for our tables.

Find the meaning of the words—*Civilization, facilitate, compound, ventilate, interest, docile, adorn, profitable, delicious.*

CHAPTER XLII.

AGRICULTURAL MACHINERY: ITS USES.

Q. What is a machine?

A. It is a complicated piece of workmanship,—an engine made up from many parts.

Q. What is an implement?

A. It is simply a tool, such as a hoe, rake, axe, or saw.

Observation.—Machines are generally moved by horse-, steam-, or water-power; implements are sometimes used by the same power, but most generally by hand.

Q. What is a cultivator?

A. It is a labor-saving implement for stirring the soil and keeping it clean from grass and weeds.

Observation.—A cultivator is a sort of complicated hoe, drawn by a horse and guided by a man or boy. It is a labor-saving machine; for one day's work in the field with a horse and cultivator will stir more soil and kill more weeds and grass than can be done by a man or boy with a hand hoe in ten days.

Q. What is a "horse-hoe cultivator"?

A. It is an implement for hoeing or cultivating corn, as well as other vegetable and root crops.

Observation.—It is drawn by one horse, and managed by one man or boy. When city and town boys go to the country and out on the farms, they should make themselves acquainted with the workings of cultivators, and all other agricultural machines, tools, and implements. Farmer-boys will tell you all about them.

Q. What are the different kinds of harrows?

A. The double U harrow, the "square drag," the "hinge," the "triangular," and the "double grain" harrow.

Q. What is said of harrowing?

A. It is next in importance to plowing.

Observation.—Harrowing pulverizes the soil. The lumps of soil—or clods, as they are generally called—must be broken, or reduced to a light and friable condition, for they hold the plant-food, and retard the progress of the delicate roots sent out in search of food and sustenance.

Q. What is a "grubbing plow"?

A. It is a plow used for clearing new land preparatory to using the common plow.

Q. What is a "double-shovel plow"?

A. It is a plow which stirs the ground deeper than a cultivator or harrow, effectually destroying all grass and weeds. It loosens and pulverizes the soil completely, causing it to absorb and hold moisture in dry seasons.

Q. What is a "three-furrow gang plow"?

A. It is a plow with three shovels, used for covering seeds when sown broadcast. There are, also, two-furrow gang plows, and sometimes even four or five.

Q. What is a "potato-digging plow"?

A. It is a large shovel plow, drawn by two horses or oxen, and will plow out the potatoes as fast as twenty men can pick them up. There is not over one bushel in fifty that it does not bring out on the surface of the soil.

Q. What is a "hillside plow"?

A. It is a plow so constructed that the mould-board may be changed from one side to the other, turning all the furrow slices down the hill.

Q. What is a "self-sharpening plow"?

A. Its points are made of steel bars, with five holes, by which the point can be let out as it wears.

Q. What is a "plug plow"?

A. It is a plow which runs deep in a soil infested with weeds or bramble, turning them well under, and leaving the furrow slices perfectly level.

Q. What is a "Livingston plow"?

A. Its mould forms an acute wedge. It is not easily choked with grass and weeds, and is a very popular plow.

Q. What is a "cuff and brace plow"?

A. It is a plow regulated so as to go deep or shallow, and cut either a wide or narrow furrow, at the pleasure of the plowman.

Q. What is a "lock coulter plow"?

A. It is a plow having wrought-iron shares and lock coulters laid with steel. They are used for breaking up new land, cutting the roots of trees as they move along.

Q. What is a "seed sower"?

A. It is a machine for sowing all kinds of garden seeds, such as carrots, parsnips, beets, peas, beans, etc.

Q. What is a "broad-cast sower"?

A. It is a machine for broad-casting lime, plaster, bone dust, ashes, and commercial fertilizers. It is drawn by one or more horses.

Q. What is a "corn coverer"?

A. It is a simple implement formed with two small shovels to one beam, for covering seed corn when planted in hills. With a horse and boy, this machine will cover more corn in a day than ten men with hoes.

Q. What is a "root cutter"?

A. It is a machine worked by hand for cutting up root crops for food of cattle.

Q. What is a "lime spreader"?

A. It is a labor-saving machine drawn by two horses. It spreads over the soil either stone or oyster-shell lime, in the most regular and perfect manner.

Q. What is a "field roller"?

A. It is a cast-iron cylinder for rolling over grass or plowed ground. It is drawn by horses.

Observation.—No farm should be without a roller. It is valuable for setting wheat and grasses in the spring after the frosts have disturbed the roots. It breaks or pulverizes clods after plowing, and binds or hardens sandy soil.

Q. What is a "rubber"?

A. It is a simple and valuable substitute for the roller. It crumbles and crushes clods that are too hard and dry for the roller.

Observation.—The rubber is made by splitting or sawing a log ten feet long lengthwise through its centre. The two parts are then joined together, flat side up, by nails, and hooks by which horses draw are attached to it. Sometimes a round log is used as a rubber or clod-crusher. These simple instruments are very valuable and effective.

Q. What is a "corn-planter"?

A. It is a machine drawn by one horse, and it will drop, cover, and roll down ten acres in corn in one day. It saves both labor and seed.

Q. What is a "clover-seed gatherer"?

A. It is a machine which cuts off the seed-heads of clover, and leaves the stems standing to be mowed down for hay. The revolving rake reaper is now generally used.

Q. What is a grain cradle?

A. It is an implement used for cutting down wheat, rye, and oats, when ripe.

Observation.—The cradle is used by hand. It is made with a cast-steel scythe for cutting the grain off close to the ground; five fingers, for gathering it together; a snath or handle, and wire braces to hold the fingers in their places. With this implement the grain is cut and thrown in a swath behind the farmer to be raked up and bound into sheaves. The reaping-hook or sickle of old times is a curved blade with a saw-tooth edge, about 25 inches long. It is used by hand only. It is a slow but effective implement in skilful hands, as well as dangerous to young and awkward reapers, as the writer can testify by a scar, which still remains, though received more than sixty years ago.

Q. What is a "horse-rake"?

A. It is a labor-saving machine formed with steel-wire teeth curving from a wooden head. It is drawn by horses.

Observation.—It is useful in the grain field as a gleaner after the cradle or reaping-machine, and it is the best machine for raking hay. A boy or smart girl can ride on it and guide its work.

Q. What is a masticator?

A. It is a straw, hay, and corn-stalk cutter.

Observation.—This machine is made with four cast-steel knives attached to two revolving cylinder heads. These knives are made to revolve by steam, horse, or hand power, cutting the hay, straw, or stalks into small pieces convenient for feeding cattle and horses.

Q. What is a corn-sheller?

A. It is a machine for shelling corn; that is, separating the grain from the cob or spike.

Observation.—This machine is generally made to run by horse or hand. It thoroughly separates the grain from the cob and cleans it for grinding. There are also strong and elegant machines for grinding ears of corn, called corn and cob crushers. Corn is crushed for fattening cattle, and it is sometimes fed to work-horses. It is better when fed with cut straw or hay, moistened.

Q. What is a reaper?

A. It is a machine moved by horse-power, and used for cutting grain and binding it into sheaves. It can cut and bind more grain in a day than 15 or 20 men with hand implements.

Q. What is a thresher?

A. It is a machine moved by horse- or steam-power. It separates wheat, rye, and oats from the straw and chaff, and puts the clean grain in bags ready for the mill.

Observation.—A thresher, well tended, will thresh from 500 to 900 bushels of wheat in a day. It requires 4 or 5 men to feed it, and 6 or 8 to keep the straw out of the way. In all it takes about 20 men to feed it, dispose of the grain, and stack the straw, but the job is soon over and done with for the year.

Find the meaning of the words—*Complicated, triangular, delicate, progress, preparatory, gang, constructed, infested, acute, crusher, cylinder, masticator, circular, substitute, centre, commercial.*

CHAPTER XLIII.

THE FARM-HOUSE.

Q. What is a farm-house?

A. It is a house in which the farmer and his family reside.

Q. What is said about the style of a farm-house?

A. It is said the house should have some adaptation to its situation on the farm, and to the character of the scenery by which it is surrounded.

Observation.—There may be one style for the picturesque, one for the romantic, and another for the beautiful. It is not good taste to build a street-like house on a high-land glen, nor a castle-like mansion on a flat.

The outside appearance of a house should have such a relation to its inside arrangements that the spectator on the outside should make no mistake as to which is the front entrance; which the drawing-room side, and which the office and kitchen.

Q. When a site is chosen for a house, what is to be thought about building material?

A. Use that which is nearest at hand, if it is of the proper kind.

Observation.—If good stone is near, nothing is better. It is convenient, cheap, and durable. If good clay is convenient, use bricks; if not, lumber must be used.

Q. How should the front rooms of a dwelling be finished?

A. They should be of the highest finish; and devoted to the leisure hours of the family, and to purposes of hospitality and social intercourse. All the show of outside finish should be displayed in front, commanding the best and most extended view over surrounding objects.

Q. What of out-houses?

A. They should be shut off from the main dwelling, if possible, by shrubbery, fences, and trees. A broad verandah, on the principal front, if nowhere else, should not be forgotten. A background of garden and fruit trees is both useful and beautiful. If no forest trees are growing, they should be planted around the dwelling, that their leaves may absorb malaria, and that cool shades may be afforded. If the house cannot be built near an unfailing spring of cool water, sink a well and put in it an easy pump, such a one as ladies and the other members of the family can work with ease. A conservatory for plants

and flowers may be constructed by an extension of the drawing-room or parlor. The climate of a cold greenhouse, on a sunny day in winter or spring, is a Florida climate. It is better for pulmonary sufferers than an expensive trip to the West Indies. Flowers are the most pleasing objects and perfect disinfectants, and life is a burden without them.

Q. Where should the barn and stables on a farm be located?

A. Within convenient call of the family dwelling.

Observation.—They should be to the leeward of the dwelling, to prevent flies from being blown in that direction. Stable and barn grounds should be high and dry. Horses and cows cannot be healthy in damp grounds.

Q. What is meant by an approach to a dwelling?

A. It is an avenue leading from the principal highway, and passing through the dressed-grounds to the mansion. The approach should not afford a continuous view of the family mansion. A glimpse from a turn or two in the approach impresses upon the visitor the commanding position of the dwelling. The main approach should not be used by the wheels and implements of labor. It should lead to the mansion in the easiest possible way, curving around hills and avoiding hollows.

Q. How should the approach be decorated?

A. By trees and shrubs.

Q. What kinds of trees and shrubs?

A. The larch, horse-chestnut, and holly trees, are highly ornamental. Plant sparingly—too much shade is not healthy. Maple trees are beautiful and durable. Lilacs and roses should be planted near the dwelling. Let trees and shrubs, native to the place, have wide sweep in luxuriant profusion.

Q. What other attractive objects are healthful and pleasing to the eye?

A. The natural tree, the rugged rock, the purling stream, the quiet lake, and the tangled brushwood.

Q. What is in bad taste?

A. A road through a wild park, bordered with choice roses, vines, and shrubbery, held up by railings, are all in bad taste. Domestic flowers abhor the wildwood.

Q. How should all your floral improvements look?

A. As if "nature herself might have done the same; that man had only washed her face, and combed her hair, and given her a more attractive garb."

Find the meaning of the words—*Reside, style, adaptation, scenery, romantic, picturesque, spectator, material, durable, hospitality, verandah, shrubbery, pulmonary, disinfectant, leeward, approach, decorate, luxuriant, garb.*

CHAPTER XLIV.

FLOWER GARDENS.

Q. How should flower gardens be placed?

A. Partially, not wholly, around the mansion. The entrance front should be open, as well as the rear. Face your terraces with grass slopes instead of walls. A long, grassy slope closely shaven by the scythe or lawn mower is always pleasing and popular. Flights of steps form an excellent means of decorating terraces.

Observation.—No native forest trees should be allowed to grow in or very near to a garden. They give too much shade, and their green roots are poisonous to the roots of domestic plants. If forest trees are allowed to grow on the borders of a garden, a deep ditch should be dug between such trees and the garden soil, to prevent the roots of the trees from robbing the roots of the flowers and vegetables of their food in the soil; and, even if this is done, the luxuriant foliage of the trees will rob the flowers of their food in the air.

Q. In arranging shrubs and ornamental trees in a garden, where should the taller ones be planted?

A. They should be planted in the rear.

Q. Where should the smaller ones be placed?

A. They should be placed in a front position near the mansion.

Observation.—Thus arranged the eye will rest upon a continuous and unbroken line of verdure, and the effect will be harmonious and beautiful.

Find the meaning of the words—*Partially, wholly, entrance, terrace, slope, lawn, nature, forest, poisonous, domestic, ditch, border, ornamental, rear, front, position, mansion, rob, continuous, verdure, harmonious, effects.*

CHAPTER XLV.

SENTIMENTS OF PLANTS AND FLOWERS.

Q. What is intended by the sentiments conveyed by plants and flowers?

A. The intention is to increase the interest in botanical researches among young people.

Observation.—Flowers have always been symbols of the affections, representing pure, tender, and devoted thoughts and feelings.

Q. What have ancient authors said of flowers?

A. They said “flowers are the messengers of the heart.”

Q. What have modern writers done towards establishing a language of flowers?

A. They have selected such interpretations of their language as appear most reasonable from their character and history.

Q. What would a holly tree in the yard of a farm-house signify to a visitor?

A. Domestic happiness, or “a pleasant home amid my friends.”

Q. What sentiment does a cedar tree convey?

A. “Think of me.”

Q. What does a locust tree signify?

A. "Affection beyond the grave."

Q. What the magnolia tree?

A. "Love of nature."

Q. What by a pitch-pine tree?

A. "Time and philosophy."

Observation.—According to Ovid a very dark green pine signifies "pity." A spruce pine signifies "hope in adversity."

Q. What does the snow-ball bush signify?

A. "Thoughts of heaven."

Q. What does the tulip poplar tree signify?

A. It signifies "fame."

Observation.—The tulip tree, or yellow poplar, bears a flower resembling a tulip, variegated with yellow and orange. This tree is celebrated for its size and beauty.

Q. What do roses signify?

A. Hundred-leaved rose,	Dignity of mind.
Damask	" Bashful love.
Austrian	" Thou art very lovely.
Bridal	" Happy love.
Burgundy	" Simplicity and beauty.
Carolina	" Love is dangerous.
Deep-red	" Bashfulness.
Moss	" Superior merit.
China	" Grace.
Versicolored	" You are merry.
Musk	" Charming.
Red-leaved	" Beauty and prosperity.
Dark Chinese	" Forsaken.
Bud of White	" Too young to love.
White	" Sadness.
White (withered)	" I am in despair.
Thornless	" Ingratitude.
Yellow	" Let us forget.
Champion	" Love's messenger.
Rosemary	" Remembrance.

Observation.—The following is the language of other well-known flowers :

Almond flower	Hope.
Yellow Acacia	Concealed love.
Amaranth	Immortality.
Ambrosia	Love returned.
American Starwort . .	Welcome to a stranger.
Anemone	Anticipation.
Arbor Vitæ	Unchanging friendship.
Batchelor's Button . .	Hope in love.
Balm	Social intercourse.
Box	Constancy.
Buttercup	Riches.
Catchfly	Artifice.
Chamomile	Energy in adversity.
China Astor	Love of variety.
Clematis	Mental beauty.
Columbine	Desertion.
Convolvulus	Worth sustained by affection.
Crocus	Youthful gladness.
Crown Imperial	Pride of birth.
Daffodil	Uncertainty.
Dahlia	Elegance and dignity.
Daisy	Beauty and innocence.
Dandelion	Coquetry.
Eglantine	I wound to heal.
Elderflower	Compassion.
Flax	Domestic industry.
Forget-me-not	True love.
Fox-glove	Insincerity.

Find the meaning of the words—*Sentiment, botanical, symbol, messenger, modern, interpretation, philosophy, signify.*

CHAPTER XLVI.

THE GERANIUM.

Q. What is the language of the geranium?

A. Nutmeg geranium,	An expected meeting.
Scarlet “	Consolation.
Oak “	True friendship.
Mourning “	Despondency.
Rose “	Preference.
Lemon “	Tranquillity of mind.
Ivy “	Bridal favor.
Silver-leaved “	Recall.

Observation.—The poets have also attached a signification to the following well-known flowers:

Gilly-flower	She is fair.
Golden-rod	Encouragement.
Wild grape	Mirth.
Grass	Submission.
Hawthorn	Hope.
Heart's Ease	Love in idleness.
Heliotrope	Devotion.
Hollyhock	Ambition.
Melianthus	My love is sweet and secret.
Honeysuckle, coral . . .	Fidelity.
“ wild	Inconstancy.
Hyacinth, blue	Constancy.
“ purple	Sorrow.
Hydrangea	Heartlessness.
Ice-plant	An old beau.
Iris	My compliments.
Ivy	Wedded love.
Jasmine, white	Amiability.
“ yellow	Grace and elegance.
Jonquil	I desire a return of affections.
King-cup	I wish I was rich.
Lady's Slipper	Capricious beauty.
Larkspur	Haughtiness.

Laurel	Virtue makes her charming.
Lavender	Acknowledgment.
Lemon Blossom	Discretion.
Lichen	Solitude.
Lilac, purple	Fastidiousness.
“ white	Youthful innocence.
Lily, white	Purity and beauty.
“ yellow	Playful gayety.
“ scarlet	High-souled.
“ of the Valley	Delicate simplicity.
Lotos flower	Estranged love.
Marigold, yellow	Sacred affections.
“ French	Jealousy.
Meadow Saffron	I fear not to grow old.
Mignonette	Your qualities surpass your loveliness.
Monk's-hood	Deceit.
Myrtle	Love in absence.
Narcissus	Egotism and self-love.
Nasturtium	Patriotism.
Nettle	Slander.
Nightshade	Dark thoughts.
Oakleaf	Bravery and humanity.
Olive	Peace.
Orange-blossom	Woman's worth.
Ox-eye	Patience.
Pansy	Tender and pleasant thoughts.
Passion-flower	Religious fervor
Pea, everlasting	Wilt thou go with me.
“ sweet	Departure.
Peach-blossom	I am your captive.
Peony	Anger.
Periwinkle, blue	Early and sincere friendship.
“ white	Pleasures of memory.
Phlox	Unanimity.
Pink, red	Woman's love.
“ Indian	You will always be lovely.
“ Mountain	Aspiring.
“ white or variegated	You are fair and fascinating.
Primrose	Inconstancy.

Primrose, rose-colored	Unpatronized merit.
Prickly Pear	Satire.
Queen's Rocket	She will be fashionable.
Rosemary	Remembrance.
Rue	Disdain.
Saffron	Marriage.
Sage	Domestic virtues.
Scabious	Unfortunate attachment.
Snowdrop	Friendship in adversity.
Sorrel, wild	Parental affection.
Speedwell	Female fidelity.
Star of Bethlehem	Reconciliation.
St. John's Wort	Animosity.
Dwarf Sun-flower	Your devout adorer.
Sweet-briar	Simplicity.
Sweet-William	A smile.
Thorn-apple	I dreamed of thee.
Thyme	Thriftiness.
Tuberose	A sweet voice.
Tulip, red	A declaration of love.
" variegated	Beautiful eyes.
Violet, blue	Faithfulness.
" white	Modesty.
" yellow	Rural happiness.
Virgin's bower	Filial love.
Wall-flower	Fidelity in misfortunes.
Water-lily, white	Purity of heart.
Willow, weeping	Forsaken lover.
Witch Hazel	A spell.
Woodbine	Fraternal love.

Q. Why is the earth enriched and adorned with such an endless variety of flowers?

A. To show the infinite wisdom and goodness of the great Creator.

Q. In what respects are they useful to man?

A. The most valuable medicines are extracted from their petals, leaves, and roots.

Q. How are they instructive to man?

A. Their marvellous structure shows what complete

arrangements are made for their growth and protection ; the study of all which is most instructive.

Q. How do they give pleasure and delight to man ?

A. By their varied and beautiful formations, by their rich and delicate colors of all shades, by their sweet odors, and by those refining and elevating influences which they exercise upon the mind, the affections, and the tastes of mankind.

Find the meaning of the words—*Consolation, despondency, ambition, fidelity, amiability, capricious, fastidiousness, discreet, patriotism, unanimity, inconstancy, reconciliation, animosity, fraternal, rural.*

CHAPTER XLVII.

BOTANICAL GEOGRAPHY.

Q. What does botanical geography treat of ?

A. It treats of the divisions of the vegetable kingdom, and their geographical distribution.

Q. How are vegetable forms divided ?

A. Into flowerless and flowering plants.

Observation.—A plant is “a collection of wonders.” The roots, the stems, the branches, the leaves, and the flowers are not only perfect in themselves, but are perfectly adapted by their varieties to the place where they grow, and the purposes they are intended to answer in creation.

Q. Where is vegetation most luxuriant ?

A. In tropical countries.

Observation.—There an abundance of moisture combines with light and heat to produce trees of an enormous size, flowers of the most brilliant colors, and climbing plants in great variety.

Q. With what are some seeds of plants furnished?

A. With *wings*, by which they take flight from one place to another.

Q. For what is this flight intended?

A. It was intended for the distribution and perpetuity of plants.

Observation.—Seeds often continue their flight till they are overtaken by a shower of rain, which, wetting their wings, stops their further flight.

Q. Proceeding from the equator what do we notice?

A. That tropical plants disappear, and other forms of plants mark the change from a hot to a temperate climate.

Q. What is the character of this change?

A. Green meadows, abounding with tender herbs, succeed the tall grasses which form the jungle.

Observation.—Instead of the towering evergreen forests, we behold trees which cast off their leaves in winter, such as the oak and maple. Here cereals and vines come to their highest perfection. The vine is less affected by a cold winter than by a cool summer.

Q. What trees have their seeds furnished with wings?

A. The maple and the ash.

Q. Of what do these wings consist?

A. Of a fine membrane, by means of which they fly in the air from one place to another.

Q. With what means of distribution are other seeds provided?

A. They are provided with hooks or barbs, by which they attach themselves to the fur of animals or the clothing of men, and are thus carried far away from the place of their growth.

Q. With what are the seeds of the burdock furnished?

A. With hooks standing in all directions, ready to catch on to any fibrous substance.

Observation.—Squirrels often carry nuts to a great

distance and hide them in the hollow of a tree, and birds in their flight carry seeds hundreds of miles.

Q. By what other means are seeds distributed?

A. By the currents of oceans, seas, and rivers. By these means seeds are carried from America to the West Indies, and from thence other seeds to America.

Q. Receding still further from the equator what do we behold next?

A. Magnificent forests of fir and pine trees.

Observation.—As we gradually approach higher latitudes we see that the trees dwindle to mere dwarfs, and finally wooded vegetation disappears.

Q. Where is the northern limit of forests?

A. It is a line along the extreme north of the Western continent from Hudson's Bay to Behring Strait.

Q. What is the last tree found on drawing near the snows of the North Pole?

A. The dwarf birch, a mere bush.

Q. Are there any flowering plants in the polar zones?

A. There are some low annuals which flower during the short hot summer.

Q. Are there any perennials in these zones?

A. There are a few, which do not rise higher than four or five inches from the ground.

Q. What do the extreme northern regions of America produce?

A. They produce a species of lichen only, much esteemed by hunters as food.

Observation.—Various species of mushroom which are poisonous in temperate regions lose their bad qualities in cold climates, and are eagerly sought after as food. Plants growing at the sources of the great rivers of North America may be transported to their banks in warm climates, and, reaching the ocean, they may be wafted to foreign countries.

Q. Where may seeds from the headwaters of the Mississippi river be carried?

A. To Africa or Asia, distances equal to the earth's diameter.

Q. What may be observed everywhere between the equator and the poles?

A. Distinct vegetable regions, defined by certain lines.

Observation.—All plants appear to have been developed in certain specific localities, from which they have been diffused by natural means, or transported by man to distant regions.

Q. What is said of vegetables?

A. It is said that "the Creator has so endowed these plants which are of most value to man, that their cultivation in various climates and on different soils may be widely extended."

Q. What are the principal cereals brought from the Old World to the New?

A. Wheat, rye, oats, and rice.

Q. What were the principal fruit-trees?

A. Most of the finer fruit-trees, the apple, peach, cherry, pear, fig, and orange. These were brought into Europe from Asia, thence to America.

Q. With what has America supplied the Old World in return?

A. Corn, tobacco, and potatoes.

Q. What is the chief food of one-third of the human race?

A. Rice.

Q. What does rice require in its cultivation?

A. A considerable amount of heat and an abundance of moisture.

Q. Where is it principally produced?

A. Between the tropics. It was introduced into America by Christopher Columbus, in 1493.

Find the meaning of the words—*Botanical, tropical, extreme, waft, diameter, regions, specific, locality, human, jungle.*

CHAPTER XLVIII.

CEREALS.

Q. What are the principal food-plants of the warm and temperate zones?

A. Wheat, rye, oats, barley, and potatoes.

Q. What is barley?

A. It is a grain used for malt.

Q. How is barley cultivated?

A. Like wheat, rye, and oats, on a rich loamy soil.

Q. When is barley sown?

A. As soon as the ground is dry in the spring.

Q. How much is sown upon an acre of land?

A. From six to eight pecks.

Q. What is buckwheat?

A. It is a plant cultivated for its seed, which makes a delightful bread called buckwheat cakes.

Q. What soil is the best for this plant?

A. A mellow, dry, and sandy soil.

Q. How is the soil prepared for buckwheat?

A. As for wheat, rye, or oats.

Q. When is buckwheat sown?

A. In the latter part of the month of June, so that it may mature before the frosts of autumn come.

Observation.—Buckwheat is a good and convenient manure. A small quantity of seed sows a large surface. When sown for bread, sow broadcast or in drills, three pecks to the acre. When sown for manure, sow two bushels to the acre. When in flower, roll it down, and plow it in. Decomposition soon converts it into a valuable manure.

Q. Of what country is buckwheat a native?

A. Of Asia.

CHAPTER XLIX.

ZONES, TROPICS, AND BREAD LINES.

Q. What is meant by the word *zone*?

A. It means *belt* or *girdle*.

Q. What are zones?

A. They are divisions of the earth's surface formed by the tropics and polar circles.

Q. What are circles of the earth?

A. They are lines imagined to be drawn on its surface.

Q. What is meant by "the equator"?

A. It is a great circle around the middle of the earth.

Q. What are the poles of the earth?

A. They are points, one at the extreme north of the earth, and one at the extreme south.

Q. What are the tropics?

A. They are two circles around the earth drawn at the distance of about 1400 miles from each pole.

Q. What is the tropic towards the North Pole called?

A. The Tropic of Cancer.

Q. What is the tropic towards the South Pole called?

A. The Tropic of Capricorn.

Q. What is the circle nearest the North Pole called?

A. The Arctic Circle.

Q. What is that circle nearest the South Pole called?

A. The Antarctic Circle.

Q. What is that part of the earth which lies between the Arctic Circle and the North Pole called?

A. The North Frigid Zone.

Q. What is that part called which extends from the Arctic Circle to the Tropic of Cancer?

A. The North Temperate Zone.

Q. What is that part between the two tropics called?

A. The Torrid Zone.

Observation.—The hottest parts of the earth are in the Torrid Zone. In this zone, vegetation is very luxuriant, the fruits are luscious, and the flowers beautiful.

Q. What part of the earth does the South Temperate Zone include?

A. All that part of the earth which lies between the Tropic of Capricorn and the Antarctic Circle.

Q. What part of the earth does the South Frigid Zone include?

A. All that part which lies between the Antarctic Circle and the South Pole.

Q. What are the principal food-plants of the Torrid Zone?

A. Rice, bananas, bread-fruit, dates, cocoanuts, yams, and sago.

Observation.—The bread-fruit tree grows to the height of forty feet. It has leaves like the fig-tree, and bears large fruit, which, when cooked, is said to taste like bread made of wheat.

Q. What are the principal food-plants of the Temperate Zones?

A. Wheat, corn, rye, oats, barley, and potatoes.

Observation.—In the Frigid Zones there is little vegetation.

Q. What is meant by the vegetable kingdom?

A. All the plants which are produced by the earth, from the largest tree to the smallest shrub or blade of grass.

Q. What are the tropical fruits?

A. Pineapples, pomegranates, bananas, oranges, lemons, olives, figs, and other smaller fruits.

Q. What are the fruits of the Temperate Zones?

A. Apples, peaches, pears, plums, cherries, and other fruits.

Observation.—In the bread countries, where the soil is fertile and the climate favorable, a large surplus of grain and fruits are collected and sent to less favored regions.

Q. What is commerce?

A. It is the exchange of products between different countries. Goods brought into a country are called imports; those sent out of a country are called exports. Commerce is carried on between different countries principally by means of ships or vessels propelled by sails or by steam.

Find the meaning of the words—*Principal, temperate, malt, decomposition, belt, girdle, imagine, tropic, extreme, cancer, frigid, torrid, commerce, propel.*

CHAPTER L.

RAISING POULTRY.

1. Every boy and girl in the country, and even many in cities, should keep chickens. They can manage them, with a little help, as well as grown people. They are nice pets, and pay you back for all the care you give them.

2. Start with a male and six hens, of whatever kind you please. There are many kinds to choose from, and you can take what you like best. Learn how to take care of a few before you take charge of many.

3. HOUSES.—A house 8 feet wide, 8 to 10 feet long, and 7 feet high is plenty large enough. Large houses are a waste of lumber, harder to keep clean, and colder in winter. Even when you have a large flock, two houses of that size are better than one large one. The house should be battened over the cracks to keep out the draughts. It should have a large window facing south, a door for you and a small door for the fowls. Holes should be cut near the roof to let pure air in. The floor should be of dry sand or hard-packed clay. The roosts should not be over 4 feet from the floor. Sassafras poles make the best roosts, as they keep insects away from the fowls. The house should be cleaned every other day, and white-washed twice a year. Be careful to whitewash all round

the roosts and in the cracks of the house. Put some carbolic acid in your whitewash. Remember, that in fowl houses, as in our own bodies, want of cleanliness is the nearest road to sickness.

4. NESTS.—These can be made in any way, but they should be whitewashed every three months and kept nice and clean. Soft meadow hay, or clean bright wheat straw, well bruised, is the best thing to fill them with. Keep the back to the light. Hens lay best in a dark nest.

5. It is best, if you can, to have a separate house to set your hens in. Move the hen after dark and keep her in the house a day or two, when she wants to sit, and you will have no trouble. While it is cold 11 eggs are enough to put under her; in warmer weather 15. If she breaks an egg in the nest, put in clean hay and wash the other eggs clean with warm, not hot, water.

6. CHICKS.—When the hen begins to hatch out, every 3 hours take from her the chicks that are dry, and throw the empty egg-shells out of the nest. Keep the chicks in a basket, with an old piece of flannel to keep them warm; in cold weather set near, not too close, to the fire. When all are out, take the hen and grease under her wings and around her tail with a little carbolic salve. Put her in a coop on dry ground, put her chicks with her. At dusk is the best time to do this.

7. Feed your chicks on cooked bread made from corn-chop or coarse corn-meal, till they are old enough to eat a grain of wheat. Then feed cracked corn and *good* screenings. Put a little salt in the bread. It will do them good. Do not give them much to drink at first. Milk is better than water. One great secret in raising little chickens is in feeding them. Feed them every 4 hours of daylight, just giving them what they will eat up clean and no more. Keep the water or milk clean.

8. The coops should have no bottom, be kept clean and whitewashed like the houses, and moved to fresh ground every other day. Do not let the hen out until the grass is dry, or until the chickens are at least three days old. Let the chickens run out. They will stay near the coop and will not get wet or tired.

9. As soon as they begin to get their feathers look at them carefully for lice. These will be found about the top of the head, under the wings and tail. At dusk, if you find they have lice on them, grease them lightly with carbolie salve, and put some on the old hen. This should be done every month until the fall comes.

10. It may seem troublesome, but remember that gapes, which kills so many chickens, comes from these two things—first, feeding wet, sloppy dough, and letting the water pans get dirty; and secondly, from not keeping your little chickens clean.

11. When the warm weather comes let the chickens run all you can. Do not keep them shut up. The exercise, and the grasshoppers, worms, and bugs that they catch will make them grow better than feed, and save the feed besides.

12. If you do as I tell you, you will never have gapes. In eight years' breeding I had only six cases. But if you do, put a little camphor in your water pans, and salt and black pepper in your bread.

13. In summer keep strips of white oak bark in your water pans and keep your houses clean, and you will never have cholera. Cholera is not bad luck, it is bad management.

14. For old fowls the greatest change in the food is the best. By the greatest change I mean not to feed grain all the time. When the cook boils a piece of bacon, get the pot liquor. Chop up some carrots, cabbage, turnips, potatoes, anything fit to eat as vegetables, and boil them in the liquor. Mix a little meal with it and feed it hot in the morning. Then see how your hens lay. Salt never hurt fowls yet unless they got too much of it. Too much candy is bad for children too. In the winter give them a hot breakfast, and corn at night. Give them the scraps from the table and all the milk you can get. In the summer if they are shut up, pull some grass for them.

15. Treat your fowls kindly and pet them. They will soon learn to know you, and you will find them easier to take care of.

16. Lastly, keep the kind best suited to your wants and your place, and not just what you fancy. You will soon learn to like those best that you have the best luck with, and those will be the kind best suited to you.

17. For a large farm, take your choice of these: Layers only—Leghorns, Hamburgs (these are delicate when young, and need great care), Houdans (these must have their crests cut off if there are hawks around). Setters—Plymouth Rocks, Dominiques, Games, and Wyandottes. For a small place near the city, or in it: Layers—Polish and Bantams; Setters—Brahmas and Cochins.

18. Start with a pure, unmixed kind, and give them a fair trial. They look better, are some pleasure to you, and are as useful as common chickens.

19. When your father gives you money for a ball, remember, one ball never makes more. Three fowls may bring you in fifty. You cannot play ball always, but your chickens will always want some of your time.

20. When you start, commit to memory these watch-words. They will do you good in other things as well as in raising chickens: Patience, Thoughtfulness, Cleanliness, Kindness, Care. One for each finger, and Care for the thumb. Count them over every day of the year when you are raising chickens, and you will soon find it hard to count all your chickens, you will have so many.—*T. B. Dorsey, of Ellicott's Mills, Md.*

CHAPTER LI.

SHEEP RAISING.

Having carefully selected a flock in which there is no blemish, the next thing to be considered will be the sheepfold; for without a good sheepfold, there can be no certainty of success. Sheep raising, with proper care, is a very simple thing, provided the farmer is "fixed for it;"

otherwise, failure may be looked for with certainty. And, before going farther, we will say, that it is a law that sheep must be folded *every night*, be the weather hot or cold, if the farmer expects to avoid the attacks of his deadly enemy, the *Dog*. As a general rule, sheep are killed by dogs at night when left out in pasture. Safely secured at night in a good sheepfold, such a horror rarely occurs; and, by a little patience in training them to come up at sunset to a regular "call," and rewarding them on their arrival at the fold with a little corn, they soon learn to respond from any reasonable distance, and, in fact, after awhile, they will prefer to be folded at night to being "left out in the cold." But, of course, once folded, the fold should be one which is secure against the entrance of the midnight foe; and the plan of a building herewith recommended will be a fair model for the beginner to follow.

To describe it, we will say that, for a flock of 25 ewes and a buck, the house may be a frame building, 25x20; corner-posts to be 10 feet high, with a square roof. Let the building always front south, because it will be warm in winter and cool in summer. Cover the west, north, and east sides with perpendicular planking, without any battens, so that, when the planks shrink, spaces of about a half inch will be left between the boarding to afford *ventilation*—a matter of the first importance to sheep in *any* weather. Let the front, or south side, be picketed with 7-foot pickets, sharpened at their tops. Divide the fold in half with pickets 5 feet high, and have a good front picket-gate to each division. The object of this division is that, towards the lambing season, the ewes which are sprung, and thus known to be about to drop their young, may be separated at night from the main flock, which is of the highest importance for the good behavior of the mother, as well as for the safety of the young lambs when dropped; as, in the early stage of their existence, they are liable to be butted or trampled to death by the rest of the flock.

This brings us to the subject of lambing, upon the good management of which depends the whole success

of the business. We have found, from long experience, that the first forty-eight hours of a lamb's existence is the most critical period. If a lamb can be taught to suck, and remains confined with its dam during that time, afterwards it will follow her to pasture without risk, for the simple reason that, during that period, it learns how to suck with confidence and energy; becomes familiar with the "grutting-call" of its mother; and, above all, it acquires *strength* enough to follow her. And we can say, from close observation, that for the want of the latter ability, more lambs are lost which are dropped in pasture than from any other cause; for sheep being a gregarious animal, if it drops a weak lamb in pasture, and the whole flock strays off, if the lamb is unable from feebleness to follow its dam, she will cruelly leave it behind to perish.

With regard to young ewes, much patience must be exhibited towards them with their *first lamb*. Sometimes they will disown it; in which case we have found the best method was to halter the mother in the fold; and, holding up the chin of the lamb, thus aid it to acquire the art of sucking; which operation must be repeated every two or three hours. If the mother proves obstreperous, and kicks, which, as a general rule, she will do, and thus maim or kill her young, let an assistant, facing backwards, straddle the neck of the mother, to hold her still, while a second person assists the lamb to suck. In a day or two the lamb will learn how to "work for its living;" and the maternal instinct will develop itself to the extent of acquiescing in the novel performance.

Supposing then that the whole flock have been safely delivered, and they are enjoying themselves in the meadow, the next thing to be thought of will be the shearing, and, during this operation, we must not forget to destroy the probable crop of "sheep-ticks," which are, at this moment, the probable cause of the old sheep rubbing themselves against the rough bark of trees and fence sides. To destroy these vermin, a good time to do so will be during the shearing. On the day the flock is to

be sheared, let the farmer procure a good water-tight barrel, and place it near the fold. Let him put a very large pot of water over a good fire; and, when the water is boiling-hot, fill the pot with leaf-tobacco to one-fourth its capacity; and, when the decoction becomes the color of strong coffee, pour it off into the barrel to cool; repeat this until the barrel is about two-thirds full. Just before commencing to shear the old sheep, catch the lambs, one by one; and, holding the feet together in one hand, and the nose in the other hand, dip the lamb down *thoroughly* into the barrel of tobacco water. As soon as each lamb is dipped, turn it loose in a lot, or pasture, where there is sun, in order that it may dry off without *chilling*. It will be found upon examination that by this bath every tick has been almost immediately killed. If the lambs can be allowed to join their dams soon after the shearing, it will be found to be of great advantage, as the shock produced by the change of appearance in the dams after being sheared, and the chocolate color of the fleece of the lambs from the dipping, produces a momentary confusion; which, if imprudently prolonged, will cause an estrangement to spring up between mother and lamb, which may cause much embarrassment and produce trouble afterwards.

With regard to shearing, the art being as old as the days of Abraham, and so many "professionals" nowadays attend to this matter, that it is almost the better plan to have such persons to do it. But for the preparing the fleece for the modern market, too much care cannot be taken. Competition is so great that to sell *anything* to advantage it must *look* well. And this holds good as well with fleeces as anything else; therefore, we say, if you wish to get the top of the market for your wool, prepare your fleeces properly. When the fleece is taken from the sheep—presupposing of course that in the operation of shearing it has not been torn into rags—lay it upon a good, long, ample table. Let two cords of hardware twine be stretched a foot apart the length of the table; one end of each cord to be caught in a notch at the upper end of the table, and the rest of the cords having

first been passed through two gimlet-holes in the lower end of the table, remain attached to the two balls upon the floor. Lay the fleece upon the table over the cords, "outside up"—the neck at the farther end of the table. Fold the two sides inwards to the centre, edge to edge; then fold the neck part over to the centre; then the hind quarter to meet the neck; then fold the two sides, once more together, with their edges upwards; roll up the fleece tightly from the neck towards the hinder part; tie it as compactly as possible with the two cords, like the two straps to a soldier's knapsack; cut the cords, and the fleece will then look like a ball of gold. Weigh it, and credit each particular sheep with the weight of its own fleece. Make a sack out of gunny-cloth, resembling in shape the bales of Sea-island cotton, that is, long and narrow, and tramp the fleeces into it with strength. Sew up the mouth of the sack, stencil it with the owner's name, and mark the total number of pounds upon it. This latter item tends to save dispute in its sale, if it is shipped to an agent.

Next in order will come the sale of lambs. In this, of course, the farmer will judge for himself; but we say never sell lambs until they are well grown, say from seventy to eighty pounds, weight. For the grass will still be growing, and it costs nothing to keep them until they are at their best. In selling lambs it is always judicious to retain the ewe-lambs, for the purpose of keeping up the standard of the flock. Sell, therefore, only the wether-lambs, and the old ewes that are beginning to fail—retaining now and then some fine buck-lamb for stock purposes.

Buck-lambs should be altered within four weeks of their birth; and, at the same time, cutting the tails of all the lambs, called "docking," should be done. This docking is of great importance to the future comfort of the sheep in case of "scours." The first operation should always be done only by an experienced person; for, although the operation is a very simple one, nevertheless, it requires skill. The latter, "docking," almost any one can do. Let one assistant, seated, hold the lamb with its

back against his breast; with his left hand he holds the tail firmly down on a stout plank, at the same time drawing the skin towards the lamb. The operator then, with a chisel and mallet, cuts the tail off at one blow, about an inch and a half from the buttocks, selecting a joint for the purpose. A little salt and water, applied immediately, will arrest any serious hemorrhage that might otherwise follow. Sometimes a fastidious ewe will reject her lamb on account of the smell of blood. In this case confine the mother and lamb together for a day or two, and she will receive it again.

With regard to the vital point, the profit in sheep, we would say that if the farmer desires a goodly number of lambs raised with the least trouble, they should not be dropped before the first of April. This can always be accomplished by keeping the buck separate from the flock, and only letting him join the ewes on the first of November. After he has been with them six weeks, remove him again until the next season. This is always a good plan, as he frequently, if allowed to remain with the flock, butts the ewes with great cruelty, and prevents them from lying down and resting, by a continual worry.

When lambs thus come in April, the weather is genial, and the grass is all springing up, and the ewes, having thus a plenty of succulent food, are better able to furnish a generous supply of milk. The lambs, consequently, under the benign influence of sunshine, plenty of milk, and young grass to nibble, thrive better, grow faster, and the percentage of loss is nothing compared to the loss of winter lambs exposed to cold and snow.

Lambs should be weaned about the fifth month after they are dropped; and, if possible, the whole flock should be weaned at once, as this saves a great deal of trouble. In weaning them, select a good, fair day, and try and so arrange it that the respective pastures are so situated that the mothers will not hear the bleating of their young; for, if not, the weaning will be much retarded. Select the *best* pasture for turning the lambs into, and the *poorest* for the dams, in order that the lambs may have plenty to eat, and the ewes little, so that they may

"dry up," and stop the flow of milk. About a week's separation will generally be sufficient to accomplish the estrangement necessary for weaning; after that time they may be permitted to run together again. Sometimes a ewe will, in spite of the weaning, continue to make milk, which will be known by the appearance of her bag. In such a case it will be necessary, at times, to relieve her by hand, otherwise her bag may "cake," and thus injure her future usefulness as a mother.

In conclusion, we would say that no amount of dog-laws can ever prevent dogs from killing sheep, if they are left out in an exposed, and often isolated, pasture, night after night. It is the nature of the sheep to flee at the sight of a dog, and it is the nature of the dog to chase, not only sheep, but anything else, man or beast, that runs away from him. No dog-law which does not authorize the farmer to shoot any dog found trespassing upon his premises, unaccompanied by its owner, can ever be of any practical value to the farmer. A law which requires the farmer to wait until his sheep are chased and killed, is a mockery of justice—"prevention is better than cure." If the Legislature will not do this, then let the farmers universally adopt the plan of *folding their sheep* every night, winter and summer, in a dog-proof sheep-fold, as herein described; and they will find that they will be "a law unto themselves."—*Col. A. L. Taveau, of S. C.*

CHAPTER LII.

THE BEE: ITS HONEY.

Honey bees are often noticed in ancient poetry and in the Bible. Virgil described them elaborately, and mentioned their kings, drones, and laborers. They have queens only, no kings. The drone bee, however, is a male, and may have been called a king, for the word queen always suggests a king. In what is called a swarm

of bees there is but one queen. She is a very large bee, about three-quarters of an inch long; the drones are two-thirds of an inch, and the laborers one-half an inch long. The queen bee is very gentle, so much so, indeed, that it is difficult to provoke her to sting. Her eggs are deposited in cells of different size, according to the kind of bee to be hatched. The cells, or nests, as we will here call them, intended for hatching queen bees, are made large and long, and the place where hatching and honey-making is carried on by the bees is called a *bee-hive*. Glass hives are generally used, through which may be seen the queen and her workers performing their respective duties.

“See how the little busy bee
Improves each sunny hour,
And gathers honey all the day
From every opening flower.”

Nature has intended the bee to teach lessons of industry to mankind, and the drones which do not work afford us a sight of the miseries of idleness.

After the honeycomb is prepared by the laborers, for hatching young bees, the queen moves slowly over the comb, and looks out for cells suited to her purposes. She first puts her head into the cell and examines it carefully, and if she finds it well built, she rolls one of her eggs into it. If the cell is not suitable she may leave the egg outside, and all the eggs thus left are eaten by the laborers.

A kind of worm is hatched from the royal egg in three days. For six days it remains a worm, for three days longer it is called a nymph, and on the sixteenth or seventeenth day after hatching it is a perfect bee.

Several royal cells for hatching queens are made in one hive. These cells are left open, and the young queen first hatched out goes to the other cells and destroys all the rest, to prevent them from becoming queens also.

After the young queen has killed all the rest in their cells, the old queen retires from her throne and leads off a swarm of young and old bees in search of another hive.

The young queen remains at home in place of the old one flown with the swarm.

If the queen is lost, the swarm can hatch out another. To do this, they take three cells containing eggs for working bees, and make these cells into one, enlarging the house as the young queen grows. If no brood-comb is found in the hive, a new queen cannot be made, and consequently the swarm of bees perishes.

If the queen is taken from a hive, the laborers cease to work, and crawl about sadly as if in search of her; but on putting her in the hive again, the news flies rapidly to the most distant bee, and they soon set to work again as cheerfully as ever.

On giving a queen to a queenless hive, the drones and laborers give signs of great rejoicing. As soon as she presents herself, all the bees surround her in a circle with their heads towards her.

The queen has a bodyguard. When she stops moving over the comb-cells, after having deposited her eggs, a great number of bees cluster around her, and they do nothing without her.

Only one queen can live in a hive. If two hatch at the same time, one kills the other in a fight, and there is a terrible commotion among all the other bees until the fight is ended.

The drones may be called gentlemen of leisure and ease; they are lazy and idle, and, like lazy and idle people, often make a great noise. Drone bees rise from their slumber at about ten o'clock in the morning, and, after a few hours of idleness at midday, retire to bed again at about three o'clock in the afternoon.

There are at times from 500 to 2000 drones in a hive. They are hatched in the month of May, consuming during summer a large quantity of food brought in by the laborers. In order to save food for themselves in winter, the laborers proceed to kill all the drones in October. There is a lively time in killing and casting these lazy bees out of the hive, but when spring comes, the laborers go diligently to work to hatch out others. The drones are cowards. They have no stings, and appear to sub-

mit willingly to a violent death for the good of the laborers and queen. In killing the drones the laborers do not sting them to death, but tear them in two or more pieces.

The laboring bees are females, smaller than the drones, and have long stings. When they sting violently, or in earnest, the sting is left in the person or thing stung, and the loss of the sting results in the death of the stinger. When about to sting, the bee utters a sharp cry and emits a strong odor; and if, on hearing this cry, girls or boys do not leave the hive, they may expect a bee-sting pushed into their flesh like a pin. The effect of the sting is quite painful, but not very poisonous.

The bee laps its food with its tongue like a dog laps water. When at the flower, it puts the honey in its stomach, and loads its thighs with a sweet dust from the open flower.

The laborers do all the work, gather the honey and stow it away in the comb-cells, as well as keep guard and nurse the young.

Some of the bees work as ventilators. Stationed near the openings or doors of the hive, they keep up a circulation of air by a fanning motion of their wings. From this work they are relieved every half hour, and others take their places. The fanning motion of the wings produces a noise as well as a wind, which also scares off any insects that may be about the hive.

If this noise and wind do not scare off the insect, a number of the ventilator bees will proceed to kill it.

Working bees will go a number of miles in search of flowers for honey. They greatly prefer the flower of buckwheat, and farmers who keep bees should liberally sow this grain for their accommodation.

When wax is wanted for building comb-cells, the bees fill their stomachs with honey from the flower, and, several of them hanging together, the wax is secreted from their sides.

Between November and April about three-fourths of the bees in a hive die, but in spring the survivors proceed to hatch from the queen's eggs a swarm more numerous than the old one.

After the spring broods come out of the cells, the old queen, with a great number of others, both old and young, rush out of the hive and swarm, if they have not sufficient room and air within, and it is well known that the want of room and air, as well as the want of a throne for a young queen, lead to commotion and swarming.

The queen occupies the centre of the swarm, and if she can be got into a new hive, all the rest will soon follow.

As to the best mode of hiving a swarm of bees, no general rule can be given. The noises made by shovels, tongs, and tin pans, may be useful to call some one to your assistance, but as for the bees, they have no ear for such music.

The little busy bee, that makes the beautiful and elegant honeycomb we see on our tables, has been described, and when you go to the country, try to get a sight of the wonderful queen bee, the drones, and the laborers. Their work can be seen through the glass windows of the hive, and it is exceedingly interesting and instructive to children.

CHAPTER LIII.

FRUIT-TREES.

It is in the power of every farmer to have delicious fruits. Fruit-trees require but little land. Briars in the fence corners, offensive weeds, and perhaps poison-oak, often occupy a spot of ground where a fruit-tree might grow.

Along the cross-fences where brambles often grow, fruit-trees can be planted; they are pleasing ornaments to a farm, and afford a shade delightful to children, as well as to small animals.

An orchard pays well for the labor bestowed upon it; besides, fruit is not only delicious to the taste, but when

fully ripe, it contributes greatly to the health and the comforts of every family.

For planting an orchard, the best varieties of trees should be selected. Good trees require no more land and labor than bad ones, and if a bad fruit-tree is found on a farm it should be removed and a more promising one planted in its place.

In planting an orchard, consider first the distance the trees should be planted from each other. If the cultivation of crops of vegetables, grain, and grass in the orchard is in view, the spaces between the trees must be wide, say 30 feet apart. At this distance apart an acre of land will contain 48 trees; at 35 feet apart, 35; at 40 feet, 27 trees, and at 50 feet, about 18 trees.

Fruit-trees will not grow well in very poor ground. The earth must be as rich for trees, generally, as for vegetables and cereals, and when a tree is taken up for transplanting, it is right to transplant it just as it grew in the nursery. Transplant it in its new situation just as it grew in the old one—no deeper, and cut off no top roots. Set the roots in a deep, rich soil, made to suit them. Let this all be done in February or March, for trees, when planted in the fall, suffer too much from the cold of mid-winter.

When trees are planted in holes they should be dug about four feet square and two feet deep. Compost from the barnyard, mixed with meadow-mud, is good to put in these holes. When the roots of the young tree reach it, they grow vigorously. Shells or broken stone is good to put around the roots of young trees after planting, that moisture may be retained on the top of the ground.

Orchards must be plowed and planted every three or four years; for, as vegetation runs wild on the soil, the fruit-trees follow. Trees planted on uncultivated old fields will, from their surroundings, soon begin to incline to their native wildness. As before observed, cultivate your orchards, nurse your trees, carefully remove dead and dying branches, and do not let the tree carry more branches than will appear well proportioned to the size

of its body. It is a law of nature that a head too large will soon cause the death of the body. Prune your trees every year. Lop off all the disproportioned and useless branches. Plant them on land well exposed to the sun, and if the earth is loosened around the roots by the force of the winds replace it as soon as possible.

The best crops for an orchard are potatoes, beets, turnips, and cabbage, which do not require that the earth should be worked so deep as to injure the roots of the trees.

CHAPTER LIV.

CANNING.

The best, because at once the healthiest and cheapest, as well as the most toothsome, mode of preserving fruit, is to can it. For this, very little sugar is necessary; indeed, some people use none. Glass jars are to be preferred to tin, because they keep the fruit better, are more easily managed, and while costing a third more at first, last a great deal longer—forever, in fact, if care be taken of them. In canning fruit and vegetables two things are necessary—the fruit must be put up boiling hot and sealed at once air-tight. If these two rules are strictly observed the fruit may be warranted to keep. Have the jars all ready, with elastic and tops fitted before you begin, and when the fruit is ready to can, roll them in hot water, scalding hot, with a quick twist of the hand, drain and stand them in hot water in a pan on the stove close to the kettle. Fill each jar full as quickly as possible and let some one stand ready to clap on the top, which must be wiped dry, and screw it as soon as the jar is filled. As the fruit cools the top must be tightened to suit the contraction of the jar.

To can berries heat them slowly to boiling in your preserving kettle. When they begin to boil add a heaping tablespoonful of sugar to each quart of fruit. Boil

for fifteen minutes. If there is much syrup, dip it out and set aside for jelly or bottled syrup, when it will be of much more use than if canned. Blackberries, grapes, raspberries, huckleberries, etc., are all excellent canned, making pies equal to fresh fruit, and also very good eaten with milk for tea.

Peaches must be cut in halves and packed in the kettle with sugar, in the same proportion, sprinkled between the layers, putting a cupful of water at the bottom of kettle to prevent burning. Heat slowly on the back of the stove, then bring to a boil for ten minutes, to be sure that every piece of fruit is hot through. Can as hot as can be and seal.

Plums must be pricked with a large needle or hairpin to prevent bursting. Then make a syrup, allowing half a gill of water and an ounce of sugar to every quart of fruit. When the sugar is dissolved and the water is warm, put in the fruit and heat to a boil. Keep them boiling slowly or they will break, for ten minutes, then can.

For pears, peel and cut up, make a syrup, allowing a quarter of a pound of sugar and a gill of water to every quart of fruit. Heat slowly, boil ten minutes and can. Bartlett pears should have twice the quantity of water allowed. Let the syrup come to a boil; then put in the pears and cook until clear. Pack in jars, cover with boiling syrup and seal.

Tomatoes are the cheapest and most useful of all canned fruits or vegetables. Pour boiling water over them to loosen the skins, peel and boil for ten minutes, then can piping hot and screw the cans as close as possible. Green corn is difficult to can. The only way in which we have ever seen it successfully done is to boil the corn on the cob until the milk ceases to flow. Cut it from the cob and pack it in the jars close. Set the jars on the fire in a kettle of water and bring the water to a boil. Seal while still on the fire.

CHAPTER LV.

BUTTER.

It has already been said that butter is made from cream, but it may be made by churning the milk and cream together. The best butter is made of cream, but cream and milk churned together make the largest quantity of butter.

If it is desired to make butter of a very superior quality, the milk last drawn from the cow at each milking should be used. It is rich and nearly all cream.

When butter is to be made from cream, the cream from each milking is put into a vessel until a given quantity is collected. Before the cream arrives at too great a degree of sourness, it is put into a churn and agitated for about an hour; at the end of this time, the butter will appear in the shape of small kernels, which are united by pressure.

A solid mass of butter is thus formed. It is worked or kneaded in cold water until the milk is entirely separated from it. Salt must be put in at the first working; then work the butter till nothing but pure and clear water can be pressed out of it.

After the clear water appears, work the butter no more, for it may become tough and glucy. Use good and pure salt in butter. The Germans use a kind of salt made by a slow process which perfectly crystallizes it.

Too much attention cannot be paid to the most minute circumstances in making butter, especially everything that relates to cleanliness. The complexion and temperament of a butter-maker are matters not to be disregarded. However clean he or she may be, there are times when the insensible perspiration of the body has a powerful effect upon the milk and butter.

Any kind of an odor may give a turn to the chemical change which commences as soon as the milk or cream is exposed to the surrounding air.

In making butter, no water should be permitted to

come in contact with the cream or butter, because it is known that water dissipates much of the fine flavor that gives to butter its high value.

If the cream is kept clean, the butter needs no washing; and if the butter is dirty, water will never make it clean.

CHAPTER LVI.

THE WEATHER.—THE MOON.

Observation.—Persons who have devoted their attention to the weather have built upon the hope of being able to discover, by repeated observations, some rules concerning its changes.

Such rules would be of great usefulness in agriculture. Nature “hangs out” many reliable signs for our instruction, and if we could at all times read her language, we might often escape a loss of time, labor, and crops.

The influence of the moon on the weather has been believed by some people in all ages. This opinion has been maintained from the established fact that the moon has an influence upon the sea, and it is therefore believed that it also has an influence on the atmosphere.

It has been observed that certain situations of the moon in its orbit have almost constantly been attended by changes of the weather, either to rain, to wind, to calm, or dry weather.

Be all this as it may, it is, nevertheless, well and proper to have some regard to opinions held by men of experience on this subject, who have recorded their testimony concerning predictions, which have generally been verified.

In every revolution of the moon in her orbit she arrives at ten different points, where she exerts an influence on our atmosphere.

These points are: The new moon, the full moon; the first quarter, the last quarter; the moon’s nearest ap-

proach to the earth; her greatest distance from the earth; her two passages *over* the equator, known in the farmer's almanac by the "moon's descending," and the "moon's ascending;" and, lastly, when the moon is nearest the point *overhead*, and when it is farthest from it.

These ten situations of the moon are known to be attended by changes in the atmosphere.

They may be great or trifling, producing great or trifling changes in the weather; yet they should be marked by every good and careful farmer as to what they are worth.

Changes in the weather seldom happen on the same day the moon reaches one of these points, but sometimes before and sometimes after that day.

The points of the moon are always stormy about the time of the equinoxes, which occur about the 21st of September and the 21st of March.

When there has been no storm about the equinox of March, the following summer will be dry, at least *five* times in *six*.

When a storm arises from an easterly point, either on the 19th, 20th, or 21st of May, the following summer will be *dry*, *four* times in *five*.

When a storm arises from any point on the 25th, 26th, or 27th of March, *and not before*, the following summer will be *dry*, *four* times in *five*.

If a storm arises from the south-west on the 19th, 20th, 21st, or 22d of March, the following summer will be *wet*, *five* times in *six*.

A rainy autumn and a mild winter are generally followed by a *cold* and *dry* spring, which greatly retards vegetation.

If a summer is very *rainy*, the following winter will be severe.

If a great crop of acorns, chestnuts, hickory-nuts, and small berries appear in the fall, a severe winter is expected. Nature is prophetic, and provides for small animals and birds.

The early appearance, on the wing, of wild-geese and other birds of passage announces a severe winter; for it

is a sign that winter has already begun, with severe indications, in northern countries.

When it rains plentifully in May, it will rain but little in September.

When the wind is generally south-west in summer and autumn, much rain may be expected during its continuance.

A cold and severe autumn announces a *windy* winter; and a rainy winter predicts poor crops in the following summer. Much rain in September predicts a dry May.

CHAPTER LVII.

TEA AND COFFEE.

The leaves of a shrub which grows chiefly in China and Japan are gathered by the natives of these countries and called tea.

The tea-shrub is an evergreen, grows to the height of five or six feet, and bears white flowers resembling white roses.

There are a great number of tea-farms in China and Japan, situated on the high grounds, where the soil is light, dry, and rich. Tea-plants are raised from seed; and, that the stem and the roots of these plants may grow and mature, no crop of leaves is taken from them for three years.

The leaves are carefully picked by hand, *one at a time*; and there are three or four gatherings each year. A well-grown bush will produce three or four pounds of tea each year.

For green tea, the leaves are allowed to dry only for an hour or two after gathering, and then they are thrown into a roasting-pan placed over a wood-fire. By this means the green color of the leaf is *set*. To make black tea, the leaves are allowed to dry for a whole day before

they are fired, and are finally dried over a slow fire. Good tea will not grow on the farms of this country.

Coffee is the seed of an evergreen shrub. It was first found in Arabia, and is now chiefly cultivated in the tropical parts of America.

Brilliant sunlight gives to coffee its delicious flavor. The coffee-plant resembles a laurel bush; it grows eight or ten feet high, and continues in bearing-order for forty or fifty years. It bears clusters of white flowers, and after the flowers, beautiful red berries. Each berry contains two seeds, which we call *coffee*. The seeds are pressed from the berries by means of a rolling-mill, dried by the sun on large clay floors, then winnowed, picked over by hand, and put in bags or barrels.

The green coffee is roasted over a moderate fire; and the sooner the coffee is prepared for the table after roasting, the finer will be its flavor. Coffee is a stimulant, very nutritious, and contains three times as much nourishment as tea. It will not grow to perfection on the farms of our country.

It is said that the best method of extracting the strength from roasted coffee is to pour boiling water through it in a strainer. This plan is found to extract nearly all the strength. Another method is to pour boiling water upon it, and set it upon the fire, not to exceed ten minutes.

The Turks and Arabs, met by travellers in the Holy Land, and in the wildernesses east and south of the Mediterranean Sea, boil each cup of coffee by itself, and only for a moment, before it is offered to the traveller. The fine aromatic oil of coffee, which produces its flavor, is lost by too much boiling. By this means our most delightful breakfast beverage is made flat and weak.

CHAPTER LVIII.

THUNDER-STORMS.

Thunder-storms are much dreaded by the inhabitants of the farm-house, because they are considered dangerous.

The chances of persons being injured by lightning are far less than the chances of injury in their daily walks about business, or even in sleep, from the falling of the house in which they reside, or its destruction by fire.

During a thunder-storm we should keep at a distance from the fireplace, especially if the fire be lighted. We should also keep away from the walls of our dwelling and occupy a place in the middle of the room. The safest place is upon a feather bed in the middle of the room; and, indeed, this is the best and safest place for a bed at all times.

It is dangerous to be in a crowd of people during a thunder-storm, because a crowd forms a better conductor of lightning than one person; and *vapor* from a crowd is a conductor; consequently, the more conductors the greater the danger.

When persons out on a farm are overtaken by a thunder-storm they should not take shelter under a tall tree, because the lightning generally chooses tall trees as conductors; and we should not be near enough to a tree for the lightning to diverge from it to us.

Cattle and horses that take shelter under trees during thunder-storms are in great danger. When the light from a flash of lightning is seen the danger is past. There is no danger in the thunder which follows.

A lightning-rod is a rod made of metal. It should be made to extend from ten feet in the ground all along the wall of a building, and end in a point above it. Copper makes the best lightning-rod; and the lightning will run down the rod rather than the walls of a building.

A good rod will protect a space all around a building four times the length of that part of the rod which rises above the building. For example, if the rod rises four feet above the building, the space protected will be to the distance of sixteen feet all around it.

Dwellings, stables, barns, and all places where animals assemble during a storm, should be furnished with lightning-rods.

CHAPTER LIX.

CLOVER.

Clover is a native of Europe and America. Its introduction in connection with the rotation of crops has contributed largely to improvements in agriculture.

It affords wholesome food for every other plant, and for every class of stock kept on a farm.

Clover imparts a new and beautiful aspect to the fields in which it grows. That which has been introduced in agriculture is known by its broad leaves, reddish-purple flowers, and luxuriant growth.

The soil most favorable to the long tap-roots of this plant is a deep sandy loam, but it grows well in almost any kind of soil.

Fed in the green state to horses and cattle it is very nourishing, and should be cut and brought into the stable for this purpose, that all its waste may contribute to the heap of compost in the barn or stable-yard.

Clover-seeds are sown broadcast, either in the fall or spring, on fields set in wheat, rye, or oats. That the seeds may germinate and not be lost, they should be covered to the depth of at least a quarter of an inch in well-pulverized soil. If sown on the wheat-field in spring, they should be covered by a light harrowing, so that the wheat may sustain as little injury as possible.

They may be sown on snow in winter; and, in this case, they will be covered by the melting away of the snow. These seeds must be always sown in fall, in winter, or very early in the spring; for if sown late in the spring, the heat of the sun may kill the young plant as soon as it appears above the ground.

If clover be allowed to grow and fall down upon the soil, it will, perhaps, enrich it more rapidly than any other mode of treating it. Land is always rapidly enriched by any covering.

The best wheat crops are raised on a crop of clover well turned in by the plow.

Clover draws but very little of its nourishment from

the soil, but a very large portion from the air. It brings from the air to the soil a far greater amount of plant-food than it takes away from the soil; and this fact discovers to us the vast powers of clover for enriching poor lands on which it is sown.

A crop of clover made into hay is very valuable for milch cows in winter. The crop of clover-hay is harvested in June; the second crop produces a valuable crop of seed, which is gathered in the fall; and the crop from which the seeds are gathered makes a second crop of hay.

When clover is raised for its seeds the ground should be clear of weeds. Weed-seeds take away from clover-seeds a large portion of their commercial value. When a crop of seeds is desirable, the clover should first be cut for hay; then, at times, when the second crop is growing, remove from it all noxious weeds, that they may not ripen into seeds. By the observance of this rule pure clover-seeds may be gathered.

On small farms it may be desirable to set a lot in clover for the purpose of soiling; that is, for cutting in the green state for feeding horses and other animals.

For this purpose plow the ground deep, and pulverize it well by the harrow. Do this in April, for May is too late on account of the approaching heat of summer. Sow fifteen or eighteen pounds of pure seeds to the acre, broadcast, and harrow them in with a light harrow. After this, a light roller should go over the ground to level it, break all the clods, and bury the light stones.

Do not be afraid you might bury the seeds too deep. They will stand an inch or two of light earth very well; and this will protect the germ of the seeds from injury by the sun.

A lot well set in clover will last for "soiling" several years. When growing in dry soil it may be cut green twice a year for four or five years. After this, the soil should be allowed a rest from clover. Although clover fertilizes a soil, yet that soil must be allowed a rest from it, or impoverishment will follow.

In setting clover in any soil always sow about fifteen or eighteen pounds of seed to the acre.

CHAPTER LX.

REMARKS ON GRASSES.

It is wonderful to contemplate how long mankind neglected the cultivation of those grasses which are the chief food of cattle, and the great progress made by the enlightened farmer since the general commencement of their cultivation for green and dry provender.

The number of different grasses worthy the notice of a farmer, as food for horses and cows, is not more than half a dozen. It is highly proper for every farmer to have good grasses and hay on his farm, and that in abundance. It is improvident to allow a sprig of grass to go to waste on a farm by floating down stream, or drying up on stone heaps and among coarse brambles. All of it should be used for food of animals, covering for soils, or material for the heaps of compost.

A few different kinds of grass should be raised on farms. Horses will scarcely eat hay that will do well enough for oxen and cows, and sheep are fond of certain grasses, fattening upon them and rejecting all others.

Timothy is the favorite grass of the farmer. It was introduced into Europe by Timothy Hudson, where it is still known as *timothy grass*, or *meadow cat's tail*.

Timothy may be set in lands like clover. Some farmers set it with clover, but it is recommended that all grasses be set alone. Clover matures much earlier than timothy. When clover is ready for the scythe, timothy is quite green, and lacks the nutritious qualities which it acquires by remaining longer in the field.

Orchard-grass is better with clover, for both acquire a proper maturity about the same time, and should fall by the scythe together.

Since the cultivation of grass by farmers has been introduced, large hay-farms are found in all parts of the country.

Timothy, well set in good soil, produces from four to six tons of hay to the acre; and when it is allowed to go

to seed, from ten to thirty bushels of seed to the acre may be gathered ; and the saving of seed does not essentially diminish the crop of hay.

Timothy and clover, cultivated together, make an improved hay for milch cows in winter ; but, as food for horses, all the grasses should be grown and fed separately.

Corn, sown broadcast at different times in the spring and early part of the summer, makes an excellent food for horses and cows when the pastures are scant, especially if run through the cutting-box and fed with *mill-feed*. Green corn, to be used in this way, should not be cut until its tassel appears ; and a farm should not be without a supply of it, in this condition, at all times, from June to November.

APPENDIX I.

ON TEACHING AGRICULTURE IN THE PUBLIC SCHOOLS.

My experience of three years at the Maryland Agricultural College as president of the board, confirmed my former impression as a trustee, that it is a mistake to begin teaching farming in a college. Even the sonorous prefix "agricultural" by no means remedies such mistake; nor have I seen or heard anything since to change that opinion.

Must we, then, conclude that agriculture, as a science, or as a branch of practical industry, can derive no benefits or advantages from the schools? Far from it. On the contrary, it can derive very great benefits from the schools, if we begin at the right time and in the right way. And, in my judgment, the right place is in the primary schools, where the "young idea" is vigorous and pliant, and mere inclination has not hardened into habit. The first letter of the alphabet stands for *agriculture*; and while seeking to impress that letter on the pupil's mind, how easy it would be for a skilful teacher to lead the child imperceptibly to some knowledge of the *products* of agriculture. Take an apple, for instance, of which all children are fond. While teaching the shape and sound of the letter A, let the master also please the child by teaching something concerning the beauty of the apple, of its fragrance and lusciousness, and of its general value and usefulness. In a little while the child will want to know where and how the apple is grown and cultivated. B stands for bread, as well as for butter. Bread is made from flour, and flour is ground from wheat, and wheat is the leading product of agriculture. It is cultivated more widely and is used more generally than any other grain grown by the farmer. How is it cultivated? How is it harvested? How is it threshed and prepared for market? How is it converted into flour? Such questions as these would readily arrest the attention and excite the interest of the child. From these simple beginnings there could be gradually evolved and impressed on the pupil's mind a valuable fund of informa-

tion; such as the vast quantity we raise every year, the immense number of bushels we have over and above our own needs for consumption, whither we send it to find a market, particularly our Patapsco flour, which goes to South America, whence we get coffee in exchange for it, and to almost all portions of the earth, which send us back either money or tea or sugar, or the like important needs of modern civilization. And as to the letter C, which stands for cow and coffee, what bright child would not be intensely interested to learn where coffee grows, how it grows, how it is harvested, prepared for market, and brought to our homes to diffuse its fragrant aroma and give us strength, with fresh cream, as well as pleasure?

Such a line of inquiry as this brings up the great questions of exchanges and barter. The shipload of flour is worth more than the shipload of coffee—how is the balance of trade adjusted? The solution of this latter question leads in a most familiar and impressive manner unto the great subject of political economy. And, in like manner, thousands of questions will arise and follow each other in most natural order when we once begin to teach agriculture where it should be commenced, *in the primary schools*. But where is the authority to introduce it into those schools, seeing that the course of studies is “inflexibly” prescribed by law, and that agriculture is not one of them? This is true; but, fortunately for the farmer, reading and geography are included in the branches that are *required* to be taught. Geography is defined in *Brand’s Encyclopædia of Arts and Sciences*, to mean “everything relating to the circumstances and conditions, natural or artificial, of the globe which we inhabit;” and our school geography, maps, and atlas, particularly Maury’s and Appleton’s, are so divided and illustrated as to show, almost at a glance, the *productions* as well as the geographical divisions of the earth’s surface. They are intended to be studied and taught in this double sense and form; and thus there is opened to the youthful mind a vast, useful, and most interesting field of knowledge. Not only do these books and maps tell of the natural products of the earth, but they also give

bright glances at the *natural history* of every country. And when the child's mind has become interested in these pleasing subjects, how much easier then to fix indelibly in his memory the location of States and cities, rivers and mountains, seas and dry land; where different animals, as well as different grains, fruits, and vegetables grow.

The child born and raised in the country would thus learn more and more to love the country as the source and fountain of all that is useful, beautiful, and necessary to the wants and comfort of the human family. And the child born and raised in the city, accustomed only to bricks and mortar, to dirty streets, rumbling carts, and the mere works of man, would yearn for the green fields, the dense forests, and the babbling brooks—for the fish, the fowl, the frisky squirrel, the lambs, colts, and the calves of the farmer, which, to his youthful imagination, constitute the sum of human bliss and happiness. Taught in this way, geography is one of the most pleasing and useful studies, and might well take the place of the dry study of the Constitution of the United States, which should be relegated to our statesmen at Washington, or of the abstruse study of philosophy, which Roger Bacon says cannot be understood without first mastering the mathematics. "For," says Bacon, "he who knows not mathematics cannot know any other science; and, what is more, he cannot discover his own ignorance or find its proper remedies." Again, of philosophy, another great writer says, "It is the sum total of human knowledge."

What folly to place abstruse mathematical and scientific studies into the hands of those children for whose early training in the primary and fundamental branches our public schools were established and endowed at the expense of the State. To show that the great public mind is leaning to this sort of practical study, I point to the effect of the prizes of one hundred dollars awarded by a gentleman of Harford county, to the three boys who would produce by their own labor the best three lots of corn. The avidity with which the boys of that county applied themselves to the task of winning such prizes, has taught them a lesson in the art of cultivating corn which will

never be lost by them, and which is destined to be widely followed and imitated. Already Washington county has had a similar contest, with very gratifying results. But Montgomery county, jutting down upon the District of Columbia, whose Washington city markets she supplies, has varied the contest. A public-spirited gentleman offered a prize of five dollars for the best pound of Montgomery county butter, the award to be made at the following county fair. This offer was quickly followed by additional sums towards the prize until it reached thirty-five dollars. This prize for a single pound of butter excited a very lively competition. It was won by Mr. Ignatius D. Blunt, a young gentleman suddenly called from college by the death of his father to take charge of the latter's fine and successful dairy of beautiful Alderneys.

Will any one pretend to say that the money for those prizes was thrown away, or that no useful and enduring lesson has been taught by the contests which it stimulated? As well might you say that there is no truth in the maxim, "Competition is the life of trade."

Another reason for introducing agriculture as a branch of study into the public schools, is because it will set the boys to thinking, which Bishop Kerfoot, late President of St. James' College, said, "was the most important part of education," and because the public schools are free schools and pervade every part of the State, so that no parent can say that either poverty or distance excludes his children from the benefits and advantages of public school education.

Believing that the primary school is the true place to begin instruction in agriculture, and that it can be well and advantageously introduced into our public schools under the course of reading and geography, as I have endeavored to point out, and that it can be made equally interesting, and offer more lasting benefit than many of the higher and ornamental branches now taught in those schools, I, with a renewal of my best wishes for the joyous season, beg leave to send this as my New Year contribution to the old *American Farmer*.

A. B. DAVIS.

Greenwood, Montgomery county, Md.

APPENDIX II.

IN my article upon the public schools, printed in the April number of the *Maryland Farmer*, I suggested that the elements of agriculture might be advantageously introduced into these schools, under the head of geography. This would not add a new branch of study to our already overloaded course of public school instruction, only an expansion and a better mode of teaching an existing required branch. The branches required by law to be taught in our public schools are—reading, writing, arithmetic, history of the United States, grammar, geography, and good behavior. These are declared to be the necessary branches of public school instruction, and are common to all. They are in most of the States called “common schools.” In ours, free public schools, the word “free” being used as an equivalent to common, making them common schools, like common roads are free and common to all the people. They are supported from a common fund, universal taxation, and teach or profess to teach common branches of study; that is, branches of study necessary and *common to all*. When the common road advances to the dignity of a turnpike, it ceases to be a *common* road; it is a special road, improved at the cost and expense of those desiring the improvement, and kept up by a toll exacted from all who use it. The law requires this, and custom and equity sanction it. So ought it to be with our common schools. Whenever optional branches, such as algebra, natural philosophy, physiology, geometry, the Constitution of the United States and of Maryland, book-keeping, the laws of health, etc., are introduced, not necessary and common to all, like the improved road it ought to be at the cost and expense of those receiving the advantage. Any other course would destroy the principle of equity and equality upon which the system is founded. It is like taxing one man for another’s benefit. This principle has been violated by forcing the higher branches—for

which provision has otherwise been made, as I shall presently show—into the common school, greatly to their injury, and greatly to the added cost of those schools. In place of these I would introduce the *production* of agriculture in teaching geography. Geography is universally admitted to be a dry study. Talk to a child about the latitude and longitude of Calcutta, the boundaries of States and the location of cities, there is nothing to interest him; but point him to the productions, and you at once engage his attention. Take, for example, the State of Florida, a long tongue of low, level, and sandy land, separating the Gulf of Mexico from the Atlantic ocean. This, from its peculiar shape, might possibly fasten its location upon the memory of some children; but tell him that Florida is the land of perpetual flowers, where frost never blights, where the sugar-cane and the delicious oranges and the bananas grow, where the alligator is to be found, and you will have no difficulty in fixing Florida, its location, boundaries, and productions in the child's mind.

Take, again, Norway, a rough, irregular country of mountains, with continual snow upon their summits, and half the State subject to perpetual frosts. There is not much here to attract or interest the child, but tell him that Norway as well as Lapland is the land of the reindeer, where sleds and sleighs are drawn by these fleet-footed animals; that vast quantities of cod and herring are taken and packed upon its coasts, and that its inland streams abound with the beautiful salmon and the speckled trout, the delight of the angler and the fisherman, and you give the child something to think about. In this way a thousand other objects will suggest themselves to the teacher, and geography will become a profitable, pleasing, and interesting study to both child and teacher. In the same way the geography of Europe and America may be studied, their different productions exchanged and sent from one to the other, by which industry is stimulated and commerce established. In this familiar way the child is instinctively led into the practical lessons of political economy, barter and sale, the

value of exchanges, the use of ships, the founding of cities, the opening of canals, turnpikes, and railroads, all the direct result of industry and labor applied to the productions of the soil. How much more profitable such a course of studies for our primary schools than Latin, Greek, French, and Hebrew, or the fashionable sciences, such as philosophy, poetry, geology, or biology. For these latter studies ample provision, as stated, is made in our colleges and academies, at an expense of upwards of \$50,000, in annual donations, and with a corps of teachers, professors, and instructors, averaging one to every eight or ten pupils—where the primary schools are required to show an average of fifty pupils before a first assistant can be called in. How unjust, nay unreasonable, to rob the little children, just beginning to learn, of the time and attention so necessary for them, to teach what at best can be taught but imperfectly, when by the liberality of the Legislature so much better provision has been made for them in the endowed schools, academies, and colleges scattered in almost every county in the State. To these are now added many free scholarships in the Johns Hopkins University.

A. B. D.

ALPHABETICAL INDEX.

A.		PAGE	
Agricultural implements	69	Corn	9
Agriculture defined	7	Cows	68
Alkali	13	Cradle	73
Ammonia	13		
Approach to dwelling	76	D.	
Asparagus	61	Dressed-grounds	76
		Drones	102
B.			
Barometer	63	F.	
Beans	46	Farm-house	74
Bee-hives	103	Flower gardens	77
Bee, honey	100	Flowers, sentiments of	78
Botanical geography	84	Fog	7
Bread	31	Fruit-trees	104
Bread-fruit	90		
Bread lines	89	G.	
Buckwheat	88	Gas	67
Butter	108	Grass	9
		Grasses	116
C.			
Cabbage	40	H.	
Canning fruits	106	Hay	10
Carrots	41	Hogs	69
Celery	59	Hominy	25
Cereals	9, 88	Hopper-boy	30
Clover	114	Horse-radish	57
Coffee and tea	111	Horses	68

L.		PAGE			PAGE
Land		7	Review		65
Line		11	Rhubarb		59
M.			Rice		87
Manure		8	Roots		9
Mist		7	Rotation of crops		31
Moon, the		109	Rye		9, 35
O.			S.		
Oats		9, 37	Sentiments of flowers . .		79
Onions		44	Sheep		94
Out-houses		75	Signs of rain		63
P.			Soil		7
Parsley		59	T.		
Parsnips		43	Tea and coffee		111
Peas		47	Thunder-storms		112
Peas, canning		48	Tobacco		32
Plants		8	Trees		76
Plow, the		17	Turnips		45
Poke		61	W.		
Potatoes		38	Water		7
Poultry		89	Weather		109
Q.			Wheat		9
Queen bees		101	Wheat flour		30
R.			Wheat, history of		26
Radish		57	Wings of seeds		85
Rain		8	Z.		
			Zones		89

APPROVED SCHOOL BOOKS

Published by John B. Piet & Co., Baltimore.

READERS.

NEWLY REVISED SERIES

The First Reader.
The Second Reader.
The Third Reader.

LIBRARY OF CONGRESS

00025865972

strated.
strated.
strated.

THE UNIVERSAL
CREERY'S ILLUSTRATED
with Exercises in

ated.
BOOK,

CREERY'S GRAMMAR SCHOOL SPELLING BOOK, containing
Derivative Words, with Rules for their Formation.

GRAMMAR.

AN ELEMENTARY GRAMMAR OF THE ENGLISH LANGUAGE. By
HENRY E. SHEPHERD, M.A.

HISTORIES.

THE HISTORY OF MARYLAND. From its Earliest Settlement
to the Present Time. By WM. HAND BROWNE and J. THOMAS
SCHARF. Illustrated. 12mo.

CREERY'S CATECHISM OF UNITED STATES HISTORY, with
Questions on the Constitution of the United States. Illustrated.
KERNEY'S, M. J., CATECHISM HISTORY OF THE UNITED
States. (New Edition.) Illustrated.

IRVING'S SERIES OF CATECHISMS.—Revised by M. J. KERNEY.
Catechism of Astronomy, *Catechism History of England,*
Catechism of Botany, *Catechism Jewish Antiquities,*
Catechism Classical Biography, *Catechism of Mythology,*
Catechism of Chemistry, *Catechism Roman Antiquities,*
Catechism of Grecian Antiquities, *Catechism of Roman History,*
Catechism of Grecian History, *Catechism of Sacred History.*

CLASSICAL BOOKS.

EPITOME HISTORIÆ SACRÆ. 18mo., cloth.

PHÆDRI AUGUSTI LIBERTI FABULARUM.

DE VIRUS ILLUSTRIBUS URBIS ROMÆ. 18mo., cloth.

OVIDII NASONIS SELECTÆ FABULÆ, ex Libris Metamorphoseon
Publii. Pars Prima. 18mo., cloth.

OVIDII NASONIS EXCERPTA EX LIBRIS FASTORUM, ex Tristium
et ex De Ponto. Pars Secunda. 18mo., cloth.

MATHEMATICS.

VIRGINIA MILITARY INSTITUTE SERIES.

ELEMENTS OF GEOMETRY. 8vo.

ELEMENTS OF TRIGONOMETRY. 1 vol., 8vo.

ELEMENTS OF DESCRIPTIVE GEOMETRY. Part 1. 8vo.