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AGRICULTURE AND RURAL LIFE DAY

MATERIAL FOR ITS OBSERVANCE

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CONTENTS.

LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, October 3, 1913.

SIR: In several States one day in the fall of the year is set apart as "Agriculture and Rural-Life Day," to be observed in the schools in such ways as to emphasize the importance of agriculture to the nation and to the world of mankind, to call attention to the worth and worthiness of the tillage of the soil, the cultivation of plants, and the breeding and care of animals as an occupation and profession, and to reveal something of the beauty and glory of simple and sane life in the open country. In other States exercises appropriate to this purpose are held in connection with Arbor Day, Thanksgiving, or the Harvest Home celebration. Those who know children best will appreciate most fully the possibilities of this day and the importance of making its program both interesting and instructive. The manuscript transmitted herewith contains material selected and arranged for that purpose. I recommend that it be published as a bulletin of the Bureau of Education. That this should be done is all the more appropriate since in many places this day has been set apart for this purpose at the suggestion of this bureau.

Respectfully submitted.

P. P. CLAXTON,
Commissioner.

To the SECRETARY OF THE INTERIOR.

THE COUNTRY BOY'S CREED

I believe that the Country, which God made, is more beautiful than the City, which man made; that life out-of-doors and in touch with the earth is the natural life of man. I believe that work is work wherever we find it, but that work with Nature is more inspiring than work with the most intricate machinery. I believe that the dignity of labor depends not on what you do, but on how you do it; that opportunity comes to a boy on the farm as often as to a boy in the city; that life is larger and freer and happier on the farm than in the town; that my success depends not upon my location, but upon myself—not upon my dreams, but upon what I actually do—not upon luck, but upon pluck. I believe in working when you work, and in playing when you play, and in giving and demanding a square deal in every act of life.

EDWIN OSGOOD GROVER.

THE FOOTPATH TO PEACE

To be glad of life, because it gives you the chance to love and to work and to play and to look up at the stars; to be satisfied with your possessions, but not contented with yourself until you have made the best of them; to despise nothing in the world except falsehood and meanness, and to fear nothing except cowardice; to be governed by your admirations rather than by your disgusts; to covet nothing that is your neighbor's except his kindness of heart and gentleness of manners; to think seldom of your enemies, often of your friends, and every day of Christ; and to spend as much time as you can, with body and with spirit, in God's out-of-doors. These are little guideposts on the footpath to peace.

HENRY VAN DYKE.

AGRICULTURE AND RURAL LIFE DAY.

PART I. MAN'S STRUGGLE FOR FOOD.

MAN AND NATURE.

The history of our agricultural developments illustrates this principle—that enlightenment is increased by inventions and discoveries, which in turn create new industrial problems that call for still other inventions and discoveries. Thus man is ever modifying or changing his environment, while the environment is ever modifying or changing the habits of man. The intelligence of man and the forces of nature are acting and reacting on each other, while the race is working upward, always passing into higher and clearer intellectual zones, where many phenomena, once mysteries, are made plain, and new forces are brought into service for the advancement of the race. Moreover, as the arts of life have unfolded, man has become more open-minded to natural causes. He has learned to adjust himself more readily to the forces of the world about him, to work in harmony with them, and to adopt for his own use many things in the natural world which were once thought to be useless or harmful. The world has practically been made over in the past hundred years. New sciences have been evolved that have given a new meaning to life. New occupations have been opened up, making it easier for men of different talents to provide an honest living. New subjects have been added from time to time to our school curriculum, until the whole purpose of education has undergone a complete change. New foods for man, beast, and plant have been discovered, and ancient food plants have been so influenced, and their habits have been so changed, that they bring forth an hundredfold more than they did in their original state. These are some of the results of man and nature working together in harmony.

—Selected from Brooks' "Story of Cotton."

HOW NATIONS HAVE FOUGHT FOR LAND.

Man can not live without food, and the great wars of the world have been in the main wars of conquests for new territory, new river valleys, or fertile plains where the cereals grow and where the

starving multitude may receive food in plenty. It is an interesting fact that civilization had its birth in the great river valleys of the world, and the great nations of the world have been those that controlled the rich food-producing lands.

We have only a few records of a great civilization that once lived in the Euphrates Valley, where Babylon and Nineveh contended with one another, and where, it is said, the wheat of the world had its origin.

From this very ancient beginning nations have followed one another in rapid succession, each one contesting for the great valleys, only to be soon captured and destroyed by a more vigorous people. Jacob's sons, driven by hunger, went down into the valley of the Nile begging for food. Their descendants, more than a million strong, having been held captive by the more powerful Egyptians, broke away from their captors and reoccupied the valley of the Jordan—the land of Canaan. Thence came our first lesson in careful food selection and preparation.

The overcrowded Greeks colonized the fertile districts along the shores of the Mediterranean. The Romans went to war with the Carthaginians for the great grain fields of Sicily, and finally annexed the Nile Valley to their great empire. The congested tribes along and beyond the Danube pressed down into the fertile valleys of Italy, France, and Spain and overcame the Romans. Wanderers from the cold north and from across the Rhine overcame northern France, England, Scotland, and Ireland. Several centuries later a way was found to America, and the natives of Europe pushed their underfed population over into America and took from the Indians the fertile valleys along the coast. And when the coastal plain was settled and all the river bottoms taken up the population still pushed westward, fighting the Indian and the bear until the fertile valleys of the Mississippi and its tributaries were revealed. It took only about a century for the valley to become occupied and its products to find their way into the markets of the world. But the struggle for river valleys did not stop. During the past half century another great valley was discovered—the La Plata of South America—and the grain of this great valley feeds millions of Europeans, who would be hungry without it.

THE STRUGGLE FOR FOOD.

The first instinct of every being is to secure food for the nourishment of its body. The moment any living thing appears in the world it begins to feel about for food. The infant animal makes its wants known by its movements, and the little plant begins to send its tiny rootlets around in the soil. The body is extremely sensitive

to the pangs of hunger and responds more readily to its call than to any other stimulus. When the body is insufficiently nourished, both the mind and body become abnormal; the child in the schoolroom is unable to respond to the demands of the teacher; the statesman is unable to hold firmly the reins of government; and the worker in the fields, in the store, or in the factory is unable to render efficient service. When the weakening organs begin to call for support and the life currents begin to draw heavily on the stored up energy of the body, all the native habits of the individual are greatly exaggerated or undergo a sudden change. Upon the lower animals, whether it be the worm of the earth or the lord of the forest, the effect is the same. Among the races of men the instinct is identical in the most beastly cannibal that feeds on the captives of war and in the most exalted ruler of nations. Hunger takes away a mother's love and drives her to devour her own child. It fills the slums of our cities with thieves and thugs, nullifies all laws, and destroys all order. It turns men into demons. The feeding instinct is the great motive power that drives all life and that makes all living things active.

ANCIENT KNOWLEDGE OF COOKING.

It has ever required great skill to convert the corn of a country into a wholesome food. Bread is very ancient in its origin, and baking is older than history itself. Man learned from experience that bread supports life better than any other single food except milk, and thought was devoted to its preparation, even in the very earliest times.

Sarah, the venerable wife of Abraham, knew well how to mix flour and water into a shapely pone, which she baked in hot ashes in her tent. The most ancient Egyptian knew how to make a light, wholesome bread, which they called "leavened bread"; and the Hebrews carried the art with them into Palestine. The Greeks enjoyed a mixture of flour, wine, pepper, oil, and milk, and the ladies of Greece delighted their friends with puff cakes of exquisitely perfumed flour kneaded with the precious honey of Mount Hymettus. The Roman patrician ate bread made by mixing flour, salt, oil, and milk. When the white man came to America, the Indian taught him to make an ashcake from Indian corn. Not only has the world been studying breadmaking since the earliest recorded time, but, as time advanced, the real differences in the value of foods were observed. Many centuries before the Christian era Moses taught his people the superiority of clean over unclean food. The Greeks, clever students of life and of living, studied the influence of food on the mind and body, and to this day the world is the better because of their wisdom.

ANCIENT USE OF VEGETABLES

It was a belief of the Cherokee Indians that all disease came from animals, but that plants contain a cure for every ill which beasts brought to man. Many vegetable foods found on our tables first came into use as medicinal plants, and it is probable that the majority of them thus originated. The cabbage was once regarded as a remedy for drunkenness and various diseases. The Greeks thought asparagus a good remedy for intestinal trouble, and that the beet had very fine medicinal qualities. The cucumber was supposed to have all sorts of healing properties, and lettuce, the favorite plant of Adonis, according to their ideas, possessed narcotic virtues. Garlic incited warriors to courage, and was avoided in time of peace. Parsley excited the brain to agreeable sensation; water cresses gave a very refreshing effect, and onions were good for preserving the health. Hyssop renewed and purified the blood, thyme was an antidote to the venom of a serpent; pennyroyal was taken to facilitate digestion, mint prevented milk from curdling, ginger was a cure for scurvy, and asafetida was in ancient times the chief seasoning for food, since it was supposed to promote digestion. All these vegetables were in use long before the Christian era. In fact, it is impossible to go back to a time when they were not in use. Patroclus probably peeled onions; Achilles washed cabbage; and many centuries before the Trojan war the chief baker for Pharaoh fell into disrepute, probably because of the poor bread that he served.

THE BREAD OF THE WORLD.

It has been well said that the quality of bread made by the inhabitants of any country is a fair measure of their civilization. Of all the cooking processes now in use by civilized man, the cooking of bread is the most important. The kind of bread that is used in any country has always depended upon the kind of corn or grain or food-giving plants found in that country.

Wheat bread is probably the most widely used in the world's history, because wheat is indigenous in the most fertile valleys of the Old World and could be easily produced in those countries in which it is not indigenous. *Rye bread* is next in importance, and, though it has not had such long continuous use as wheat, it is used extensively, especially in Germany, France, Spain, and Greece. *Buckwheat*, or black wheat, is the staple bread flour in Russia, Siberia, and Brittany. *Soya bread* is eaten in some places, especially by the inhabitants of China and Japan. It is made from an oily pea that is native to those countries. *Millet flour* produces a wholesome bread that is eaten by the inhabitants of India, China, Egypt, Italy,

Spain, and Portugal. *Rice* constitutes the staple food of a majority of the inhabitants of the world; it is eaten less in America than elsewhere. *Barley bread* was an ancient food of note, but it is not used now to any great extent except in portions of Russia. *Oats* was originally the grain food of Europe. It has been eaten in Germany for 1,000 years, but it is eaten to-day more in Scotland than in any other country. *Arrowroot flour* is derived from a tropical plant grown in both East and West Indies, and when made into a bread is eaten by the inhabitants of these countries. *Tapioca flour* makes a wholesome bread that is eaten by the inhabitants of Central and South America. The flour is made from the roots of the plant. It is becoming popular in Europe and America. *Sago* is derived from the pith found in the stem of several varieties of the palm in Sumatra, Java, and Borneo, and makes wholesome bread for the people of those and adjoining islands. *Iceland moss* also is used as a food. The Eskimos purify it by washing, and then make a fine flour of it that is easily made into a bread. *Indian corn*, or *maize*, was the chief bread plant of American Indians. In Mexico it is still the principal food, and the cakes made of it are called *tortillos*. In Italy it is called *polenta;* in Roumania, *mamaliga*, and in Transcaucasia, *kukurus*. In North America it is made into corn pone, johnnycake, ash cake, griddle bread, and corn bread.

Rise of the baker.—The preparation of food for the dignitaries of the world has always been an important matter. You will recall that when Joseph was serving in the house of Potiphar he was cast into prison. Later the royal baker offended his lord, the king, and was cast into prison, where he had a dream which Joseph interpreted. His dream is interesting. "Behold, I had three white baskets on my head, and in the uppermost basket there was all manner of baked meats for Pharaoh." But in his dream he let the birds pick the food and it foretold his doom. The Hebrews on leaving Egypt took with them their knowledge of breadmaking, but they discarded the leavened bread of Egypt and made specific regulations concerning the preparation of bread in "the ovens and in the frying pans."

The baker, however, became an important person when the people stopped their tribal wanderings and settled down to fixed ways of living. Greece had the most skillful bakers in the world. From that country they went to Rome, and the Greek baker, like the Greek school-teacher, became an important person. It is a significant fact that he who could prepare food after the most approved manner for those who followed intellectual pursuits held almost equal honor with him who trained the intellect of the youth. The bakers of Rome formed an association, and sometimes one of them was raised to the dignity of senator.

In the fourteenth century a baker was required to go through a four years' apprenticeship, after which he was licensed to pursue his occupation. Bread was supposed to contain properties according to its mixture and preparation. Hence the baker's art was important. Different kinds of bread were prepared for different people. The slave had a special kind that would keep him humble and submissive; the athlete another kind that would make him strong and supple; princes and senators another kind, and fashionable ladies still another kind. Each kind was expected to give to the individual eating it a character appropriate to his station in life.

—Selected from Brooks' "Story of Corn."

THE PLOWMAN.

Clear the brown path, to meet his coulter's gleam!
Lo! on he comes, behind his smoking team,
With toil's bright dewdrops on his sunburnt brow,
The lord of earth, the hero of the plow!

First in the field before the reddening sun,
Last in the shadows when the day is done,
Line after line, along the bursting sod,
Marks the broad acres where his feet have trod;

Still, where he treads, the stubborn clods divide,
The smooth, fresh furrow opens deep and wide;
Matted and dense the tangled turf upheaves,
Mellow and dark the ridgy cornfield cleaves;

Up the steep hillside, where the laboring train
Slants the long track that scores the level plain;
Through the moist valley, clogged with oozing clay,
The patient convoy breaks its destined way;

At every turn the loosening chains resound,
The swinging plowshare circles glistening round,
Till the wide field one billowy waste appears,
And wearied hands unbind the panting steers.

These are the hands whose sturdy labor brings
The peasant's food, the golden pomp of kings;
This is the page whose letters shall be seen
Changed by the sun to words of living green;

This is the scholar whose immortal pen
Spells the first lesson hunger taught to men;
These are the lines which heaven-commanded Toil
Shows on his deed—the charter of the soil!

—Oliver Wendell Holmes.

God Almighty first planted a garden; and indeed it is the purest of human pleasures. It is the greatest refreshment to the spirits of man, without which buildings and palaces are but gross handiworks; and a man shall ever see that when ages grow to civility and elegancy, men come to build stately, sooner than to garden finely, as if gardening were the greater perfection.

—FRANCIS BACON.

THE SOWER'S SONG.

Now hands to seed-sheet, boys!
We step and we cast; old Time's on wing;
And would we partake of harvest's joys,
The corn must be sown in spring.
Fall gently and still, good corn,
Lie warm in thy earthy bed;
And stand so yellow some morn,
For beast and man must be fed.

Old earth is a pleasure to see
In sunshiny cloak of red and green;
The furrow lies fresh; this year will be
As years that are past have been.
Fall gently and still, good corn,
Lie warm in thy earthy bed;
And stand so yellow some morn,
For beast and man must be fed.

Old earth, receive this corn,
The son of six thousand golden sires;
All these on thy kindly breast were born;
One more thy poor child requires.
Fall gently and still, good corn,
Lie warm in thy earthy bed,
And stand so yellow some morn,
For beast and man must be fed.

Now steady and sure again,
And measure of stroke and step we keep;
Thus up and down we cast our grain;
Sow well and you gladly reap.
Fall gently and still, good corn,
Lie warm in thy earthy bed;
And stand so yellow some morn,
For beast and man must be fed.

—THOMAS CARLYLE.

And I must work thro' months of toil,
And years of cultivation,
Upon my proper patch of soil
To grow my own plantation.
I'll take the showers as they fall,
I will not vex my bosom:
Enough if at the end of all
A little garden blossom.

—ALFRED TENNYSON.

I've plucked the berry from the bush, the brown nut from the tree,
But heart of happy little bird ne'er broken was by me.
I passed them by, and blessed them all; I felt that it was good
To leave unmoved the creatures small whose home was in the wood.

—WILLIAM MOTHERWELL.

AFTER THE RAIN.

The cock is crowing,
The stream is flowing,
The small birds twitter,
The lake doth glitter,
The green field sleeps in the sun;
The oldest and youngest
Are at work with the strongest;
The cattle are grazing,
Their heads never raising;
There are forty feeding like one!

Like an army defeated
The snow hath retreated,
And now doth fare ill
On the top of the bare hill;
The ploughboy is whooping—anon—anon:
There's joy in the mountains;
There's life in the fountains;
Small clouds are sailing,
Blue sky prevailing;
The rain is over and gone!

—WILLIAM WORDSWORTH.

PART II. THE APPLICATION OF SCIENCE TO AGRICULTURE.

THE MYSTERIES OF MOTHER EARTH.

It has ever been a mystery how seed go down into the darkness of the earth and come back again in the form of new life. Ages ago this mysterious underworld, with its strange and inexplicable processes, excited the profoundest awe and reverence in the inhabitants of the world. "The earth is the mother of all, and the stones are her bones," said the ancients.

Families, tribes, and nations moved about on the surface of the earth and engaged in fierce struggles for the necessities of life, which came from this underworld of the soil. Yet in the soil and subsoil, about which man knows so little even to-day, there is always going on a struggle equally as fierce. This world of darkness is, and ever has been, teeming with life. Roots and rootlets, the great laborers of the plant world, go creeping about through the soil and on down into the subsoil, contending with one another in a perpetual struggle for existence, silent but inexorable. Ever working in and through the very texture of the earth's surface, millions of living things, always busy and always keeping the particles in motion, furnish life for the things that grow above.

The problem with which the world has been struggling for ages is to establish a harmony between the things that live on the surface and the things that live beneath the surface of mother earth. Man has learned much of the habits of people and the principles of government, and of the value of the plant world and the dependence of man upon plants, but little has been learned of this strange world beneath our feet, from which growing plants spring and from which they derive a great part of their sustenance. We do know to-day, however, that there are certain fundamental laws that control the habits of this life of the darkness.

The world has suffered untold miseries because of its ignorance of the soil. Famine, pestilence, and even destructive wars and slavery have been some of the results, direct or indirect, of this ignorance, during the long centuries through which the race has come. But from age to age, these dire calamities have made their visits to man and have punished him sorely because of his ignorance and blindness.

—Selected from Brooks' "Story of Cotton."

THE ORIGIN OF FOOD PLANTS.

Nearly all our vegetable foods have been developed from five original plants. One of these was a kind of grass, another bore its weeds in pods, the richness of the third was in its roots, the fourth surrounded its seeds with a fleshy or pulpy growth, and the fifth had spreading leaves.

The seeds of the grass were developed by cultivation till they became what we now call grain. This process gave us wheat, barley, Indian corn, rye, rice, millet, and buckwheat. The same grass plant was cultivated in another way, so as to make its stalks luscious and juicy, with the result that there finally evolved timothy, blue-grasses, and other forage crops. So it is that both man and man's animals are fed by descendants of the same original plant.

But grass was cultivated in still a third way, to make its stalks stiff and woodlike, and this gave us bamboo.

From the plants which bore their seeds in pods, the farmers have developed clover, alfalfa, lentils, beans, peas, and other legumes.

The root plant gave us the onion, the beet, the turnip, carrot, parsnip, and sweet potato. The white potato is not a root, but a thickening of the plant's underground stem, which is called a tuber. The peanut is neither a root nor a tuber, but a seed, which the plant ripens underground instead of in the sunshine.

The plant which surrounded its seeds with a fleshy covering was the first parent of all the hundreds of fruits and berries which we now enjoy; while the leafy plant gave us cabbage, celery, lettuce, asparagus, spinach, chicory, and tea.

THE FARMER'S VICTORY.

In the agriculture of the future the preventive medical treatment of plants will be an important factor. The country suffers a loss from insect pests amounting to a billion dollars a year. These puny invaders are costing this country more every year than the total expenses of the United States Government, including the Army, the Navy, the post office, and Federal pensions. In the South there are the boll weevil consuming the cotton crops, and the cattle tick giving the live stock a fever from which they die; in the West there is the Hessian fly attacking the wheat; in New England the brown-tail moth and the gypsy moth are ruining trees without number; and everywhere there are the San Jose scale and the codling moth, whose unconsidered ravages in our fruit orchards entail a greater loss annually than that which was suffered by the loss of the splendid *Titanic* with all her cargo.

Steadily and surely the Government is overcoming these marauders upon our prosperity. It is now possible to grow cotton that is weevil proof; fruit trees can be saved by a wash discovered by the scientists of the Department of Agriculture; the southern cattle infected with the tick and the New England timber to which cling the brown-tail and the gypsy moth alike are quarantined from other parts of the country. So the war goes on, with victory sure to rest with mankind at last.

EFFECT OF INVENTION ON AGRICULTURE.

It is to improve farm tools that manufacture may thank agriculture for the present large number of workers which she has borrowed from her older sister. In the beginning man's plow was only a forked stick; he sowed by hand, harrowed by dragging a piece of brush over his field, weeded, when he weeded at all, with a shell, or perhaps with no tools at all, using only his bare hands. At the beginning of historic times, the Egyptians were using a bent piece of heavy timber drawn by oxen. Later the point of this plowshare was shod with iron. The Romans further improved the plow by joining two pieces of timber at the ends to form an acute angle, and they covered the angle with the iron. This was the first real plow; and it was the only plow known to Europe for almost 2,000 years.

Finally, the Dutch made another advance, when they curved the moldboard, the part of the plow which turns over the furrow, so as to make the furrow wider. The Dutch also made the beam by which the plow is drawn and added the two handles by which the plowman guides his implement. Modern farming began at that time, about 1725.

To-day, the great western farmers use a machine driven by a 100-horsepower engine, which plows, sows, and harrows at the same time a strip 30 feet wide at the rate of 3 or 4 miles an hour, covering more than 100 acres a day, and doing the work of 50 men with teams. This great mechanism would have been impossible without the earlier discoveries of the humble Dutch peasants.

Since the invention of the modern plow, the most important machine yet devised for the liberation of the farmer from hand toil is the reaper. This machine is as important to us as the cotton gin, for while the latter has made cotton planting profitable and has also given us cheap clothes, the reaper has insured us against famine and at the same time has made the farmer's labor so much more effective that agriculture can spare us enough help to man our mills.

With all the improvements in plows and in mechanical seeders, their efficiency was limited by the fact that the crops had to be reaped by hand, and that, too, within a space of 10 to 15 days. Hence the hand labor necessary to one part of harvesting was limiting the amount of work which man's mechanical helpers could do for him in all the other parts of the cropping process. Inventors put their minds to work; British devices were improved by Americans, till to-day we have the harvester, which reaps the grain, thrashes it, and binds it into sheaves, doing all its work automatically. The amount of labor saved by this machine is enormous.

If we had to harvest our wheat by hand, it would take half the men of the nation for that crop alone. Five men, with this reaper, can now do as much as 100 men with scythes. The reaper enables us to raise more wheat than Russia, whose population is larger than ours; and at the same time we can maintain a larger proportion of people in the cities than Russia can. It is the harvester which has made the difference.

So, with the improved plow, the harvester, and the other modern agricultural machinery, the amount of labor required to raise a bushel of wheat has been shortened from 3 hours to 10 minutes. The men no longer needed on the farms are employed in our factories and mines, making us as great a nation commercially as we are agriculturally. And so it is that improved farm machinery is one very important cause of our industrial supremacy.

WHAT AMERICAN INVENTORS HAVE DONE FOR THE FARMER.

In the days when all work about the farm was performed by hand labor and hand tools, 90 per cent of the people had to live on the soil, for not more than 1 man out of 10 could be spared from the work of raising food. Nowadays, six men, with enough land and all modern appliances, can raise enough food to maintain a thousand people. It is the glory of America that nearly all the modern appliances making this result possible were the inventions of Americans.

First of all, an American preserved for the world an entire staple crop, together with the industry dependent upon it. This inventor was Eli Whitney (1765–1825), who produced the gin by which cotton is cleaned of its seeds. At the time Whitney perfected this machine cotton planting was dying out, owing to the fact that it had to be cleaned by hand, and as one man could pick the seeds from only about a pound a day, the labor made its cost prohibitive.

Whitney's gin was able to clean nearly 200 pounds a day, and the great saving in labor cost thus effected at once placed the occupation of cotton planting on a profitable basis, in addition to giving all the world much cheaper clothes. Even to-day Whitney's gin is essentially the same machine it was when it left his hand more than 100 years ago.

Practically all advances in machinery used in growing cereals have been made by Americans. The great Thomas Jefferson planned a number of improvements to the plow which others carried into effect. William Manning, of New Jersey, was granted a patent for a mowing machine in 1830. The reaper was invented by both Obed Hussey, of Maryland, and Cyrus McCormick, of Virginia, the former taking out his patent in 1833 and the latter in 1834. In 1837 John Deere, of Moline, Ill., invented the steel plow, the first one he turned out being made of an old saw. This improvement greatly aided in settling the prairie country of the West, for the pioneer was thus supplied with a plow which slipped through the fine, sticky soil of that country as no other plow would.

Scarcely less important, from a money-saving standpoint, than the invention of these machines, were the corn-planter and the two-horse cultivator, which came into use about the same time. By means of these effective implements the farmer's ability to raise big crops was greatly increased, as the machines enabled him to use horses in performing every part of the work of growing corn, except the one operation of husking.

Still other Americans have invented the sheaf-binder, which includes a mechanism that can perform the feat of tying a knot automatically; the steam thrasher, which does the work of over 100 men with flails; and machines which reduce from 11 hours to 1½ hours the time necessary for a man to cut and cure a ton of hay.

The American inventors of agricultural implements have done more to make the United States a rich and powerful nation than all the statesmen and all the soldiers since our national life began. If it were not for them, and those who invented the steam engine, steamboat, locomotive, and electric engines, the buffalo and the red man would still possess the vast country between the Mississippi and the Rockies; Chicago would be a sleepy little lake-shore city; St. Louis, Cincinnati, Minneapolis, St. Paul, Kansas City, and Omaha would be frontier settlements; New York would be smaller than Marseilles. For it was machinery that made it possible for us to become so quickly the greatest country in the world. After the crops came the railroads, with the railroads came the population, and with the population came industry and commerce.

THE GROWTH OF AGRICULTURAL INSTRUCTION.

Several hundred years before Columbus discovered America there were in many parts of Europe great religious institutions known as monasteries, which had in their possession many acres of land. In those institutions manual labor was first recognized as a necessary part of an educational system, and the monks were required to cultivate the land around the monasteries in which they lived. In their work and methods the monks furnished models for the peasants of Europe and introduced among them better seed and plants.

Before the first settlement was made in America certain principles of plant growth were published in England, and were recommended to be taught in the schools of that day. But it was not until near the close of the eighteenth century that the attention of practical men began to be directed to the discoveries of science, and hopes began to arise that man would learn something valuable about the vast possibilities of the soil.

Necessity was driving the nations of Europe to study the possibilities of the land because the food supply was often short and famine made frequent appearances. But America was new and possessed such a vast area of fertile land that little attention was paid to the conservation of the fertility of the soil. It took the early colonists several generations to learn that there was any limit to its productiveness. George Washington, Thomas Jefferson, and other large planters called attention repeatedly to the necessity of studying the soil. Benjamin Franklin demonstrated that an acre well fertilized will produce considerably more than an acre unfertilized. In 1785 the first American agricultural society was established in Philadelphia, and Washington and Franklin were members of it. In the same year a similar society was organized in South Carolina, which proposed to establish an experimental farm. These societies led to others in other States, and agricultural fairs were started.

However, with all this agitation by the leading men of America there was a fine scorn for "book farming." By the close of the eighteenth century, however, signs appeared here and there of exhausted lands along the seaboard, where land was becoming harder and harder to get.

Columbia College, of New York, followed the example of certain European schools and in 1782 made provision for teaching agriculture. In 1823 the first practical school of agriculture was established in Maine. Nine years later Connecticut moved in the same direction. In 1857 Michigan, a new State, took the lead in soil study and provided in her constitution for creating agricultural schools; two years later Maryland and Pennsylvania turned in that direction;

and in 1862 the Morrill Land-Grant Act came into effect, which granted the proceeds of public lands to the several States and Territories to provide for the teaching of agriculture. In this same year the Federal Government established a Department of Agriculture, and in 1889 its head became a Cabinet officer as Secretary of Agriculture.

Agriculture is now taught in every State, Territory, and outlying possession of the United States. It is required by law to be taught in the rural public schools of Alabama, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Oregon, South Dakota, and Wisconsin. Training courses for teaching agriculture are offered in State agricultural schools, State normal schools, and county normal and summer schools. Thus the educational machinery of the country is employed to investigate the great underworld of the soil and to carry to the youth and the adult the knowledge that will lead to a better understanding of its wonderful possibilities.

COOPERATION AMONG FARMERS.

This is an age of organization and cooperation, and a great force is the result of a union of many individual forces. A century ago, when the farmer made the larger number of the things necessary for the use of the family, there was little need for cooperation. With the development of modern machinery, we have reached an age of specialization and the farmer must buy his machinery and tools, his clothing, and even much of his food from the manufacturer or the merchant, who is the salesman for the manufacturer. In order, therefore, for the farmer to control the price of the products of the farm and to reduce as much as possible the cost to him of the manufactured articles, it has become necessary for him to combine with other farmers and to buy and sell in large quantities in order that he may get the benefit of wholesale prices. For many years farmers have been realizing the necessity for such cooperation.

One of the first organizations of the farmers was the Grangers, sometimes called also Patrons of Industry. This organization was brought about by O. H. Kelly, whom President Johnson sent to the South immediately after the Civil War to study agricultural conditions. It became a powerful order and at one time had a membership of nearly a quarter of a million.

Another order of tremendous power was the Farmers' Alliance, organized in Texas in 1876 for the purpose of punishing land and cattle thieves. The Louisiana farmers, about the same time, had

an organization known as the Farmers' Union. These two organizations were united in 1887 with the name of Farmers' Alliance and Cooperative Union of America. Another organization known as the Agricultural Wheel, which was effected in Arkansas, united with the Alliance in 1889. These and other State orders met at Ocala, Fla., in 1890 and adopted a platform. It is said that all these various branches of the Farmers' Alliance had a membership of over 5,000,000. During the depression of business from 1893 to 1900 the Farmers' Alliance became involved in politics and split into factions, losing some of the influences that come from united effort. The Farmers' Union of to-day, however, is the successor of the Farmers' Alliance, and it is one of the most powerful organizations in the country.

Through these organizations, the farmers have influenced public-school legislation; they were helpful in creating a national Department of Agriculture, and in establishing agricultural colleges and experiment stations; they have lowered prices in agricultural machinery and kept up prices on agricultural products; they have improved farming by introducing better methods of planting, tilling, and harvesting; and they are now especially interested in securing credit on the same terms as the manufacturers.

WONDERS OF A SINGLE ACRE.

A new light is shed on our agricultural productiveness by figuring the unconsidered details of plant life that spring from a single acre of ground. A bushel of wheat contains an average of 720,000 kernels; and so, if the yield of an acre is 30 bushels, the total number of grains is well toward 22,000,000. The number of stalks per acre is 35,000. If each stalk is only 3 feet tall—and this is a dwarfish stature, indeed—the total is nearly 200 miles. This does not include the miles of roots and leaves.

A ton of average well-dried timothy hay may contain upward of 1,500,000 separate stalks, and an acre may yield 4 tons. A head of timothy of average length will bear from 400 to 500 flowers. Thus the number of timothy blossoms in a good acre is just about double the number of human beings in the whole world. An acre of apple trees in full bearing may yield 100,000 good apples; an acre of tomatoes, 120,000 tomatoes, of which each one contains 1,200 seeds.

Thus the man who can increase the yield of even a single acre of land by so much as 5 per cent will ultimately bring more living individuals into the world than both he and all his posterity can ever take out of it.

THE LITTLE BROWN SEED IN THE FURROW.

A little brown seed in the furrow
  Lay still in its gloomy bed,
While violets blue and lilies white
  Were whispering overhead.
They whispered of glories strange and rare,
  Of glittering dew and floating air,
Of beauty and rapture everywhere,
  And the seed heard all they said.

O, little brown seed in the furrow,
  At last you have pierced the mold;
And quivering with a life intense,
  Your beautiful leaves unfold
Like wings outspread for upward flight;
  And slowly, slowly, in dew and light
A sweet bud opens—till, in God's sight,
  You wear a crown of gold.

—Ida W. Benham.

GREEN THINGS GROWING.

Oh, the green things growing, the green things growing,
The faint sweet smell of the green things growing!
I should like to live, whether I smile or grieve,
Just to watch the happy life of the green things growing!

Oh, the fluttering and the pattering of those green things growing!
How they talk each to each, when none of us are knowing;
In the wonderful white of the weird moonlight
Or the dim dreamy dawn when the cocks are crowing.

I love, I love them so,—the green things growing!
And I think that they love me, without false showing;
For by many a tender touch, they comfort me so much,
With the soft, mute comfort of the green things growing.

—Dinah Mulock Craik.

SEPTEMBER.

We are drinking the wine of the ages,
  From cups that are brimming over
With the sweet of a honey unbought with money,
  Distilled from the heart of the clover.

The flowers afringe on the wayside
  Are in raiment of purple and gold;
To the rough-hewn edge of the old stone ledge
  The clinging brier-vines hold.

We are breaking life's fine elixir
In the waft of the perfumed breeze,
The sudden showers, the sunlit hours,
The rustle of leaves on the trees.

The fathomless blue of the heaven,
The beauty and bloom of the day,
Are making us young—they are waking the tongue
Of the years that have passed away.

'Tis the radiant rare September,
With the clusters ripe on the vine,
With scents that mingle in spicy tingle
On the hill-slope's glimmering line.

And summer's a step behind us,
And autumn's a thought before,
And each fleet sweet day that we meet in the way
Is an angel at the door.

—HARPER'S BAZAR.

DEEP.

Plow deep!
Sow not the precious seeds
Among the scarce uprooted weeds,
Or thou shalt weep
To find thy crops all choked and dead.
And naught but thorns and tares instead.
Then plow down deep,
The promise ringing in thy ears,
That those who sow their seeds in tears,
In joy shall reap.

PART III. MEN INFLUENTIAL IN IMPROVING AGRICULTURE.

GEORGE WASHINGTON.

No man in the eighteenth century did more to improve farming in America than George Washington. Our histories are full of his political and military achievements, but little is said of his great service for the agricultural improvement of the new Republic. His life was so full of the most important things bearing on the life of our country that it is difficult to estimate in which line he was of most service to humanity. Notwithstanding his success as a soldier and a statesman, he was first and last a farmer.

He owned estates located in many different States, and his published utterances contain many letters about his farms and how he was trying to improve the methods of farming. He induced Gen. Lafayette to send some improved seed from France. He corresponded with the agricultural experts of England and sought the best advice on sheep raising. He imported improved stock from Spain and Holland and bought the latest machinery in England. At that time Scotland was perhaps making more progress in agriculture than any other country, and he sent his agent to Scotland to secure overseers for his plantations.

His home was really a veritable agricultural experiment station, and he had both friends and agents in Europe sending him improved seeds and cuttings and giving him the best ideas in agriculture. He kept weekly records of planting, and made experiments in seed selection and cultivation. He became an expert agriculturist for that day and was consulted by leading scientists of Europe.

He saw with concern the declining fertility of old estates, and advocated crop rotation, the use of fertilizers, and seed selection as the best means to prevent decline. He favored the establishment of agricultural schools and was an active member of the first American agricultural society, which was established in 1785. While he was leading the armies of the Revolution he received regular reports from his overseers. During the most stormy periods of his administration as President, he followed his overseers' work, and he wrote them letters full of advice about planting, cultivating, and caring for the stock. When he grew tired of political affairs, it was to

Mount Vernon that he retired to spend his last days. Thus the greatest man in American life looked upon farming as the greatest of all occupations. The following extracts from his letters show it:

I think that the life of a husbandman of all others is the most delectable. It is honorable, it is amusing, and, with judicious management, it is profitable. To see plants rise from the earth and flourish by the supreme skill and bounty of the laborer fills a contemplative mind with ideas which are more easy to be conceived than expressed.

The more I am acquainted with agricultural affairs the better I am pleased with them, insomuch that I can nowhere find so great satisfaction as in these innocent and useful pursuits. In indulging these feelings, I am led to reflect how much more delightful to the undebauched mind is the task of making improvements on the earth than all the vainglory that can be acquired from ravaging it by the most uninterrupted career of conquest.

I know of no pursuit in which more real and important service can be rendered to any country than by improving its agriculture, its breed of useful animals, and other branches of a husbandman's care.

SEAMAN A. KNAPP.

Essex County, N. Y., gave to America one of the greatest men that has lived in this or in any age. This man was Seaman A. Knapp, born December 16, 1833. It was no part of his great work to lead armies, guide political parties, or write essays on the theory of government and the rights of man. His achievements were greater. He sought freedom and independence in the soil, and he found both, and gave them to the world.

A sketch of the first 70 years of his life is merely the story of his preparation for a great career. Dr. Wallace Buttrick summed it up by saying, "Seventy years of preparation for seven years of work"—a work that is referred to by Dr. Walter H. Page, the Ambassador to England, as "the greatest single piece of constructive educational work in this or any age."

As a boy he took advantage of such schools as were available in that early day in the country districts of New York. Later he entered and graduated from Union College, Schenectady, N. Y. He taught school for several years after graduating. But at the age of 32 he moved to Vinton, Iowa, and settled on a farm. There he regained his health and vigor. During the sojourn in Iowa Dr. Knapp was called to manage several lines of work, all of which were good training for the greater work yet to be done. He established a farm paper. There were few such papers in the country at that time. He, with others, conducted an agricultural campaign. The first course in agriculture in the Iowa College was organized and the graduation of the first class took place during his incumbency as professor and president.

Another crisis in Dr. Knapp's life came about this time. His health gave way under a severe attack of rheumatism. Physicians said he must give up college work. Turning his face to the sunny South he organized a great development company, bought a million acres of land in southwest Louisiana and sent invitations all over the Northwest, "Come South, young men, and grow up with the country." Several thousand came. For many years he had believed that the South was destined for a wonderful future. He said, "Here is a people of pure Anglo-Saxon stock, energetic but conservative, without much admixture of foreign blood. These people should be the conservators of the best American traditions. Here is a productive soil, delightful climate, and long growing seasons."

He at once began to conduct demonstrations in rice growing and diversified farming for benefit of native farmers and immigrants. In 1898, however, he was authorized by the Secretary of Agriculture to visit China, Japan, and the Philippines, to make rice investigations. In 1801 he made a second trip to the Orient; he went to Europe in 1901 to study agricultural conditions, and later to Porto Rico to report on agricultural resources and possibilities.

His training was complete after 70 years of study to begin his great work. In 1903 the Mexican boll weevil began to make such destruction in the Texas cotton fields that Dr. Knapp was sent into Texas to fight its deadly ravages. He began by organizing the farmers and instituting the Farmers' Cooperative Work. Dr. Knapp visited one small farm near Terrell, Tex., about twice a month and directed the operations there. Neighboring farmers met him in field meetings. At the close of the year he had proved that cotton could be grown in the face of the boll weevil, and was urged to extend his teachings and his methods throughout the whole country devastated by the pest. The next year, with funds furnished by Congress and by local business men, he appointed a few agents and began to organize different counties in Texas. The work soon attracted the attention of the country. Congress enlarged its appropriation, local aid was increased, and the work was extended to Louisiana and Mississippi. About this time the General Education Board of New York asked to be allowed to appropriate money for similar work in other cotton States. In a few short years this great work had covered the entire South, had a force of 1,000 agents, an enrollment of 100,000 farmers, 75,000 boys in the corn clubs, and 25,000 girls in the canning clubs. Every State in the South began to show an increase in the average corn production per acre, as well as other crops, and southern corn club boys attracted the attention of the world by producing more than 200 bushels of corn to the acre at low cost. Girls, too, demonstrated practical, scientific work in garden and home. During the year of his death, Russia, Brazil, England, South Africa,

and Argentina sent representatives to this country to study the demonstration work. Sir Horace Plunkett, the great Irish reformer, came for the same purpose, and at the request of the King of Siam, Dr. Knapp sent one of his agents to take charge of agricultural matters in that country.

Dr. Knapp died in Washington, D. C., April 1, 1911. But he lived long enough after this important work was begun to see something of the wonderful results. Although his work was confined chiefly to the Southern States of America, every State and nearly every nation has felt his influence.

SOME OF KNAPP'S EPIGRAMS.

The greatest of all acquisitions is common sense.

A prosperous, intelligent, and contented rural population is essential to our national perpetuity.

A patent to land is a title to nobility, a right to sovereignty.

A great nation is not the outgrowth of a few men of genius, but the superlative worth of a great common people.

It is impossible to impress upon anyone that there is dignity in residing upon a farm with impoverished soil, dilapidated buildings, and an environment of ignorance.

The income of the farm can be increased from three to five fold by the use of improved methods.

Double the crop to the acre and halve the cost.

More power and less hand work.

Increase the earning capacity of country toilers.

No nation can be great without thrift.

Training is the great item which fashions a race.

The world's most important school is the home and small farm.

The public school teacher's mission is to make a great common people and thus readjust the map of the world.

You can cause the soil to become more responsive to the touch of industry and the harvest more abundant to meet the measure of a larger hope.

The common toiler needs an education that leads to easier bread.

The basis of the better rural life is greater earning capacity of the farmer.

It appears to be a philosophy of the southern people to let money slip through their fingers without sticking.

Let it be the high privilege of this great and free people to establish a republic where rural pride is equal to civic pride, where men of the most refined taste and culture select the rural villa, and where the wealth that comes from the soil finds its greatest return in developing and perfecting the great domain of nature which God has given to us as an everlasting estate.

The demonstration work may be regarded as a system of adult education given to the farmer upon his farm by means of object lessons in the soil, prepared under his observation and generally by his own hand.

Any race betterment to be of permanent value must be a betterment of the masses.

An idle saint only differs from an idle sinner in a coat of paint and direction.

The greatest failure as a world force is the man who knows so much that he lives in universal doubt, injecting a modifying clause into every assertion, and ending the problems of life with an interrogation point.

In general, it is not the man who knows the most who is most successful, but the man who imparts an implicit belief in his message.

Agriculture in most sections consists simply in a series of motions inherited from Adam.

This learning agriculture (which is a compound of the following ingredients—one-eighth science, three-eighths art, and one-half business methods) out of a book is like reading up on the handsaw and jackplane and hiring out for a carpenter.

These mechanic farmers now reside in a town or city, live out of a canned garden, and milk a tin cow.

The great battles of the future will be industrial.

We are now prepared for the accomplishment of what we have so earnestly sought, the placing of rural life upon a plane of profit, of honor, and power.

The least worthy monument to a man is a granite block or a marble shaft. They represent the dead man's money and the kindness of friends. The true monument is what the man has accomplished in life. It may be a better gate, or house, or farm, or factory; put his name on it and let it stand for him.

800 PER CENT BIGGER PROFITS FOR THE SOUTHERN FARMER.

I estimate that there is a possible 800 per cent increase in the productive power of the farm laborer in the average Southern State, and I distribute the gain as follows:

300 per cent to the use of more and better mules and farm machinery;
200 per cent to the production of more and better stock;
150 per cent to a rotation of crops and better tillage;
50 per cent to better drainage;
50 per cent to seed of higher vitality, thoroughbred, and carefully selected;
50 per cent to the abundant use of legumes and the use of more economic plants for feeding stock.

KNAPP'S TEN COMMANDMENTS OF AGRICULTURE.

(1) Prepare a deep and thoroughly pulverized seed bed, well drained; break in the fall to a depth of 8, 10, or 12 inches, according to the soil, with implements that will not bring too much of the subsoil to the surface. (The foregoing depths should be reached gradually, if the field is broken with an ordinary turning plow. If a disk plow is used, it is safe to break to the above depths at once.)

(2) Use seed of the best variety, intelligently selected and carefully stored.

(3) In cultivated crops give the rows and the plants in the rows a space suited to the plant, the soil, and the climate.

(4) Use intensive tillage during the growing period of the crops.

(5) Secure a high content of humus in the soil by the use of legumes, barnyard manure, farm refuse, and commercial fertilizers.

(6) Carry out a systematic crop rotation with a winter cover crop on southern farms.

(7) Accomplish more work in a day by using more horse power and better implements.

(8) Increase the farm stock to the extent of utilizing all the waste products and idle lands of the farm.

(9) Produce all the food required for the men and animals on the farm.

(10) Keep an account of each farm product, in order to know from which the gain or loss arises.

LUTHER BURBANK.

Few people believed until within recent years that a man could achieve distinction in working with plants. Most people know of the work of Edison and some of the marvelous things he has done with electricity, but there is a genius living in California who has done as wonderful things with the plants as Edison has done with electricity. It is Luther Burbank, who is known all over the world as the most wonderful developer of plants.

He was born in Lancaster, Mass., March 7, 1849. His parents were so poor that Luther was unable to attend any but the public elementary school, and even then he had to find work in the factory at odd hours that would bring some income to the family. He cared little, however, for the factory and machinery, and as soon as he could conveniently do so, he left the factory and began in a small way to raise vegetables for the market. While in his potato patch one day, he noticed on the top of each plant a seed ball which interested him. Some were very good, while others were poor. Selecting the best of these, he planted them, and from this selection came the famous "Burbank" variety of potato. It is said that this one variety has been worth many millions of dollars to the world.

While working in his garden he received a partial sunstroke, and his health became so impaired that he was forced to give up his garden and go West, where he could find a climate in which he could work out-of-doors the greater part of the year. He sold the rights to his improved potato seed for $150, and taking a pocket full of them with him, he started West. He made his home in California, about 50 miles north of San Francisco. It was difficult to secure work, and his money was soon gone. At one time, it is said, he was employed to clean out poultry houses on a ranch, and more than once he had to sleep in them. He was forced to work very hard, being exposed to all kinds of weather, and frequently without sufficient food. His weak constitution was unable to stand such a severe life, and he contracted a fever which came near ending his life. A kind lady in the neighborhood gave him help and encouragement, and he slowly recovered. When his strength came back to him, he secured employment in a small nursery. His love for plants, and his genius for cultivating them, soon made him a valuable man to the nurseryman and to the community. As soon as he could save enough money to acquire a small plat of ground, he started a nursery of his own. The place has since become famous over the whole civilized world as "Santa Rosa, the home of Burbank."

It is said that the first order received by Burbank, was for 20,000 young prune trees. He accepted the order, but he did not have so many trees old enough to bear prunes, and it required about three

years to grow the prune trees. But what he did then started the agricultural world along a new route. The almond is very closely related to the prune, and he decided to make the almond tree bear prunes, since the almond could be planted at once. Therefore, he planted a large quantity of almond seed, inserted prune buds in the almond plants, and in nine months he was ready to fill the order. This achievement brought him money and considerable fame, and within a short time he left the nursery business and became a plant breeder.

For many years his great talent has been devoted to the improvement of trees, flowers, vines, shrubs, vegetables, fruits, and nuts. This improvement is brought about in three ways: (1) By improving the old plant, (2) by combining the good qualities of wild plants with those of their cultivated relatives, and (3) by originating entirely new varieties of plants. In carrying out this work he first takes the pollen from one plant and puts it on the stigma of another plant of the same kind; then he gathers and plants the seed which ripens from the flower he has thus pollinated. As the new plants grow, he selects for perpetuation those which show the qualities he desires.

Constant improvement upon nature has been Mr. Burbank's life-work. Some of the most wonderful results which he has obtained by scientific breeding and crossing of plants are: A Wickson plum as large as a turkey's egg; the plum-cot, which combines the taste and appearance of the plum with those of the apricot; the "shasta daisy," which has several rows of petals and produces flowers 4 inches across; a calla lily 3 feet in circumference and another one only 1 inch in diameter; black roses, and an amaryllis as big as a football. In addition, Mr. Burbank has made very many practical improvements on the potato, the plum, the walnut, chestnut, and many kinds of flowers. He has also "invented" several new kinds of berries, by ingeniously crossing a number of varieties from all over the world.

On Mr. Burbank's estate in California as many as 80,000 lilies are in full bloom at the same time. "No horticulturist ever worked on so vast a scale nor in so scientific a manner as Mr. Burbank." He is still busily engaged in producing new fruits, flowers, and vegetables to nourish the bodies and please the senses of all humanity.

So successful has he become that the feeble lad who once did menial service and slept with the chickens is one of the most famous men in the world. Wealth has come to him, as well as fame, and his work is studied by learned men the world over. He knows the habits of plants as the mechanic knows the movement of machinery, as the sailor knows the motion of the waves and the wind, and as you or I know the peculiarities of our neighbors.

MR. BURBANK'S LOVE OF CHILDREN.

I love the blue sky, trees, flowers, mountains, green meadows, sunny brooks; the ocean when its waves softly ripple along the sandy beach or when pounding the rocky cliff with its thunder and roar; the birds of the field; waterfalls, the rainbow, the dawn, the noonday, and the evening sunset—but children above them all. Trees, plants, flowers—they are always educators in the right direction; they always make us happier and better; and if well grown, they speak of loving care and respond to it as far as in their power; but in all this world there is nothing so appreciative as children—these sensitive, growing creatures of sunshine, smiles, and tears.

—LUTHER BURBANK.

LOUIS PASTEUR (1821–1895).

This great French chemist made the wonderful discovery that there are vegetables which prey on animals, just as animals prey upon vegetables. These flesh-eating plants, which are known as bacteria, float in the blood and cells of animals, and though they are so exceedingly small that it takes a very strong microscope to see them at all, they make up in numbers and in appetite what they lack in size. Dr. Pasteur found also that there are good bacteria, as well as harmful ones, and that even the harmful kinds could be so changed that, when introduced into one's system, they could do no ill, but on the contrary that they would preserve one from the attacks of the more powerful bacteria. On these discoveries of Pasteur rest in large measure the science and art of modern medicine.

With the knowledge he thus gained, Pasteur himself was able to end the silkworm plague in France, to cure chicken cholera, and the deadly disease, anthrax in cattle, and to perfect an almost infallible treatment for hydrophobia, or rabies. It is said that he added more to the wealth of his country than both France and Prussia together wasted in the bloody war which they fought in 1870–71.

JUSTIN S. MORRILL (1810–1898).

The Land-Grant Act, signed by President Lincoln in 1862, was the work of Mr. Morrill, who at the time was a Congressman from Vermont. This act gave to each State a certain amount of land, the proceeds from the sale of which were to be used for colleges of agriculture and the mechanic arts, "without excluding other scientific and classical studies." Mr. Morrill was the author also of the bill approved August 30, 1890, for the greater endowment of these colleges. There are now 69 institutions in the United States established under these acts.

ISAAC NEWTON (1800–1867).

As the first United States Commissioner of Agriculture, Mr. Newton laid the foundations for the great Agricultural Department as it exists to-day. Upon its creation in 1862 the Government's agricultural bureau was merely a subdivision of the Patent Office; but, administered on the policy formulated by Mr. Newton, it rapidly increased in power and importance. At last, in the Presidency of Benjamin Harrison, it was raised to the rank of an executive branch of the Government and its Secretary assumed a seat in the Cabinet.

JAMES WILSON (1835–).

It was under the administration of Mr. Wilson that the United States Department of Agriculture experienced its greatest growth. To-day it comprises the greatest academy of scientists ever assembled. Mr. Wilson was Secretary of Agriculture from 1897 to 1913, thus establishing the record of holding a Cabinet portfolio longer than any other department head. Before his appointment as Secretary, Mr. Wilson was director of the Iowa Agricultural Experiment Station and professor of agriculture at Iowa State Agricultural College.

SIGNIFICANT THINGS EVERY SCHOOL BOY SHOULD KNOW.

When the cattle-fever tick is destroyed in the Southern States the country will get much more meat from that section and the producing of it will build up the farms there.

Every country in the world that has diseased plants that can not be sold at home can ship them to us. This results in great loss. The chestnut disease here is an illustration.

We are sending explorers to the ends of the earth for new plants—and getting them.

When a foreign insect invades, our scientists seek its enemy where it came from. The natural enemy of the boll weevil was an ant that could not endure our winters, but the native ant is getting busy.

The object lesson in agriculture is the best teacher: we had 60,000 of them at work last year.

The consumer pays $1 for food; the farmer gets less than 50 cents for it. Who gets the rest?

The Department of Agriculture has had success in the Southern States through object lessons in the fields, where the best southern farmers in their counties were the instructors. This method should be organized in all the States along lines of greatest necessity.

The southern farm boy is showing the way to grow more of all crops on an acre.

Educate the farmer's boy toward a more valuable life on the farm.

Uplift the farm home through the education of the farmer's daughter toward greater usefulness and attractiveness in the farm home.

There is great promise in the fact that whole classes of graduates of agricultural colleges go back to the farms, having learned how to make them profitable.

—SECRETARY JAMES WILSON, in Year Book, 1911.

O. H. KELLEY.

The National Grange, or Order of Patrons of Husbandry, a secret order of farmers that has enormously benefited agriculture, was founded by Mr. Kelley in December, 1867. Its immediate purpose was to reunite the people of the North and the South, and in this effort it was very successful. The permanent work of the Grange, however, has been to help farmers become better fitted for their work and to make better neighbors of them.

To this end the local granges hold social gatherings, banquets, lectures, and literary and musical programs. The Grange has also been very successful in making the farmer's dollar go farther. In various sections it conducts cooperative buying operations for its members and maintains mutual fire and life insurance companies. It is now working out a plan for cooperative selling of its members' farm products.

In the legislation of benefit to farmers which the Grange has had an influence in passing are the laws bettering agricultural colleges, establishing an agricultural experiment station in every State and Territory, making the head of the Department of Agriculture a Cabinet officer, creating the Interstate Commerce Commission, reforming the tax system in many States, favoring pure food and dairy products, and establishing rural free delivery.

The Patrons of Husbandry is said to have been the first secret organization to place woman on a plane of perfect equality with man. The order is now in about 30 States, and it has a very large membership.

HORACE GREELEY (1811–1872).

As the first great editor of a daily paper printed for the general public to open his columns to agricultural topics and to advocate better farming methods, Horace Greeley gave a great stimulus to the betterment of the farmer's condition. In addition to writing many editorials in his newspaper, "The New York Tribune," on country life, Mr. Greeley founded an "agricultural department," appointing Solon Robinson as the Tribune's agricultural editor.

GREGOR MENDEL (1822–1884).

In the quiet of his cloister garden, Father Mendel, Abbot of Brünn, conducted with peas a series of experiments from which he deduced laws that provide the foundation for our exact knowledge of the physical processes of heredity. His work is not only the scientific basis of plant and animal breeding, but also of the new science, eugenics, which aims to produce a more intelligent and more vigorous race of human beings. Curiously, Father Mendel's important contribution to knowledge attracted no attention till 1900, when it was rediscovered by three distinguished botanists at the same time—by Hugo de Vries, C. Correns, and E. Tschermak. But so rapidly have his ideas spread that it is now asserted that this pious, modest priest will finally have as great an influence upon the practical aspects of science applied to plant and animal breeding as the great Darwin who formulated the theory of evolution.

LIBERTY HYDE BAILEY (1858–).

Dr. Bailey's great services to the cause of better farming have been of an educational character. He has held various chairs of horticulture and agriculture; he has lectured before the general public on the same subjects; he has edited magazines which are leading the back-to-the-soil movement; and he has written a number of textbooks upon the practical study of the subject. In addition, he is the editor of the standard encyclopedias on agriculture and horticulture. Dr. Bailey was until this year director of the New York State College of Agriculture, at Cornell University, and was chairman of President Roosevelt's Commission on Country Life.

WILBUR OLIN ATWATER (1844–1907).

Dr. Atwater was the first to investigate profoundly the nutrition of plants as applied to agricultural improvement. He secured funds and induced the State of Connecticut to organize the first agricultural experiment station in the United States. He was director of this station from 1875 to 1887. Due to the demonstrations made by him the Hatch Bill was passed by Congress, which made it possible for each State and Territory to have a similar experiment station. Dr. Atwater not only investigated the nutrition of plants, but made thorough researches into the nutritive value of a great variety of food products.

The experiment stations have led to vast savings and equally vast increases in the yield of farm crops. Pests have been combated,

checked, exterminated; farming methods have been improved; new varieties of plants and animals have been introduced; and rural economies and cooperation have been inaugurated as the result of their work. At the lowest calculation, the agricultural experiment stations have increased farm products fully 10 per cent annually and farm values have increased correspondingly.

STEPHEN M. BABCOCK (1843–).

Largely because of his researches as agricultural chief and chemist at the University of Wisconsin, that State is among the foremost in agricultural wealth. The institution with which he was associated has become a model of service to a whole Commonwealth.

The Babcock tester for butter fat in milk has revolutionized dairying. A separate account with each cow becomes possible and necessary. When the unprofitable cow is discovered a whole chain of inquiries is started. Better feeding may be needed, or gentler treatment, or new dairy methods; and many times it is found that the only remedy is a new cow of better breed. The beauty of it all is that a child can make the test, and thus the school and farm may cooperate.

DAVID DICKSON (1809–1885).

Known as "the first millionaire farmer of the South," he developed many improvements in the agricultural practice of that section in addition to perfecting a number of farm implements. Starting at the age of 35 with $25,000, which he had made in business, he bought 266 acres of land in Georgia, and by the application of business principles he increased the productivity of the soil manyfold. He devised the method of breaking the land deep and cultivating shallow, using the so-called Dickson formula as a fertilizer. He practiced seed selection and developed the first prolific variety of cotton, known as "Dickson's cluster." He was also inventor of the "Dickson sweep," a plow adapted for sandy soil, which at the same time lessened the number of furrows necessary in cultivating a crop. Mr. Dickson wrote "David Dickson's System of Farming," a work which has done much to improve agricultural methods.

HAPPY THE MAN.

Happy the man whose wish and care
A few paternal acres bound,
Content to breathe his native air
In his own ground:

Whose herds with milk, whose fields with bread,
Whose flocks supply him with attire;
Whose trees in summer yield him shade,
In winter fire:

Blest, who can unconcern'dly find
Hours, days, and years slide soft away;
In health of body, peace of mind,
Quiet by day:

Sound sleep by night, study and ease,
Together mixt, sweet recreation;
And innocence, which most does please,
With meditation.

—ALEXANDER POPE.

THE HOUSE BY THE SIDE OF THE ROAD.

There are hermit souls that live withdrawn
In the peace of their self-content;
There are souls, like stars, that dwell apart
In a fellowless firmament;
There are pioneer souls that blaze their paths
Where highways never ran;
But let me live by the side of the road
And be a friend to man.

Let me live in a house by the side of the road
Where the race of men go by—
The men who are good and the men who are bad,
As good or as bad as I.
I would not sit in the scorner's seat,
Or hurl the cynic's ban;
Let me live in a house by the side of the road
And be a friend to man.

I know there are brook-gladdened meadows ahead
And mountains of weariesome height;
That the road passes on through the long afternoon
And stretches away to the night.
But still I rejoice when the travelers rejoice,
And weep with the strangers that moan.
Nor live in my house by the side of the road
Like a man who dwells alone.

Let me live in a house by the side of the road
Where the race of men go by—
They are good, they are bad, they are weak, they are strong,
Wise, foolish—so am I.
Then why should I sit on the scorner's seat,
Or hurl the cynic's ban?
Let me live in a house by the side of the road
And be a friend to man.

—SAM WALTER FOSS.

LITTLE BROWN HANDS.

They drive home the cows from the pasture,
Up through the long, shady lane,
Where the quail whistles loud in the wheat fields
That are yellow with ripening grain.

They toss the new hay in the meadow,
They gather the elder-bloom white,
They find where the dusky grapes purple
In the soft-tinted October light.

They wave from the tall rocking tree tops,
Where the oriole's hammock-nest swings;
And at nighttime are folded in slumber
By a song that a fond mother sings.

Those who toil bravely are strongest,
The humble and poor become great,
And so from these brown-handed children
Shall grow mighty rulers of state.

The pen of the author and statesman,
The noble and wise of the land,
The sword and the chisel and palette
Shall be held in the little brown hand.

—M. H. KROUT.

PART IV. OUR DOMESTIC ANIMALS.

THE FARM ANIMALS' FAMILY TREE.

Science has some wonderful stories to tell of our farm animals and their relationships. Men who have studied these things say that the pigs, the oxen, and the sheep are all distant relatives. Other members of the same family are hippopotami, camels, deer, giraffes, and goats. All these animals belong to the family of "artiodactyla." The family gets its name from the Greek language, in which the word means "even-toed." That is, they all have an even number of toes, which is the feature in which the scientists find the family resemblance, just as a boy's friends find a family resemblance in his eyes, or his hair, or his nose.

As for the horse, he must be lonely, indeed, because he has no relatives about the farm at all. In fact, the family that the horse belongs to is rather dying out, for the only animals he can claim any kinship to nowadays are the tapirs and the rhinoceri. The horse's last name is "perissodactylon," or odd-toed. He started as a little beast, no bigger than a fox, with five toes on each front foot and three toes on each rear foot. Gradually the toes grew one into the other till the horse has just one on each foot, which we call his "hoof."

Of all the many thousand kinds of animals known to science, only about 60 can be truly domestic; and by this is meant animals which can be tamed and bred in captivity, and will live under civilized conditions. While scientists say that the domestic animals of the present are not as intelligent as the wild creatures which were their ancestors, they also add that man would never have become civilized had it not been for such beasts as the horse, the ox, and the sheep. As an example, the Indians of the plains in the country are mentioned. Originally they were a feeble race, hunting game as best they were able, on foot and with dogs. Then the white man brought the horse into the country, and as soon as the Indian likewise gained mastery of that animal he became a dangerous antagonist to the settler. More than this, he was able to live better, as well as fight better, with the aid of the horse.

We call the age in which we live the age of the machine, the era of steel; but even so, in this, the most advanced country in the world,

the amount of power developed by draft animals on the farms of the United States exceeds the amount of power developed by machines in all our factories of every kind. Furthermore, one of the greatest industries in the country—that of meat packing—depends directly upon the farmer's best friends, his domesticated animals. Such is the importance of the creatures you see about you, in barnyard, pasture, fold, and pen.

HOW MAN MADE THE ANIMALS TO HELP HIM.

It was not until man learned to provide a home and to care for his family that he showed himself to be superior to the beast. When home life began, family ties were strengthened, love for the different members of his family increased, and all the finer attributes began to develop.

Man needed helpers in his struggle with the outside world, and so did the animals of the forest. Man had wisdom and foresight; animals had food and physical strength. Man needed the animals, and they needed man. But before man learned the value of different animals it is quite probable that he used them only for food. The dog was probably used first as a food, but it aided man in capturing other animals, therefore it gradually ceased to be used as a food, and instead became an important means of securing food. The horse and the camel also were probably used for food at first; but, on account of their superior strength, they became beasts of burden and aided in securing food for man and in fighting man's enemies. The sheep, the goat, and the cow were also domesticated, to be used as a food in time of need. They were of triple value. The milk was a wholesome food, and could be preserved in the form of butter and cheese; their hair or hides could be converted into clothing, and they could be used, like the horse, as a beast of burden. The fowls of the air were likewise domesticated. The hen, the goose, the duck, the turkey, the pigeon, and the peacock gave their eggs for food and their feathers for bedding and even for clothing. Man did not stop here. He went into the forest and caught the wild hog, tamed him, and improved the quality of his flesh until it has become a very important food.

Thus man rose superior to the beast of the forest and the fowls of the air. They contributed to his needs, but he in turn was obliged to provide food for them in order that they might be of more value to him. It was learned that the value of domestic animals is determined by the care that man takes of them. In providing food for them it was discovered that the hard cereals made the best food for himself and his domestic animals, and cereals became, therefore, the chief food of both man and beast.

THE COW.

Did you ever stop to think how much we are indebted to the cow? People who lived two or three thousand years ago seemed to have had a higher appreciation of the value of this animal than we have. The word "cattle" means wealth, and the English word "chattel," derived from "cattle," is still a reminder to us that we have valuable property in this animal.

It is believed by many that the cow was the first of the wild animals to be domesticated, and that she has contributed more to the development of our civilization than any other animal. In early days she was considered so valuable that a man's wealth was measured by the number and size of his herds. Abraham was rich in cattle, and before the real beginning of agriculture the chief occupation of man was tending and improving his flock.

So valuable has this animal been to the human race that it was considered sacred by many early races, chief of which were the Egyptians and Hindus. Cattle was the chief medium of exchange by early civilized tribes, and it is said that the first coin of the Greeks had an ox stamped on it. To kill needlessly or mistreat cattle of any kind was considered a crime by the Greeks, Hebrews, Egyptians, and Hindus.

The cow is just as valuable to us as she was to the ancients who held her in such high esteem. She gives us milk, butter, cheese, and her flesh for food, and without it man could hardly live. She gives us her hide for clothing, and without it we should be sorely in need, and we should have to go back to the wooden shoes that very poor people have worn in different ages. She gives us fertilizer for our crops, and if this plant food should be suddenly taken away the farmers' fields would degenerate. She gives us her bones for buttons with which to fasten our clothes. Her hair is used in making furniture and many other useful articles. She not only gives us all these things, but she gives us power to pull our carts and plows; in ancient times this was almost the only power used by some peoples in cultivating their land.

The cow is used for three things—for beef, for milk, and for butter and cheese. For the past 200 years, and especially for the past 50 years, man has studied the influence of different kinds of food on the cow and has employed the knowledge gained in breeding animals suited to his several needs. As a result, we have three distinct breeds of cattle—one that gives an abundance of milk, one that gives milk especially rich in butter, and the third, called the beef cow, most of whose food is converted into flesh which we use for beef.

We are indebted more to the British Isles and to Holland for our improved cattle than to any other country. It is said that the Ro-

mans, when they conquered Britain, brought cattle to England. The animals of Rome were mixed with the native breed, and from this crossbreeding has come the excellent stock of to-day. The most noted cattle that we have are the following:

The Jersey, brought over in 1818, has attained the widest reputation as a butter producer.

The Holstein, brought by the Dutch when they settled in the present State of New York, is noted for the quantity of milk it produces. It is said that as much as 10 gallons of milk a day have been taken from a single cow. Another breed noted especially for milk is the *Guernsey*.

The Shorthorn, imported from England about 1817, is the most widely distributed, and it is especially noted for its beef making. Another kind of beef cattle is the *Hereford*. These cows give very little milk, in fact, farmers raising them rarely find it worth while to milk them at all. But when these animals are properly cared for, they are fat and plump and almost square. Another one of the famous breeds of beef cattle is the *Aberdeen Angus*, or as it is sometimes called, the *Polled Angus*. This breed originated in Scotland and was brought to this country in 1873.

The systematic improvement of cattle by man began about the close of the eighteenth century. The greatest progress was made in Great Britain, and to Robert Bakewell, of Leicestershire, who lived from 1725 to 1795, must be given the credit of producing such superior animals as to entitle him to the distinction of being called the father of modern cattle breeding.

KINDNESS TO ANIMALS.

Turn, turn the hasty foot aside,
  Nor crush the helpless worm;
The frame thy wayward looks deride
  Required a God to form.

The common Lord of all that move,
  From whom thy being flowed,
A portion of His boundless love
  On that poor worm bestowed.

The sun, the moon, the stars, He made
  To all His creatures free;
And spreads o'er earth the grassy blade
  For worms as well as thee.

Let them enjoy their day,
  Their lowly bliss receive;
Oh! do not lightly take away
  The life thou canst not give.

THE CALF PATH.

A calf walked home as good calves should
But made a trail all bent askew,
A crooked trail, as all calves do.
Since then three hundred years have fled,
And I infer the calf is dead.

But still he left behind his trail,
And thereby hangs my mortal tale.
The trail was taken up next day
By a lone dog that passed that way.
And then a wise bellwether sheep
Pursued the trail o'er vale and steep;
And drew the flock behind him, too,
As good bellwethers always do.
And from that day, o'er hill and glade
Through those old woods a path was made.

And many men wound in and out,
And dodged and turned and bent about,
And uttered words of righteous wrath
Because 'twas such a crooked path;
But still they followed—do not laugh—
The first migrations of that calf.
And through the winding wood way stalked,
Because he wobbled when he walked.

This forest path became a lane
That bent and turned and turned again;
This crooked lane became a road,
Where many a poor horse with his load
Toiled on beneath the burning sun,
And traveled some three miles in one.
And thus a century and a half
They trod the footsteps of that calf.

The years passed on in swiftness fleet,
The road became a village street;
And this, before men were aware,
A city's crowded thoroughfare.
And soon the central street was this
Of a renowned metropolis.
And men two centuries and a half
Trod in the footsteps of that calf.

Each day a hundred thousand rout
Followed the zigzag calf about.
And o'er his crooked journey went
The traffic of a continent.
A hundred thousand men were led
By one calf near three centuries dead.
They followed still his crooked way,
And lost one hundred years a day;
For thus such reverence is lent
To well-established precedent.

A moral lesson this might teach
Were I ordained and called to preach;
For men are prone to go it blind
Along the calf paths of the mind,
And work away from sun to sun
To do what other men have done.
They followed in the beaten track,
And out and in and forth and back,
And still their devious course pursue,
To keep the path that others do.
They keep the path a sacred groove,
Along which all their lives they move;
But how the wise old wood gods laugh,
Who saw the first primeval calf.
Ah, many things this tale might teach—
But I am not ordained to preach.

—ANONYMOUS. From The Pathfinder.

PART V. OUR LEADING AGRICULTURAL PRODUCTS.

THE CORN OF THE WORLD.

The term "corn" is applied in agriculture to the seed of the cereal plants. The word is often understood locally to mean that kind of cereal which is the leading crop of a country, and it may be wheat, barley, oats, maize (Indian corn), rye, millet, or even rice. It is written in Genesis: "And all countries came into Egypt to Joseph to buy corn; because the famine was sore in the land." The grain mentioned in this quotation was probably wheat. Again, in Roman history we read of a great popular uprising because bread was scarce, and the Gracchi became great tribunes of the people because they advocated more favorable corn laws. The grain referred to was wheat. Rice is corn in China and Japan, rye in northern Europe, oats in Scotland, and wheat in England. Ruth gleaned ears of corn in the barley fields of Boaz, while in Pharaoh's wonderful dream the seven good ears of corn that devoured the seven thin and blasted ones were probably ears of wheat. In America an ear of corn means an ear of maize, or Indian corn, our national grain.

It was natural that the cereals should become the source of all our bread. They may be easily preserved, while tubers and bread fruits soon decay. Wheat, barley, oats, Indian corn, millet, and rye, if properly cared for, remain unhurt by cold climate, warm climate, dry climate, or damp climate. Hence their great value to the world.

THE ORIGIN AND DISTRIBUTION OF WHEAT.

It is impossible to ascertain definitely the geographical origin of wheat. It seems to have been a food for man since the beginning of history and to have developed as man has developed. Evidence points to the Valley of Mesopotamia, the cradle of civilization, as the birthplace of wheat, and from this center it is supposed to have spread to Phoenicia and to Egypt. The Chinese considered it a gift from heaven, and the Egyptians attributed its discovery to Isis. The most ancient languages mention it; it is found among the relics of the ancient Swiss lake dwellers; it was cultivated in China 3,000 years ago, and it was a chief crop among the ancient Hebrews.

It has been said before that all the cereals sprang from a kind of wild grass. Wheat, therefore, is related to all the other cereals, but in importance it has outclassed them all.

Wheat was not grown in the new world until after Columbus's discovery. Maize, or Indian corn, was the chief food of the Indians. It is said that a negro slave of Cortez found three or four grains of wheat in the rice which served as a food for the Spanish army. These were sown and thus wheat was introduced into Mexico. The first wheat sown in the United States was by Gosnold, in 1602, on the Elizabeth Islands, off the southern coast of Massachusetts. It was first cultivated in Virginia in 1611, and in the present State of New York by 1622.

It is easy to see that the migration of wheat has been closely connected with the migration of peoples. It is the one cereal that civilized people carry with them, and wherever they make their homes they quickly develop a variety that can be cultivated. This was especially true before the days of the railroad and the steamboat, when it was difficult to transport foods any great distance overland.

It is not as important, commercially, in America as Indian corn and does not adapt itself to new lands and changes in environment so readily. Corn was the main support of the early colonists and the pioneers, but wheat has followed the westward migration of population, and the center of wheat production to-day is in the Middle West.

Wheat is more widely cultivated than any other cereal. It is cultivated from the Arctic almost to the Antarctic circle and in every longitude of the globe, and there is not a month in the year that some nation is not harvesting it. It is interesting to observe when wheat is harvested in different countries:

January—Austria, New Zealand, Chile.
February and March—Upper Egypt and India.
April—Lower Egypt, India, Syria, Cyprus, Persia, Asia-Minor, Mexico, Cuba.
May—Texas, Central Asia, and northern Africa.
June—Southern and trans-Rocky Mountain States of America, Turkey, Greece, Italy, Spain, Portugal.
July—New England, Middle Atlantic and Northwestern States of America, Upper Canada, Roumania, Bulgaria, Austria, Hungary, Southern Russia, Germany, Switzerland, Southern England.
August—The far northwestern States of America, parts of Canada, Belgium, Holland, Great Britain, Denmark, Poland, central Russia.
September and October—Scotland, Norway, northern Russia.
November—Peru, south Africa, northern Argentina.
December—Argentina, Burmah, New South Wales.

It will thus be seen that, since wheat is cultivated in so many different latitudes and altitudes, there must be a great number of varieties, and this is true.

THE VALUE OF WHEAT.

If a nation can be judged at all by its food, wheat would doubtless be the one grain that would serve as standard of measurement. It seems to be the tendency of the civilized world to raise its standard of living, and as it rises, wheat becomes a relatively more important part of human food. Rye and oats furnished the bread of the great body of people in Europe during the Middle Ages. Wheat was high-priced and not extensively grown. England early became a wheat-eating nation. France, Spain, and Italy followed later. Rye is still extensively used in Germany, but wheat is gradually superseding it. Russia is now using more wheat flour than she did 20 years ago. Taking the civilized world as a whole, therefore, wheat forms the principal food of man. It is much more widely distributed over the world than corn or rice. It is a prime necessity of civilized life, and the quantity milled is larger than that of all other cereals combined.

Wheat is essentially a bread cereal. Not only does it have great superiority in sustaining life, but a large variety of healthful, palatable, and attractive foods are made from it, either wholly or in part. Breads, pastries, crackers, breakfast foods, macaroni—products of wheat in almost endless variety in composition, form, and appearance are found on the table and in the market.

Although it is the most valuable food for civilized man, its cultivation has had a wonderful influence on agriculture in general. It is more easily cultivated than any other cereal. Therefore, improved tools and modern machinery could be more easily invented for cultivating wheat than for cultivating any other cereal. From the crooked stick for plowing, we have come to modern drills, harrows, cultivators, reapers, thrashers, steam plows, and the combination of reaper and thrasher driven by heavy engines. All these were first applied in the cultivation and harvesting of wheat, and modifications of them were made for the cultivation of other plants.

IN THE WHEAT FIELD.

When the lids of the virgin Dawn unclose,
  When the earth is fair and the heavens are calm,
And the early breath of the wakening rose
  Floats on the air in balm,
I stand breast-high in the pearly wheat
  That ripples and thrills to a sportive breeze,
Borne over the field with its Hermes feet,
  And its subtle odor of southern seas;
While out of the infinite azure deep
The flashing wings of the swallows sweep,
Buoyant and beautiful, wild and fleet,
Over the waves of the whispering wheat.

—PAUL HAMILTON HAYNE.

HISTORY OF MAIZE.

When Columbus landed in the new world he found the natives eating a food made from a peculiar grain unlike any produced in the Old World, and to distinguish it from the corn of Europe, we have learned to call it Indian corn. In 1498 Columbus observed large fields of this grain growing on the island of Haiti, and in writing to Ferdinand and Isabella of Spain he described an expanse of 18 miles of cornfields. A few years later, another Spaniard, Hernando Cortez, in his march to the city of Mexico, wrote of passing through great fields of corn; and nearly every other explorer of the New World noticed this peculiar plant and the queer-shaped ears of corn. It is little wonder that they took special notice of it, since all the grain cultivated in Europe was similar to wheat, oats, or rye. The corn of the Indians therefore was a curiosity.

Early English explorers in writing of it described it as follows:

> The graine is about the bignesse of our ordinary English pease, and not much different in form and shape, but of divers colours; some white, some red, and some blue. All of these yielde a very white sweete flavoure and being used according to its kind, it maketh a very good bread.

The inhabitants of Haiti called the grain mahiz, hence the name maize, and Europeans in referring to it still call it maize. Many authorities believe that the grain originated in Mexico and took its name from a tribe of Indians living in southern Mexico. But when Columbus discovered America it was the leading food of the Indians from the Arctic Circle to the Torrid Zone. The grain, however, was so unlike the cereals of the Old World that the Europeans did not like to use it as a food. They watched the Indians parch it or pound it into meal, but the bread made from it was not so pleasant to their taste as the European bread, and, as a rule, the early explorers ate it only when necessary to prevent starvation. Over 100 years passed after Columbus's great discovery before the settlers from Europe learned its real value. This corn of the Indians was the one grain, however, that was to make America prosperous and end the great famines of the world. It was this grain that saved the first colonies along the coast, and supported the pioneers as they pushed westward.

When the coastal plains were settled and all the river bottoms were taken up, the population pushed westward, fighting the Indians and the wild beasts, until the fertile valleys of the Mississippi and its tributaries were reached. It took nearly two centuries and a half for the white man to take full possession of that great river valley and to send its products to the markets of the world. Not since the Nile Valley fed so many people has such a large part of the inhabitants of the world been fed from one river valley. It was maize—Indian corn—that gave strength to the settlers to make this

conquest, and afterward it was this same Indian corn, at first despised by the Europeans, that made the Northwestern States the food center of America and the Mississippi Valley the granary of the world. Wheat was not sufficient to sustain the inhabitants of the world; and the other cereals—before maize was added to the list of foods—did not give sufficient relief in time of famine that was sure to follow a short wheat crop. It was Indian corn that gave relief to the underfed population. And if this grain that Columbus found on the island of Haiti were taken from the world, famine and pestilence would again stalk abroad in the land, and the prosperity of the world would suddenly be checked.

—Selected from Brooks' "Story of Corn."

WHEN CORN WAS KING.

The farmer who has plenty of corn has both bread and meat for himself and family. Suppose our fathers had had to depend on wheat for their bread. It would have taken them a hundred years longer to reach the Rockies. Only think of a pioneer in the woods depending on wheat for bread. Corn will produce four times as much as wheat per acre, and requires only one-tenth of the seed to seed it down and only one-third of the time from planting till it can be used for food. Wheat must have well-prepared soil, and be sown in the fall, and watched and guarded for nine months before it is even ready to harvest; whereas a woman can take a sang hoe in April and with a quart of seed plant a patch around a cabin, and in six weeks she and the children can begin to eat "roastin' ears"; and when it gets too hard for that, she can parch it. She needs to gather only what she uses for the day; for it will stand all winter, well protected by its waterproof husk. Not so with wheat. It must be all gathered at once when ripe, and thrashed, cleaned, and garnered. And even then it is hard to get bread out of it without a mill. But a small sack of parched corn, with a bit of salt, was an ample supply for a 10-days' hunt or a dash with Jack Sevier after thieving Indians. Corn was King when I was a boy.

And so it was. Corn was king when those hardy pioneers followed Boone into Kentucky and Clark into the prairie lands. Corn was king when Gen. Putnam sent the first body of old Revolutionary soldiers into the Ohio Valley, and it is the power of this king of foods that has sustained the thousands and hundreds of thousands.

THE FARMER'S GOLD.

Drop a grain of California gold into the ground and there it will lie unchanged to the end of time; the clods in which it falls are not more cold and lifeless. Drop a grain of our blessed gold into the

ground, and lo, a mystery. In a few days it softens, it swells, it shoots upward; it is a living thing.

It is yellow, but it sends up a delicate spire, which comes peeping, emerald green, through the soil. It expands to a vigorous stalk; revels in the air and sunshine; arrays itself more glorious than Solomon in its broad, fluttering, leafy robes. At last it ripens into two or three magnificent batons, each of which is studded with hundreds of grains of gold. It sucks from the warm breast of earth the watery nourishment for its growth; it quivers and thrills with the forceful mystery of sense; it ministers to the higher mystery of thought. Heaped up in your granaries this week, the next it will strike in the stalwart arm, and glow in the blushing cheek, and flash in the beaming eye. The slender stalk which we saw shaken by the summer breeze, bending under the yellow burden of harvest, is indeed the "staff of life."

—EDWARD EVERETT.

THE REPUBLIC'S EMBLEM.

The rose may bloom for England,
  The lily for France unfold;
Ireland may honor the shamrock,
  Scotland her thistle bold;
But the shield of the great Republic,
  The glory of the West,
Shall bear a stalk of tasseled corn,
  Of all our wealth the best.

—EDNA DEAN PROCTOR.

THANKSGIVING HYMN.

Praise God for wheat, so white and sweet,
  Of which to make our bread!
Praise God for yellow corn, with which
  His waiting world is fed!
Praise God for fish and flesh and fowl
  He gave to men for food!
Praise God for every creature which
  He made and called it good.

Praise God for winter's store of ice,
  Praise God for summer's heat!
Praise God for fruit trees bearing seed,
  "To you it is for meat."
Praise God for all the bounty
  By which the world is fed!
Praise God, ye children all, to whom
  He gives your daily bread!

—ANONYMOUS.

THE BILL OF FARE.

Pies of pumpkin, apple, mince,
Jams and jellies, peaches, quince,
Purple grapes and apples red,
Cakes and nuts and gingerbread—
That's Thanksgiving.

Turkey! Oh, a great, big fellow!
Fruits all ripe and rich and mellow,
Everything that's nice to eat,
More than I can now repeat—
That's Thanksgiving.

Lots and lots of jolly fun,
Games to play and races run,
All as happy as can be—
For this happiness, you can see,
Makes Thanksgiving.

We must thank the One who gave
All the good things that we have:
That is why we keep the day
Set aside, our mammas say,
For Thanksgiving.

—EUGENE FIELD.

HISTORY OF COTTON.

Cotton is a plant which grows wild in nearly every tropical country. The ancient inhabitants of India were perhaps the first people to use it in making clothes. The Europeans saw the cotton plant for the first time in its natural state about the year 1200, and they spoke of it as "wool growing on trees." When Columbus discovered America he saw the cotton plant growing in the West Indies, and it was afterwards learned that the Mexicans knew of the great value of this fiber, since they have "exquisite cotton fabrics dyed in various colors."

Many years before Sir Walter Raleigh organized his first colony for the purpose of making settlements in America, England knew the value of the cotton goods made in India, Arabia, Egypt, China, and Mexico. In these countries it grew with very little cultivation. In many countries the seed had to be planted only once in every seven years, and the cotton could be gathered twice a year. The fiber was very fine, and the seed barely adhered to it. It was, therefore, easy to shake the seed out, or in many places to whip them out with switches. In those tropical countries, therefore, it required

little labor to raise cotton or to prepare it for manufacture. The inhabitants of Spain and France, Italy and Greece learned to grow cotton in the warmer climates, but they could raise barely enough for their own use. England could raise none. In the early days of the first settlement of Jamestown an attempt was made to cultivate cotton, and it was advertised abroad that cotton would grow in the American colony as well as in Italy.

But transplanting a tropical plant to a temperate climate has a tendency to change all its habits. The seed that had to be planted only once in seven years in the Tropics had to be planted every year at Jamestown. In fact, the seed were planted and replanted, crossed and recrossed with seed from Italy, the West Indies, Spain, and India before a variety could be developed that would thrive well in the temperate climate; and the variety that finally survived is unlike the cotton of the Tropics. The lint is not so fine as that of India; the plant is smaller and requires replanting every year, and a great deal of labor is necessary to make it profitable. The most difficult thing about this hybrid plant is separating the seed from the lint. Unlike the tropical cotton, the fibers adhere so closely to the seed that they can not be shaken off, whipped off, or rolled off, and it is with much difficulty that they can be picked off.

The entire civilized world to-day wears clothing made of cotton; and nearly, if not quite, every civilized nation has its cotton factory; but there is only one small section of the globe that furnishes this fiber in abundance, and this is the Southern States of America, which produce over two-thirds of the cotton of the world. The world, therefore, is dependent upon the South, since cotton is the king of clothing, and the South is the home of the king who levies tribute on the world. The nations of the earth make obeisance to him.

Cotton is the friend of the poor and the luxury of the rich. It is made into cloth so coarse that it may be bought for a few cents a yard. It is made into fabrics so fine and so beautiful that it can hardly be told from silk, and it is made so heavy and so thick that it looks like wool. It is made into rope and cord so strong that it will hold a ship, and it is made into thread so fine that 1 pound will reach more than 100 miles. Every year farmers are improving the variety, and manufacturers discover new ways of preparing and using the fiber. Every year the demand for it increases; and the world, it seems, can not have enough of it. In recent years its by-products have become a food for man, beast, and plants, and its possibilities are not yet fully developed.

—From Brooks' "Story of Cotton."

COTTON.

What a royal plant it is! The world waits in attendance on its growth; the shower that falls whispering on its leaves is heard around the world; the sun that shines on it is tempered by the prayers of all the people; the frost that chills it and the dew that descends from the stars are noted; and the trespass of a little worm upon its green leaf is more to England than the advance of the Russian Army on her Asian outposts. It is gold from the instant it puts forth its tiny shoot. Its fiber is current in every bank, and when, loosing its fleece to the sun, it floats a sunny banner that glorifies the fields of the humblest farmer, that man is marshaled under a flag that will compel the allegiance of the world and bring a subsidy from every nation on earth.

—HENRY W. GRADY.

PART VI. A STUDY OF OUR FORESTS

FROM ABUNDANCE TO NEED.

When the white man first made his home in America, thick forests hundreds and hundreds of square miles in extent covered the eastern part of the United States, the Rocky Mountains, and the Pacific coast region. Evergreens—pines, hemlocks, cedars, holly, and spruce—grew near the coast in abundance, while farther inland were the most magnificent hardwood forests in the world. At first the forests were a hindrance to progress, because the trees had to be cut down before houses could be built, land cultivated, or roads laid out. Therefore, the early settlers took no care of the trees whatever, and either burned them or caused them to decay.

Conditions have changed slowly. The country has filled with people, towns have sprung up, and railroads have been built. As population has increased, the vast forests of former times have gradually disappeared, and large wooded areas remain only in inaccessible regions. It is becoming more and more difficult to procure lumber for building, and the need of forests to regulate the flow of water and to prevent floods is constantly more apparent. The change from abundance to need has come so gradually that few persons, even those living where the forests formerly were, have realized until within the past few years how fast the forests are going.

The wholesale destruction without replanting has come mostly from ignorance and greed. Many large lumber companies cause wholesale and reckless destruction by cutting small trees that should stand, and by breaking down young trees. Forest fires, caused by carelessness, sweep away not only vast numbers of trees, but destroy likewise houses and crops and even human lives. It is estimated that the loss by fire is as great as the entire amount cut for use in the entire United States; about 50,000,000 acres of woodland are burned over yearly. Notwithstanding the fact that building materials of all kinds are constantly growing scarcer and more costly, more than enough timber to supply our needs is burned every year. The next great loss to the forests is from insects that bore into the trees and destroy them.

Notwithstanding the destruction that has been going on at a rapid rate, we still have large areas of the most valuable forests in

the world, and by careful preservation we have enough to meet the needs of our growing population. But if the destruction continues at the present rate, even this generation may feel deeply the result of the waste.

THE VALUE OF OUR FORESTS.

Few people ever think of a forest as a place to store water. Who would think that "the woods" hold water as well as a mill pond or a reservoir! But they do, although we can not see the water they hold except, perhaps, as a pool here and there; and that is one of the most important functions that a forest can perform.

All of us have noticed in walking through the woods how soft and springy the ground is. A thick carpet of leaves, twigs, and decayed wood covers the earth, sometimes to a depth of several feet. It is very porous, and it absorbs water like a sponge. When storms come and rain falls in torrents, it does not beat directly upon the ground under the trees because the raindrops first strike the leaves and branches above. The water then trickles gently down and soaks into the leafy carpet. If the forest is extensive a very large quantity of water is absorbed—enough to prevent floods except in extraordinarily long periods of rain. Gradually through the weeks and months that follow the absorbed water oozes out of low places as "springs," and it dashes merrily away in little brooks that combine to form creeks and rivers, which flow peacefully and steadily to the sea.

If there are no trees, no leaves to break the beating of the rain, and no spongy mold to hold the water when it falls, no matted roots to prevent washing, the big raindrops spatter upon the earth and quickly form rushing streams that wash the ground into gulleys. The bare earth absorbs some water to be sure, but far less than the humus of the forest. If the rains are continued the rivers are soon filled beyond the capacity of their banks and they spread over the neighboring valleys, carrying devastation with them. After the heavy rains cease, the flood waters subside as suddenly as they had arisen and the streams dwindle to insignificance, sometimes completely drying up in a long, hot summer.

Thus it is that forests act as great reservoirs and aid in preventing disastrous floods and in maintaining the flow of streams at a rate that is nearly uniform all the year round.

Now let us see what use is made of the trees. The greatest of all is for firewood; but this is largely the decaying or faulty trees from the farmer's woodlot, the waste product of a lumber region, or from

land that is cleared for cultivation. It is said that about 100,000,000 cords are used annually.

The greater part of the salable timber, however, is sawed into lumber, which is used in a variety of ways. The first and greatest use of lumber is for building houses, barns, sheds, outbuildings, and fences.

Next comes furniture of all kinds—chairs, tables, beds, and all other house, office, and school furniture; musical instruments; vehicles of all kinds—wagons, carriages, buggies, and parts of automobiles; agricultural implements—plows, harrows, harvesters, thrashing machines, and other farm implements.

Car building is another great use for lumber—freight cars, passenger cars, and trolley cars. Other important uses for timber are for crossties, poles for telegraph and telephone lines, and "shoring" or supports in mines.—Even more trees are used in the manufacture of paper than for these purposes. Then there are various small articles used in the home, such as spools, butter dishes, fruit crates, baskets, boxes, all kinds of tools, toys, picture frames, matches, pencils, clothes pins, toothpicks, etc. These are little things, but so many of them are used that they consume a great deal of wood. Next we derive tannic acid for tanning leather, turpentine and rosin, maple sugar, and many extracts used in making medicines.

So valuable are the forests that the whole Nation is interested in preserving them. No one is benefited more by them than the farmer, and no one should be more interested in them.

PRESERVE THE BEAUTY OF THE LANDSCAPE.

In protecting our forests we preserve one of the finest features of America's scenery. Trees give beauty, variety, and tone to every natural picture that our eye rests upon. A shady road, a long, green hillside, quiet woodlands in glorious autumn coloring, orchards laden with ripening fruit! Compare that picture with a country where the hillsides are worn into gullies, where rocks are seen everywhere cropping above the barren soil, where crops are scanty and vegetation stunted. What a difference! Who can enjoy an arid, treeless view, which conveys a feeling of sadness and desolation? But who can resist the fascination of a beautiful woodland scene, and who can look upon it without a sensation of cheerfulness and satisfaction? How good for the soul it is to rest the eye on a smiling landscape!

There has been a great movement toward beautifying cities and villages in the past few years. Streets are cleaner, sidewalks are

better, more shade trees are planted, and more attention is given to beautifying private grounds. The adornment of front yards and porches with vines and flowers is increasing every year. Many causes have been at work to produce this result: The broadening influence of travel, which brings people in touch with what is done in other places to promote beauty; the work of schools; newspaper and magazine articles; and women's clubs everywhere.

In many places, flower and vegetable seeds are distributed free, or at a nominal cost, to the school children; prizes are offered for the best garden, the largest vegetables, the most attractive back yard, the best arranged flower bed, and other efforts of similar nature.

A country where beauty meets the eye at every turn invites the tourist and the homeseeker, is deeply loved by its people, and is an inspiration to poetry and art. It rests largely with us to decide whether our own land shall be such an ideal place.

—From Gregory's "The Checking of the Waste."

HOW TO PLANT A TREE.

The Department of Agriculture at Washington gives the following suggestions for planting trees:

The proper season for planting is not everywhere the same. When the planting is done in the spring, the right time is when the frost is out of the ground and before budding begins.

The day to plant is almost as important as the season. Sunny, windy weather is to be avoided. Cool, damp days are the best. Trees can not be thrust carelessly into a rough soil and then be expected to flourish. They should be planted in properly worked soil, well enriched. If they can not be planted immediately after they are taken up, the first step is to prevent their roots drying out in the air. This may be done by piling fresh dirt deep about the roots or setting the roots in mud.

In planting they should be placed from 2 to 3 inches deeper than they stood originally. Fine soil should always be pressed firmly—not made hard—about the roots, and 2 inches of dry soil at the top should be left very loose to retain moisture.

APPLESEED JOHN.

Many years ago before the great Northwest was settled, and while even a large part of New York and Pennsylvania was still a wilderness, there lived a man who spent a large part of his time in what many people considered a foolish occupation. His name was John Chapman, and, according to tradition, he went through what is now western Pennsylvania, Ohio, and Indiana before the forests were cut away and planted orchards for the settlers who, he was sure, would come later. Many stories have been told of this remarkable

man. Perhaps the best is Rev. Newell Dwight Hillis's "The Quest of John Chapman."

It is said that he spent his winters in the settlements near the Atlantic coast teaching the children and doing odd jobs about the farm. In those days the teachers "boarded around" in the neighborhood. Therefore John Chapman had no board to pay, and he needed little money. But he did not ask for money. He was content to receive his pay in the seeds of apples, peaches, pears, plums, and grapes. This is why he was called "Appleseed John." The farmers and the children saved their seed for him, and when spring came he filled his boat with seeds and started down the Ohio River. At every suitable landing he took his bag of seeds on his back and trudged through the forest until he found a good open place, and there he planted his seed, built a fence of boughs about them, and started out again.

Thus he traveled on and on through many springs and summers, planting his seeds in the unsettled western countries for those who would later come and make their home in the new country. When the first settlers crossed the mountains and began to clear the forests for homes and farms they found orchards and vineyards awaiting them. Although Appleseed John lived many generations ago, a few trees are still standing which are said to have been planted by him. The story of this man, who in his humble way devoted his life to others, is one that may well be told and retold, for while none of us can repeat the work he did, it may inspire us to make some spot on earth better by planting a few seeds or trees for the enjoyment of the next generation.

FOREST SONG.[1]

A song for the beautiful trees!
  A song for the forest grand,
  The Garden of God's own hand,
The pride of His centuries.
Hurrah! for the kingly oak,
  For the maple, the sylvan queen,
For the lords of the emerald cloak,
  For the ladies in golden green.

For the beautiful trees a song!
  The peers of a glorious realm,
  The linden, the ash, and the elm,
The poplar stately and strong—
For the birch and the hemlock trim,
  For the hickory staunch at core,
For the locust, thorny and grim,
  For the silvery sycamore.

[1] Read at the first meeting of the American Forestry Congress, in Music Hall, Cincinnati, Apr. 19, 1882.

A song for the palm—the pine,
  And for every tree that grows,
From the desolate zone of snows
To the zone of the burning line;
Hurrah! for the warders proud
  Of the mountainside and the vale,
That challenge the thundercloud
  And buffet the stormy gale.

A song for the forest, aisled,
  With its Gothic roof sublime,
The solemn temple of Time,
Where man becometh a child,
As he listens the anthem-roll
  Of the voiceful winds that call,
In the solitude of his soul,
  On the name of the All-in-All.

So long as the rivers flow,
  So long as the mountains rise,
  May the foliage drink of the skies
And shelter the flowers below;
Hurrah! for the beautiful trees!
  Hurrah! for the forest grand,
The pride of His centuries,
  The Garden of God's own hand.

—W. H. VENABLE.

WOODMAN, SPARE THAT TREE.

Woodman, spare that tree!
  Touch not a single bough!
In youth it sheltered me,
  And I'll protect it now.
'Twas my forefather's hand
  That placed it near his cot;
There, woodman, let it stand—
  Thy axe shall harm it not!

That old familiar tree,
  Whose glory and renown
Are spread o'er land and sea—
  And wouldst thou hew it down?
Woodman, forbear thy stroke!
  Cut not its earth-bound ties;
Oh, spare that aged oak,
  Now towering to the skies!

My heart-strings round thee cling,
Close as thy bark, old friend!
Here shall the wild-bird sing,
And still thy branches bend.
Old tree! the storm still brave!
And, woodman, leave the spot:
While I've a hand to save,
Thy axe shall harm it not!

—GEORGE P. MORRIS.

LITTLE BY LITTLE.

"Little by little," an acorn said,
As it slowly sank in its mossy bed;
"I am improving every day,
Hidden deep in the earth away."
Little by little each day it grew,
Little by little it sipped the dew;
Downward it sent out a thread-like root,
Up in the air sprung a tiny shoot.
Day after day, and year after year,
Little by little the leaves appear;
And the slender branches spread far and wide,
Till the mighty oak is the forest's pride.
"Little by little," said a thoughtful boy,
"Moment by moment I'll well employ,
Learning a little every day,
And not spending all my time in play;
And still this rule in my mind shall dwell—
'Whatever I do, I'll do it well.'
Little by little I'll learn to know
The treasured wisdom of long ago;
And one of these days, perhaps, we'll see
That the world will be the better for me."
And do you not think that this simple plan
Made him a wise and useful man?

"HELP ONE ANOTHER."

"Help one another," the snowflakes said,
As they cuddled down in their fleecy bed;
"One of us here would not be felt,
One of us here would quickly melt;
But I'll help you, and you help me,
And then what a big white drift we'll see!"

"Help one another," the maple spray
Said to its fellow leaves one day;
"The sun would wither me here alone,
Long enough ere the day is gone;
But I'll help you and you help me,
And then what a splendid shade there'll be!"

"Help one another," the dewdrop cried,
Seeing another drop close to its side;
"This warm south breeze would dry me away,
And I should be gone ere noon to-day;
But I'll help you, and you help me,
And we'll make a brook and run to the sea."

"Help one another," a grain of sand
Said to another grain just at hand;
"The wind may carry me over the sea,
And then, O! what will become of me?
But come, my brother, give me your hand;
We'll build a mountain, and there we'll stand."

* * * * *

And so the snowflakes grew to drifts,
The grains of sand to mountains,
The leaves became a pleasant shade,
And dewdrops fed the fountains.

—Rev. George F. Hunting, in the Parish Visitor.

WHEN ALL WILD THINGS LIE DOWN TO SLEEP.

November woods are bare and still,
November days are clear and bright;
Each noon burns up the morning's chill,
The morning's snow is gone by night;
Each day my steps grow slow, grow light,
As through the woods I reverent creep,
Watching all things "lie down to sleep."

I never knew before what beds,
Fragrant to smell and soft to touch,
The forest sifts, and shapes, and spreads;
I never knew before how much
Of human sound there is in such
Low tones as through the forest sweeps,
When all wild things "lie down to sleep."

Each day I find new coverlids
Tucked in and more sweet eyes shut tight;
Sometimes the viewless mother bids
Her ferns kneel down full in my sight;
I hear their chorus of "good night,"
And half I smile and half I weep,
Listening while they "lie down to sleep."

—Helen Hunt Jackson.

NATURE'S SONG.

There is no rhyme that is half so sweet
As the song of the wind in the rippling wheat;
There is no meter that's half so fine
As the lilt of the brook under rock and vine;
And the loveliest lyric I ever heard
Was the wildwood strain of a forest bird.

—MADISON CAWEIN.

THE OAK.

A song to the oak,
The brave old oak,
Who hath ruled in the greenwood long!
Here's health and renown
To his broad, green crown
And his fifty arms so strong!
There's fear in his frown
When the sun goes down
And the fire in the west fades out;
And he showeth his might,
On a wild, stormy night,
When the storms through his branches shout.
Then here's to the oak,
The brave old oak,
Who stands in his pride alone;
And still flourish he,
A hale, green tree,
When a hundred years are gone!

—H. F. CHORLEY.

PART VII. APPROPRIATE SONGS AND SELECTIONS.

MY COUNTRY, 'TIS OF THEE!

My country, 'tis of thee,
Sweet land of liberty,
    Of thee I sing.
Land where my fathers died,
Land of the pilgrim's pride;
From every mountain side
    Let freedom ring.

My native country, thee,
Land of the noble free,
    Thy name I love;
I love thy rocks and rills;
Thy woods and templed hills;
My heart with rapture thrills
    Like that above.

Let music swell the breeze
And ring from all the trees
    Sweet freedom's song;
Let mortal tongues awake,
Let all that breathe partake.
Let rocks their silence break,
    The sound prolong.

Our father's God, to Thee,
Author of liberty,
    To Thee we sing.
Long may our land be bright
With freedom's holy light,
Protect us by Thy might,
    Great God, our King.

—SMITH.

THE OLD OAKEN BUCKET.

How dear to this heart are the scenes of my childhood,
  When fond recollection presents them to view!
The orchard, the meadow, the deep-tangled wildwood,
  And ev'ry loved spot which my infancy knew;
The wide spreading pond, and the mill that stood by it,
  The bridge and the rock where the cataract fell;
The cot of my father, the dairy house nigh it,
  And e'en the rude bucket that hung in the well.

Chorus:

The old oaken bucket,
The iron-bound bucket,
The moss-covered bucket,
That hung in the well.

—SAMUEL WOODWORTH.

WORK, FOR THE NIGHT IS COMING.

Work, for the night is coming,
Work thro' the morning hours;
Work while the dew is sparkling,
Work 'mid springing flowers;
Work when the day grows brighter,
Work in the glowing sun;
Work, for the night is coming,
When man's work is done.

Work, for the night is coming,
Work through the sunny noon;
Fill brightest hours with labor,
Rest comes sure and soon,
Give every flying minute
Something to keep in store;
Work for the night is coming,
When man works no more.

—ANNIE L. WALKER

HOME, SWEET HOME.

'Mid pleasures and palaces though we may roam,
Be it ever so humble, there's no place like home;
A charm from the sky seems to hallow us there,
Which, seek through the world, is ne'er met with elsewhere.
Home, home, sweet, sweet home!
There's no place like home! there's no place like home!

An exile from home, splendor dazzles in vain;
O, give me my lowly thatched cottage again!
The birds singing gayly, that came at my call,—
Give me them,—and the peace of mind, dearer than all!
Home, home, sweet, sweet home!
There's no place like home! there's no place like home!

To thee I'll return, overburdened with care;
The heart's dearest solace will smile on me there;
No more from that cottage again will I roam;
Be it ever so humble, there's no place like home.
Home! home! sweet, sweet home!
There's no place like home! there's no place like home!

—JOHN HOWARD PAYNE.

CREATION.

The spacious firmament on high,
With all the blue ethereal sky,
And spangled heavens a shining frame,
Their great Original proclaim.
The unwearied sun from day to day,
Does his Creator's power display,
And publishes to every land
The work of an Almighty hand.

Soon as the evening shades prevail,
The moon takes up the wondrous tale,
And nightly to the listening earth,
Repeats the story of her birth.
While all the stars that round her burn,
And all the planets in their turn,
Confirm the tidings as they roll,
And spread the truth from pole to pole.

—HAYDN.

THE WONDERFUL WORLD.

Great, wide, beautiful, wonderful World,
With the wonderful water round you curled,
And the wonderful grass upon your breast,—
World, you are beautifully drest.

The wonderful air is over me,
And the wonderful wind is shaking the tree;
It walks on the water, and whirls the mills,
And talks to itself on the top of the hills.

You, friendly Earth! how far do you go
With the wheat fields that nod and the rivers that flow,
With cities and gardens, and cliffs and isles,
And people upon you for thousands of miles?

Ah, you are so great, and I am so small,
I tremble to think of you, World, at all;
And yet, when I said my prayers to-day,
A whisper within me seemed to say—
"You are more than the Earth, though you are such a dot;
You can love and think, and the Earth can not!"

—WILLIAM BRIGHTY RANDS.

WE THANK THEE.

For flowers that bloom about our feet;
For tender grass, so fresh, so sweet;
For song of bird and hum of bee;
For all things fair we hear or see,
Father in heaven, we thank Thee!

For blue of stream and blue of sky;
For pleasant shade of branches high;
For fragrant air and cooling breeze;
For beauty of the blooming trees,
Father in heaven, we thank Thee!

—RALPH WALDO EMERSON.

THE FARMER'S CREED.

I believe in a permanent agriculture, a soil that shall grow richer rather than poorer from year to year.

I believe in hundred-bushel corn and in fifty-bushel wheat, and I shall not be satisfied with anything less.

I believe that the only good weed is a dead weed, and that a clean farm is as important as a clean conscience.

I believe in the farm boy and in the farm girl, the farmer's best crops and the future's best hope.

I believe in the farm woman, and will do all in my power to make her life easier and happier.

I believe in a country school that prepares for country life, and a country church that teaches its people to love deeply and live honorably.

I believe in community spirit, a pride in home and neighbors, and I will do my part to make my own community the best in the State.

I believe in the farmer, I believe in farm life, I believe in the inspiration of the open country.

I am proud to be a farmer, and I will try earnestly to be worthy of the name.

—FRANK I. MANN.

A MASQUE OF THE SEASONS.

QUEEN.

Summer or winter or spring or fall—
Which do you like the best of all?

LITTLE JASPER.

When I'm dressed warm as warm can be
And with boots to go
Through the deepest snow,
Wintertime is the time for me.

QUEEN.

Summer or winter or spring or fall—
Which do you like the best of all?

LITTLE MILDRED.

I like blossoms, and birds that sing;
The grass and the dew,
And the sunshine, too,
So, best of all, I like the spring.

QUEEN.

Summer or winter or spring or fall—
Which do you like the best of all?

LITTLE MANDEVILLE.

O little friends, I most rejoice
When I hear the drums
As the circus comes,
So summer time's my special choice.

QUEEN.

Summer or winter or spring or fall—
Which do you like the best of all?

LITTLE EDITH.

Apples of ruby, and pears of gold,
And grapes of blue
That the bee stings through.
Fall—it is all that my heart can hold.

QUEEN.

Soh! my lovelings and pretty dears,
You've each a favorite, it appears—
Summer and winter and spring and fall—
That's the reason I send them all!

—JAMES WHITCOMB RILEY.

The above can be easily dramatized by selecting children and assiguing parts. Suitable costuming will be a simple matter, but is not necessary.

POLLY FLINDERS.

(Found in Mother Goose Village (Rand-McNally) or in Howe Third Reader (Scribners).)

SUGGESTIONS FOR DRAMATIZATION.

Select children about 9 years old to take the parts of Polly Flinders, the mother, Mr. Cotton Stalk, six or eight children (or the whole class) to represent factory workers.

Mr. Cotton Stalk is the only person in anything but ordinary costume. A hat made of leaves from cotton plant, a cotton stalk in his hand, bits of cotton stuck on his clothes will suggest his character.

The name of the nearest factory town may be substituted for London-town.

THE GOLDEN WINDOWS.

(By Laura E. Richards, Little, Brown & Co.)

WHEN THE WORLD WAS YOUNG.

(By Elizabeth V. Brown.)

These two books have some good material and hints for vivid story-telling and play.

A good juvenile nature drama of more length and elaborateness is Mondamin: The First Harvest of Indian Corn. By Harry N. Baum (Atlantic Educational Journal, Baltimore, September and October, 1911). This has ample stage directions and clear assignment of parts. Part I is The Planting of the Corn; Part II is The Blessing of the Corn Fields; and Part III is The Reaping of the Corn Fields. Either part is complete enough in itself to be used alone.

JUVENILE SELECTIONS FOUND IN "NATURE AND VERSE."

1. Marjorie's Almanac.—Selected.
2. Who Stole the Bird's Nest?—L. Maria Child.
3. A Boy's Song.—The Ettrick Shepherd.
4. The Cotton Plant.—Selected.
5. Plant Song.—Nellie M. Brown.
6. The Four Winds—F. D. Sherman.
7. What the Winds Bring.—E. C. Stedman.
8. The Body.—Selected.
9. Two and One.—Selected.
10. Hurrah for the Flag.—Selected.

QUOTATIONS.

And he gave it for his opinion that whoever could make two ears of corn or two blades of grass to grow upon a spot of ground where one grew before would deserve better of mankind and do more essential service to his country than the whole race of politicians put together.

—Dean Swift.

The year's at the spring
And day's at the morn,
Morning's at seven.
The hillside's dew pearled;
The lark's on the wing;
The snail's on the thorn;
God's in his heaven;
All's right with the world.

—Browning.

And lo! in a flash of crimson splendor, with blazing scarlet clouds running before his chariot and heralding his majestic approach, God's sun rises upon the world.

—W. M. Thackeray.

And, though we should be grateful for good houses, there is, after all, no house like God's out-of-doors.

—R. L. STEVENSON.

Above, the clear sky was full of stars, the sky a lovely night blue. It was a time when, if ever it will, the soul reigns and the coarse, rude acts of day are forgotten in the aspirations of the inmost mind.

The night was calm—still; it was in no haste to do anything—it had nothing it needed to do. To be is enough for the stars.

—RICHARD JEFFRIES.

The simplicity of winter has a deep moral. The return of nature, after such a career of splendor and prodigality, to habits so simple and austere is not lost, either upon the head or the heart. It is the philosopher coming back from the banquet and the wine to a cup of water and a crust of bread.

—JOHN BURROUGHS.

To him who, in the love of Nature, holds
Communion with her visible forms, she speaks
A various language; for his gayer hours
She has a voice of gladness, and a smile
And eloquence of beauty, and she glides
Into his darker musings with a mild
And healing sympathy that steals away
Their sharpness, ere he is aware.

—WILLIAM CULLEN BRYANT.

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7. W. C. Bryant—A forest hymn; To a water fowl; Robert of Lincoln.
8. Robert Burns—To a mountain daisy; To a mouse.
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10. John Milton—Il Penseroso; L'allegro.
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14. Helen G. Cone—The dandelions.
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21. Hamlin Garland—The herald crane.
22. E. R. Sill—Among the redwoods.
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INDEX.