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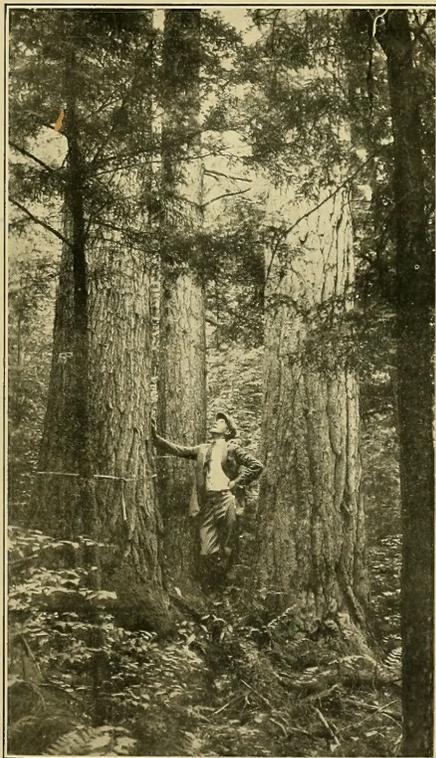
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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF PUBLIC INSTRUCTION
HARRISBURG.

ARBOR DAY and BIRD DAY



THIS IS THE FOREST PRIMEVAL.

OCTOBER 27, 1922

The Birthday of Theodore Roosevelt

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B. Suggested Program for Friday, October 27, 1922.

The topics listed below, numbers two to ten inclusive, on each of which an article has been prepared by a noted authority and printed herein, suggest themes for short talks by pupils before an assembly in the school room or auditorium. Ask the children, the patrons, and the visitors to supplement each topic. Discuss thoroughly the application of the topic to local conditions and draw as many helpful lessons as possible from each subject.

For the tree planting as suggested in number eleven, the school should proceed to the place where the planting is to be made. A young tree, a large number of seedling trees, or local native shrubs and flowers should then be planted. Preparations for this event should be made during the preceding week by having discussions as to how, what, and where to plant, and by assembling the proper materials for the planting operation.

ARBOR DAY, BIRD DAY, AND ROOSEVELT DAY PROGRAM

1. Appropriate songs.
2. Governor Sproul's Arbor Day Proclamation.
3. Letter to the school children of Pennsylvania from Dr. Finegan, Superintendent of Public Instruction.
4. Gifford Pinchot's letter to the school children of Pennsylvania.
5. "Wild Life in Pennsylvania".
6. "Charles A. Babcock—Founder of Bird Day".
7. "Pennsylvania's Wild Flowers and Shrubs".
8. "Conservation of Pennsylvania's Forests".
9. "Pennsylvania's Water Power".
10. "The Conservation of Pennsylvania Soils".
11. Planting of native trees, shrubs, or flowers on or near the school grounds.
12. Song, "America".

C. Exhibits of Pupils' Work.

1. Posters announcing the school program for Arbor Day, Bird Day, and Roosevelt Day.
2. Bird feeding shelves made by children, to be erected for feeding birds this winter.
3. Collections of specimens of native trees, including leaves, bark, vertical sections and cross sections.
4. Drawings, color studies, and paper cuttings of birds, trees, and land-scapes.
5. Decorations of appropriate kinds, such as leaves, evergreen boughs, and autumn foliage.



(Courtesy of American Game Protective and Propagation Association)

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DEPARTMENT OF PUBLIC INSTRUCTION

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HONORABLE WILLIAM C. SPROUL
Governor

IN THE NAME AND BY AUTHORITY OF THE
COMMONWEALTH OF PENNSYLVANIA
EXECUTIVE DEPARTMENT
HARRISBURG



Proclamation

Whereas, God, in His goodness, has bestowed upon our State of Pennsylvania the beautiful wooded mountains and fertile valleys threaded with their life-giving streams, and has likewise given us a great wealth of mineral deposits and abundant stores of indispensable timber, a heritage which has enabled this Commonwealth to develop into a great agricultural and industrial empire, with profitable employment to great numbers of our people who are producers in our mines, mills, and factories, and upon our farms from which come such quantities of food products that we rank among the first farming states in the Union; and

Whereas, For many years these great advantages were not fully appreciated by the people of our State and our natural resources were not well conserved, and we have not only drawn heavily and without discrimination upon our forests but we have permitted the pollution of the streams, the depletion by waste and erosion of our fruitful hill-sides, and allowed wanton destruction of the birds, the fish, the game, and the wild flowers, which contributes so much to the comfort and enjoyment of our people; and

Whereas, Far-sighted citizens, realizing the need of correcting these unsound practices and conditions, years ago initiated a program to preserve for future generations the wealth of nature in this God-favored area, and produced wise legislation looking toward the preservation of the forests, the saving of the streams pure and clean, the protection of the wild life and the preservation of healthful conditions for our workers, and especially for the women and children, in order that we may have a stronger and better manhood and womanhood, surrounded by wholesome conditions, which will save for future generations the blessings with which we have been endowed; and

Whereas, It is especially desirable that the boys and girls of Pennsylvania—the great army of two million school children upon whom the responsibility will soon fall for the management of the State's resources and the conservation of its future—should be encouraged to study and become interested in this work which has been so well started and which we have endeavored to carry on, that it may be amplified and developed for the benefit of all of the people in the future:

Now, therefore, I, William Cameron Sproul, Governor of Pennsylvania, do hereby appoint and designate Friday, October 27, 1922, the birthday of Theodore Roosevelt, to be observed as the Autumn Arbor Day and Bird Day in Pennsylvania, and I do commend to all of our people, and especially to the school children of the State, the proper observance of this day in educational and practical efforts looking toward the acquisition of knowledge regarding the tree life and wild life of the State, and particularly in the planting of trees and in the protection and cultivation of the forests and birds which bless us with their useful and grateful presence.

GIVEN under my hand and the Great Seal of the State, at the City of Harrisburg, this fourth day of October, in the year of our Lord one thousand nine hundred and twenty-two, and of the Commonwealth the one hundred and forty-seventh.

[SEAL]

By the Governor:

BERNARD J. MYERS,
Secretary of the Commonwealth

A handwritten signature in dark ink, appearing to read "Wm. C. Sproul".

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF PUBLIC INSTRUCTION
HARRISBURG

October 27, 1922.

To The School Children of Pennsylvania:

I extend to you a most cordial greeting upon your return to the school room this autumn. What a joy it would be to see every one of the one million seven hundred thousand boys and girls of Pennsylvania at work with their books in the schoolroom! Since this is impossible I am availing myself of the privilege of addressing you through this letter.

The Honorable William C. Sproul, Governor of our Commonwealth, has issued a proclamation requiring the observance of Friday, October 27—the birthday of Theodore Roosevelt—as Arbor Day and Bird Day in Pennsylvania. I am requesting you, therefore, to join us in paying proper tribute to the memory of one of America's most eminent citizens. Let us all—boys and girls, fathers and mothers—express our appreciation of the services rendered to the American people by this great man.

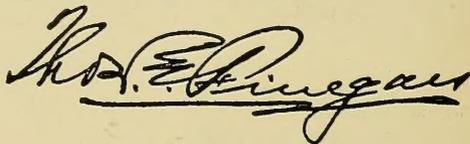
Theodore Roosevelt was a man who believed in hard work, a square deal, in education as a birthright, and in productive labor for all. Whether he was boxing, playing tennis, riding horseback, leading his men in battle, hunting big game, writing his great messages to Congress, or speaking to the thousands who loved his straightforward, honest messages, Theodore Roosevelt always did the task at hand with every ounce of strength he had. He loved the out-of-doors, the flowers, the birds, and the animals, but above all he loved boys and girls. You will take great delight in reading his books and in learning more about the wonderful life he lived.

In his proclamation, our Governor has emphasized a great national interest that was dear to Roosevelt—the conservation of the natural resources in plant and animal life. We are not good citizens unless we leave for the generations that are to follow a more valuable inheritance than was left to us. We are not good sportsmen unless we leave for the men and women of tomorrow better opportunities for recreation, more game in our mountains, and more fish in our streams than were left to us.

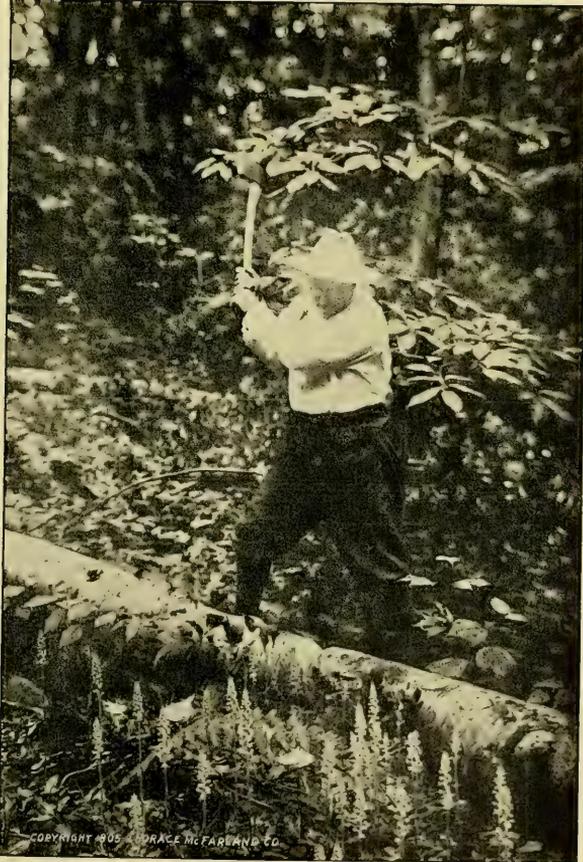
Do you know that Pennsylvania is one of the few states in the Union that has never adopted a State flower? I want you, the school children of Pennsylvania, to help us select a State flower. Next spring, when the flowers begin to bloom, I should like to have you make a careful study of the wild flowers of your community. Learn to know them and learn to love them. I am going to ask you, on the Spring Arbor Day of 1923, to decide by your votes which of the native flowers of Pennsylvania you desire designated as our State Flower.

I congratulate you on the splendid opportunities which a generous citizenship in Pennsylvania has provided for your welfare, for your growth, and for your happiness. I trust that you will use wisely and well the days of your childhood so that you may develop right ideals, and the ability to think clearly and to act with intelligence and decision. The world needs men and women of force and action. Study hard, play hard, and give your best service always.

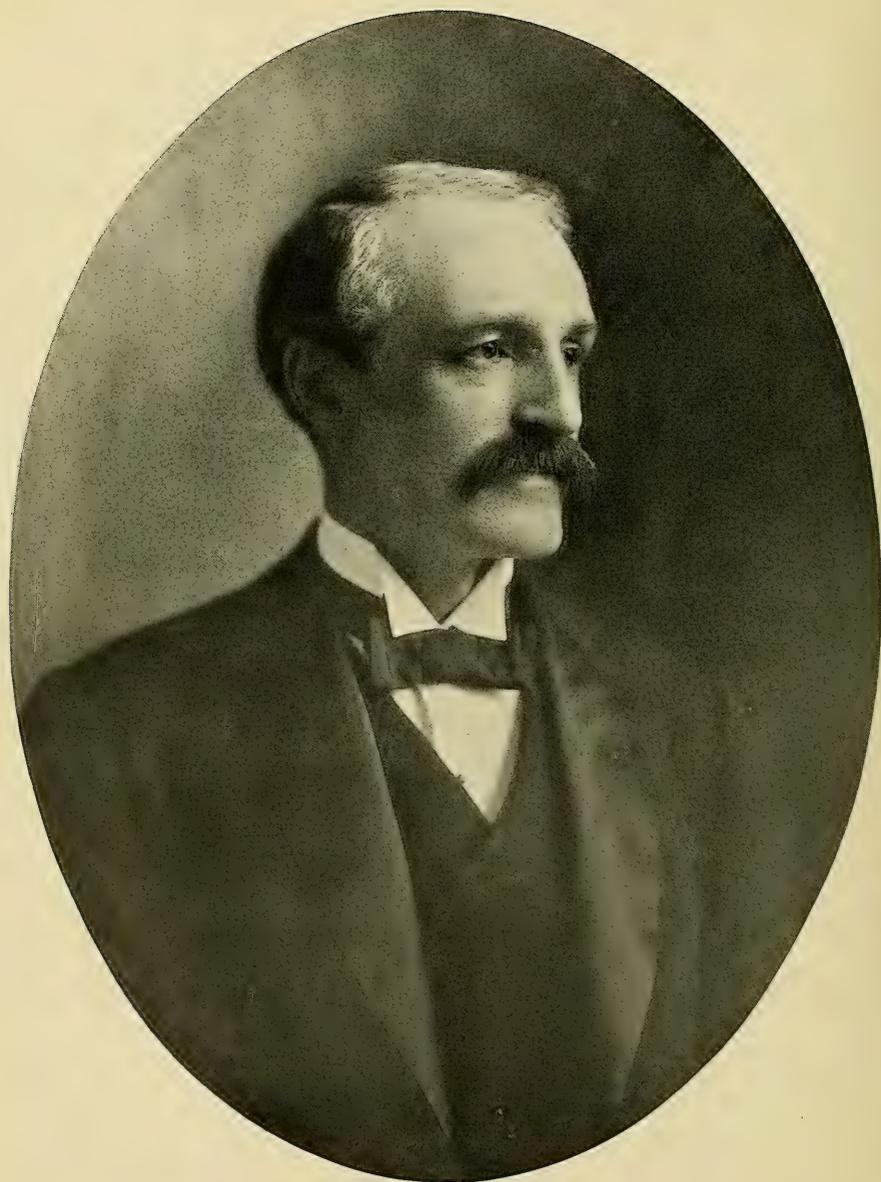
Your sincere friend,



Superintendent of Public Instruction



Theodore Roosevelt was a practical forester.



GIFFORD PINCHOT.

Theodore Roosevelt

By

GIFFORD PINCHOT

Former National Commissioner of Forestry
and late Commissioner of Forestry, Pennsylvania.

Theodore Roosevelt was an outdoor man. He knew the mountains, the forests, the plains, and the streams. He understood what they meant to the people of America now and hereafter because he never was in the open without using his eyes. What he looked at he saw, and what he saw he thought about, so that his mind was ready to understand and adopt the policy of the conservation of natural resources the moment it was brought to his attention.

The conservation policy means the use of the earth and its resources for the greatest good of the greatest number for the longest time. We who are alive today have the right to use all the natural resources that are necessary for our safety, comfort, and happiness, but we have no right to destroy more than we can use, nor to prevent the new growth of the renewable resources by destructive methods of use.

Thus we have no right to destroy the forest, which is a renewable resource, when we harvest the timber crop. On the contrary, we are under the most solemn obligation to cut our trees in such a way that new trees will grow so that land of little use for other purposes will keep on producing trees. That is one of the essential ideas of conservation.

What Colonel Roosevelt did with respect to conservation has made this Nation his debtor so long as streams run and forests grow. Not only did he accept the conservation policy, but he preached it all over the United States. He preached it just as vigorously where there was opposition as where the people were all friendly. He was never afraid to tell what he thought, and it was because of his fearless backing of the conservation policy that it made such wonderful progress during the years he was President.

Very often the opposition to conservation in Congress and in many of the States of the West was so bitter that almost any other President would have been induced to speak less clearly for fear of making enemies. Not so Colonel Roosevelt. He told the truth as he saw it no matter whether those in high places liked it or not, and the result in this case was to make the rank and file of the American people believe as he did, that conservation is absolutely necessary for the welfare of America in this generation and in all the generations to come.

Colonel Roosevelt never spared himself when there was good to be done. No man in America ever had greater power. He used it to make this country a better land in which boys and girls and men and women might live. No matter what it cost him, he stood for what was right.

He will be remembered longest for his part in conservation, a great and lasting policy in which the American people has come to have abiding faith. It is his greatest monument.

Pennsylvania needs conservation as much as any other State. We must save and renew our forests, protect and develop our streams, and make this wonderful Commonwealth of ours even richer and more beautiful than it is.

Pennsylvania will not die with us. Those who come after us have rights which we must respect.

GIFFORD PINCHOT.



"Martha", The last passenger pigeon known to science died in the Zoological Garden in Cincinnati, September, 1913.

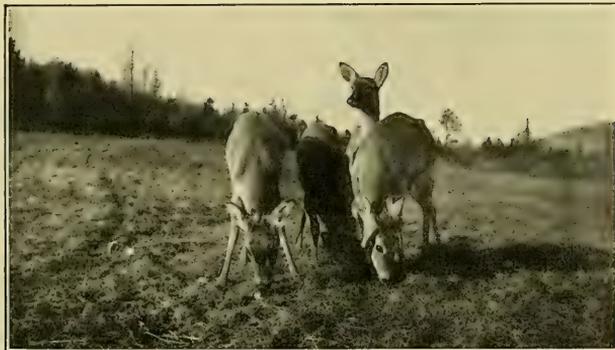
WILD LIFE IN PENNSYLVANIA

By

Colonel Henry W. Shoemaker

At the time of William Penn's first appearance on the Delaware there was probably **no** part of the world, Africa included, where nature had been more lavish with wild animals, bird and fish life than Pennsylvania. In a letter to a friend in England he spoke enthusiastically of the bounteous supply of game, for food and furs, and the fish "as a cheap and plentiful food supply for the common people."

In those days, so Watson's Annals of Philadelphia tell us, deer and bears, and **even** panthers, were killed in what is now Philadelphia and Germantown. The wild pigeons **which** flew by the millions were likened by the early settlers to the quails mentioned in the Bible, and helped to tide them over several severe winters when the crops had been poor. Fur buying and trapping were soon established on a large scale in the province, and there is a description extant by a French traveller of the long rows of sheds at Harris' Ferry, later Louisburg and now Harrisburg, jammed full of bison hides.



(Courtesy Pennsylvania State Game Commission)

Deer become tame when protected. This group was photographed in the Kalbfus Game Preserve.

In the early days the buffaloes or bison, migrated between the Great Lakes and Georgia, crossing the Susquehanna River at Haldeman's Island, near Clark's Ferry Bridge, that **huge** covered structure built by Theodore Burr and so charmingly described by Charles Dickens in his "American Notes." In Brooks' "Annals of Harrisburg" the killing of a buffalo **within** the limits of that city in 1792 is recorded. The last herd was wiped out in Snyder County in 1799. A bison was killed by Theodore Stamm in Northumberland County in 1810. That is not the latest eastern record, as one was shot on Tygart River, West Virginia, in 1825. **The** moose which came to Pennsylvania from the North during exceptionally severe winters were exterminated about the same time. As late as the middle of the last century elk were found in some of the northern counties of the State. The beaver existed in a wild state, and **the** wolf, the panther, and the Canada lynx were met with, as were the fisher fox, pine marten and wolverine.

Today all of these interesting forms of wild life are gone, and are we any better off for their passing? Dogs kill more sheep in one year than the wolves ever killed, and the small amount of game destroyed cannot be weighed against the thrill and charm of their existence in our forests. Twenty years ago the deer were all but extinct, yet half a century ago professional hunters thought nothing of killing a hundred in a season for the New York and Philadelphia markets. There were two varieties, the northern and the southern forms of the Virginia deer. Most of the big northern type are gone, but the southern type have interbred with western and southern deer introduced by the State Game Commission, and now deer hunting is again a popular sport in our mountains. The red and grey fox are present in diminishing numbers, squirrels are scarce, including the black squirrel and the picturesque flying squirrel. The 'coon, the 'possum and the groundhog are still with us, affording much sport for the average man. The black bear seems to be holding his own, and is our noblest game animal—thanks to Governor Sproul's watchful interest.

Our older people love to tell of the flights of the wild pigeons on their migrations north in the spring, south in the fall, in untold millions which "darkened the sun." They were unmercifully harassed at their breeding grounds in the northern counties, the old birds were netted, and the trees cut down for the squabs. No wonder they decreased, yet their total disappearance is the greatest of avian mysteries. In 1878 a feeble law was passed to protect them, but it came too late. They remained in the Commonwealth only a few years longer. Their last nesting was along what is now the wonderful Cherry Springs Drive, in Potter County.

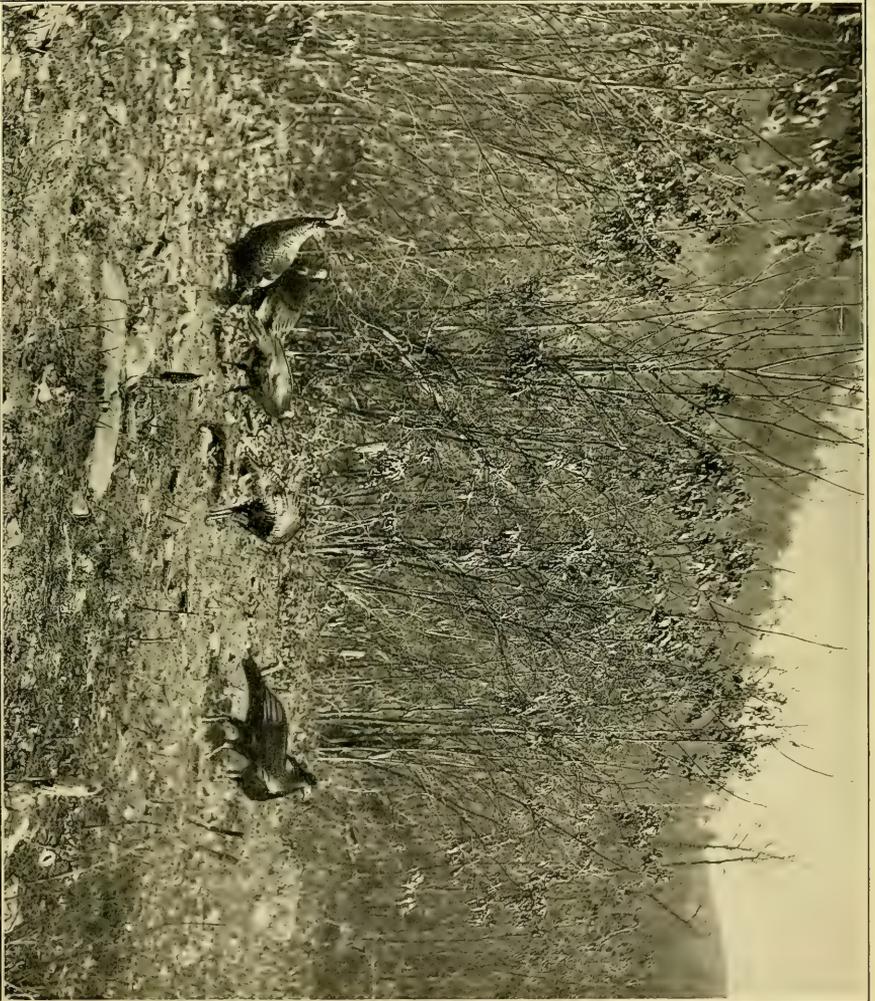
Where did the wild pigeons go when they migrated southward in the fall? They did not winter in the southern states. In very mild winters, however, a few remained and occasionally wild pigeons were found about Philadelphia and Chester. The great flocks of millions of birds crossed the Gulf of Mexico, spring and fall. Where did they go? Are they waiting for some more propitious time to revisit Pennsylvania from some hidden jungles in South America or Africa?

The heathcock, the eastern form of the prairie hen, was exterminated in Pennsylvania before it was ever mentioned in our game laws, as was the beautiful Carolina parakeet. The ruffed grouse or "pheasant" and the quail are still residents of our State.

The golden eagle is occasionally seen in Pennsylvania, but was always rarer than the bald eagle, the American eagle, or "Bird of Freedom," which regularly bred here, especially along the Susquehanna River. It was said to have been an inspiring and thrilling sight to see these noble birds soaring over the waters as they foamed and frothed over the sagged rocks of the "Big River" about Marietta, Bainbridge, and Wrightsville. Thoughtless hunters laid them low, and the bald eagle on the North and West branches of the Susquehanna River is today but a memory.

All of the smaller so-called birds of prey, hawks, and owls, so useful to the farmer are becoming scarce in Pennsylvania. They are easily shot and become ready targets for unscrupulous gunners. The raven is almost a thing of the past, due to the commercial value of the eggs for collectors. The nests have been cruelly and persistently rifled so long that the old birds have become discouraged and have left for less unfriendly climates. In years gone by hunters when they shot a deer and lost it, located its carcass by the circling of ravens. The turkey vulture, miscalled "buzzard", still soars above some of our mountains, and is a picturesque feature of our scenery, replacing to some extent the majestic but vanished eagles.

Cranes and herons, bitterns and kingfishers, which once added so much to the harmony



(Courtesy Pennsylvania State Game Commission)

Wild turkeys are increasing in Pennsylvania under the care of the Pennsylvania State Game Commission.

of nature along our dead waters and ponds, have been killed by gunners who imagined they destroyed fish, whereas they were mostly busied hunting enemies of the fish and their spawn, such as frogs, lizzards, crayfish and water snakes which they devour voraciously. One of the last heronries in the State near Falmouth, Lancaster County, was recently visited by members of the Natural History Society of Harrisburg. These water birds have been described as the "poiiice force" of our streams.

There is still a fair number of smaller woodpeckers and sapsuckers, but the musical hammering of the pileated woodpecker or log cock is now rarely heard. Wild ducks, wild geese and swans still appear on our rivers, and according to some are increasing in numbers.

Thanks to the continued efforts of Bird Clubs, Audubon Societies, Conservation Leagues and similar organizations, our song birds are fairly well protected by law and public sentiment in Pennsylvania. What would our woods, gardens and orchards be without our cheerful songsters, robins, wrens, flickers, peewees, redbirds, wood thrushes, thrashers and orioles? We cannot be too watchful that they are carefully guarded against cats, snares, poisons, and other enemies.

William Penn was filled with enthusiasm over the value of the Pennsylvania fisheries. In those days the seals followed the shad into the estuaries of the Delaware and Susquehanna Rivers, and shad fisheries were profitable investments almost to the headwaters of the Delaware, the Susquehanna, the Juniata and the Karoondinha, now called Penn's Creek. It is stated that shad even penetrated into the beautiful Penn's Cave, which is the headwaters of the Karoondinha.

The building of dams, and pollution by industrial plants have made the shad but a memory in the inland waters of Pennsylvania. As late as 1903, however, a retired Pennsylvania Railroad employee sold shad at Clark's Ferry Station, only ten miles above Harrisburg.

The old-fashioned, highly colored, gamey, native brook trout is only found in some of the wilder mountain streams of the State. Once they were so plentiful that the early fishermen caught baskets full with their hands. There was no "limit" in those days. Potter County newspapers tell how Martin E. Olmstead, then a young man, caught five hundred trout in a single day with hook and line. The introduction of western trout has pretty well destroyed the old native variety, but trout fishing today is a popular and delightful recreation. Catfish, suckers, sunfish and eels also abound, and afford sport for old and young alike.

The fishing industry on Lake Erie is of considerable importance, and "White fish" are popular all over the State. Land and snapping turtles are also found in Pennsylvania.

The search for bee trees is still a fascinating pursuit in the forests of northern Pennsylvania. John H. Chatham, aged Clinton County naturalist, says that the first bees brought in by the colonists were black, with a single white spot on their backs, and known as "Dutch bees." Their presence in the woods was a warning to the Indians that white settlements were near at hand. In the Black Forest in Clinton County, in 1876, Mr. Chatham says he saw where some one to "line" a bee had cut down a wide swath of original white pine trees for half a mile over a ridge—trees that today would be worth thousands of dollars. Those were reckless days when timber and wild life seemed inexhaustible, and no one cared. Our younger generations have lost much of the joy of life by the absence of these old forests, birds, animals, and fish.

Much game was exterminated by the early hunters and professional game butchers, but the forest fires by destroying the "cover" wiped out more wild life than all the hunters. A more sensible day is at hand. The forest fires are being fought with all the stubborn energy

of the State Forestry Department, the Boy Scouts and civic organizations. The State Game Commission and sportsmen's organizations are using every effort to conserve our game supply and certainly the deer and bears are increasing. The fishermen's license law means increased fish propagation, but it is the responsibility of the citizens as a whole to legislate the pollution of streams out of existence. It would not be tolerated in any European country. "Ce n'est pas egalite" (it is not equality) the French would say and banish it overnight. The refuse from mines and tanneries can be turned into valuable by-products, so that no one will be the loser.



(Courtesy Pennsylvania State Game Commission)

**A twenty-six pound wild cat caught in the Sproul State Forest,
Clinton County, Pennsylvania.**

We need forests and game and fish to keep alive the spirit of our pioneer forefathers, the heroic men and women who were the bone and sinew of Pennsylvania. It is in the hands of the younger generations, the school boys and school girls, by Arbor Days and Bird Days and by sincere individual effort, to save Pennsylvania Beautiful. We can again have the hunter's paradise as described by William Penn, if every boy and girl who reads these lines will become a devotee of conservation, and save for the boys and girls to come some aspect of the wilderness—the Penn's Woods which we see in our dreams, and which all that is best in us instinctively loves! Let us help to re-create the tall forests, the teeming animal and bird life, the pure waters! But above all, let us exert ourselves to the utmost to check the most destructive enemy of the wild life of Pennsylvania—the Forest Fire!



The jack-in-the-pulpit is one of Pennsylvania's flower treasures.

PENNSYLVANIA'S WILD FLOWERS AND SHRUBS

By J. Horace MacFarland

President of the American Civic Association and
Editor of the American Rose Annual

Not only is Pennsylvania remarkable for her yet unappreciated scenery of river and valley, of mountain pass or "gap," plain and forest scenery, which ought to make every citizen proud of residence in the Keystone State, but as well for the richness and extent of her natural flower and shrub adornments, her "flora," as the scientist states.

Within the borders of the state more than two thousand plants are native, or "wild," though for more than one thoughtless generation we have been doing all we know how to exterminate the finer and more beautiful, leaving only the less conspicuous, the more rugged and enduring things, not infrequently classed as "weeds" or "briars."

Curiously enough, when we think of planting flowers and shrubs about our homes or our schools, we try almost always to get something foreign to the state, rather than to use our own treasures, valued elsewhere. About the home we set the Norway maple and the Norway spruce, both from Europe, and the horsechestnut from Greece. On the lawns we plant lilacs from Bulgaria, spireas and hydrangeas from Japan and China. In the garden are geraniums and coleus, salvia and heliotrope, and a score of other European and Asiatic immigrants. Even our usual roses are of the blood of India and Japan, hybridized in England and France!

In Pennsylvania we should have, of course, the best from all lands, of plants as well as of people, but we need surely also to know and to have about us at home, in the parks, and especially near the schools, our own treasures of tree and shrub and plant—treasures that have excited the admiration and the envy of plant lovers everywhere.

With a wealth of great oaks, why not surround the school buildings with them—the white, pin, scarlet, rock and other splendid and enduring trees that made "Penn's Woods" famous? Our hard or "sugar" maple is the most beautiful of all that family. We can have the superb tulip tree or liriodendron, not a tulip-poplar, if you please! Our lindens and ashes, our birches and our beeches, are notable, and no evergreens excel in beautiful quality our white pines, our spruces and our hemlocks.

Let us stay at home for the fine hydrangeas that are of Pennsylvania, the "Hills of Snow," and the rarer oak-leaved sort. We have the lovely marsh mallows and their descendants. In England the American laurel or kalmia is as highly esteemed as it is here stupidly disregarded, and our great rhododendrons have long been valued by those who have ravished them from our woods and hills to adorn their private estates.

So a first essential to the plant surroundings of a Pennsylvania school ought to be an investigation of local and native plant resources. By reason of the variation in elevation from tide-water to 3,600 feet, and through the possession in its make-up of varied soils, the plant wealth of the Keystone State is so distributed that the natural roadside beauty in one section differs completely from that in another.

It is thus easily possible that a most beautiful and individual planting of trees and shrubs, all hardy and relatively permanent, might distinguish every city, suburban and rural school building in Pennsylvania, using only plant material native to the state. Such planting would



A MOUNTAIN OF PHLOX.

Wild flowers add to the beauty and the interest of the forests.

also, if properly undertaken, acquaint the pupils of the schools with the plant resources of their own commonwealth, and rebuild their knowledge and love in that fashion which most promotes true patriotism.

Nature herself, as she has worked in beautiful Pennsylvania, provides us with the best planting plans for the patriotic and educational work I have suggested. If the school planting is to be truly satisfactory, it must look as if it had naturally come about, and not as if a French barber had exercised all his arts on a virile woodsman fresh from the forest.

As I write, I am looking at a gardener's outrage that has been committed in a lovely open forest near a summer hotel. The beeches, birches, maples and hemlocks that rise from a lawn that is like a wooded meadow frame a charming picture of a nearby lake. Thrust into the middle distance is a "bed" of salvia and white-leaved centaurea that has been irreverently called a "cranberry pie" by one annoyed guest, and likened by another to a blot of red ink purposely spilled on the front of a dress shirt. The outrage is extended by certain painted tubs of geraniums set on beautiful weathered rocks along the path! This, too, in a climate and location that causes to flourish remarkably the laurel and the rhododendron, and is right now providing a marvelous show of color in the leaf-surrounded scarlet berries of the mountain ash and the winter-berry, while nearby the pink cluster of the withe-rod are a delight.

When the planting for the school is being thought out, the idea is to consider the most pleasing unspoiled roadside or forest edging in the vicinity. This will be varied in its items, and by no means in geometrical order.

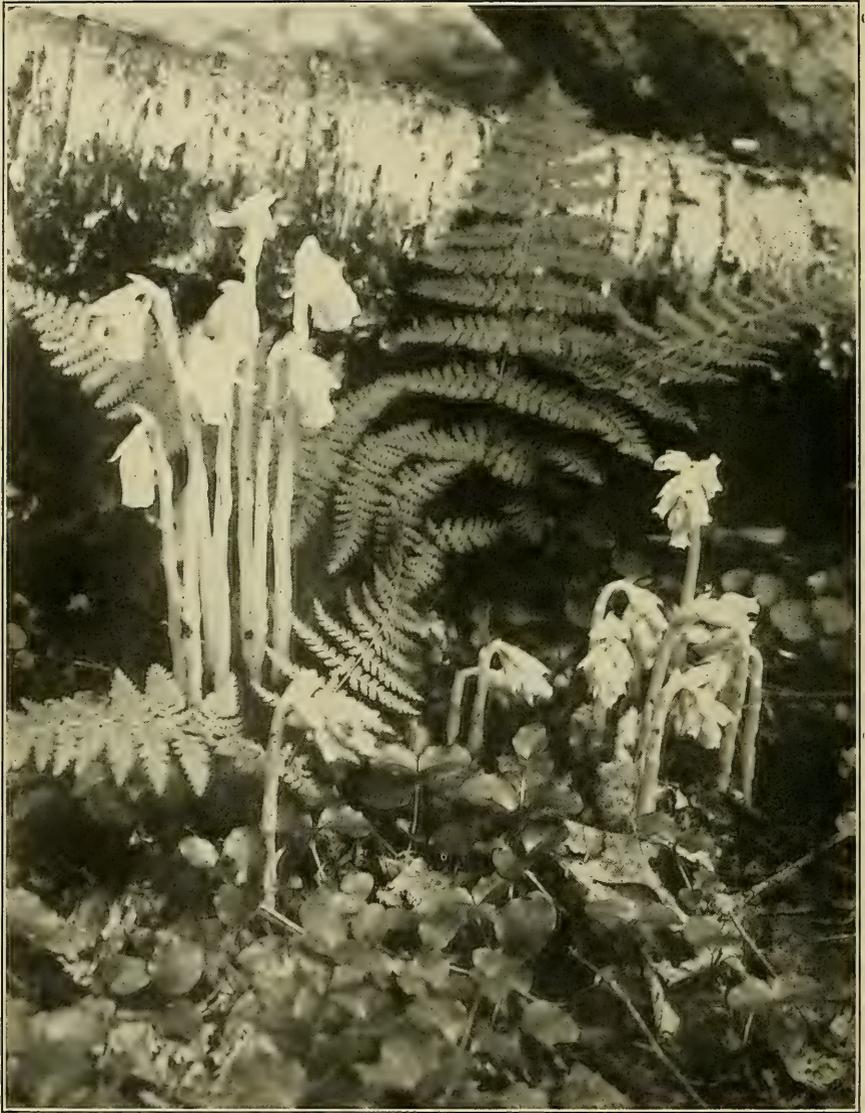
The first error to avoid, then, is that committed too often in the restricted home lawn, chiefly desecrated by a Colorado blue spruce in the exact center, or two of them symmetrically placed if the tree-agent is a good salesman,—bounded by other exotic shrubs set at regular distances and punctuated by "beds" of whatever is deemed expensively ornamental. It has been found possible to accentuate this planting crime by surrounding the beds or the walks with bricks on edge, or with oyster shells, or with carefully white washed stones. The extreme of this kind of ugliness can be attained by either whitewashing all nearby tree trunks, or by forming a "bed" like a flag, or an anchor, or something else that "never was on land or sea!"

Going a half mile along a mountain road, I find in sight a planting so lovely and so tasteful that it at first seems like the open edge of the forest. The building is brown in tone, and it is tied to the earth by the huckleberries, laurels, rhododendrons, hemlocks and other varied shrubs of the neighborhood. This "foundation planting," as it is called, is sufficiently out from the walls to provide passage and air. There are some flowering shrubs, but the decorative dependence is the native evergreen hemlock, laurel and rhododendron.

The lawn is unspotted and unspoiled by anything but grass, and consequently gives an air of extent and repose. At each side of the property is a long border of rich ground, in which flourish the hardy perennials and the summer-blooming bulbs that provide a continuous show of flowers, varied from day to day.

At the front, which is above the roadway, the bank has wild roses trailing upon it, with some American-bred hardy climbers, particularly the lovely and robust "American Pillar," to add a body of bloom and foliage.

Have I made plain an ideal for the use of Pennsylvania's wealth of plant life about Pennsylvania's now mostly unplanted schoolhouses? Can we not use mostly our own flower treasures? Think of a mountain schoolhouse surrounded by our oaks, beeches, ashes, maples, with a touch of pine and hemlock; think of irregular borders showing our wild phloxes and

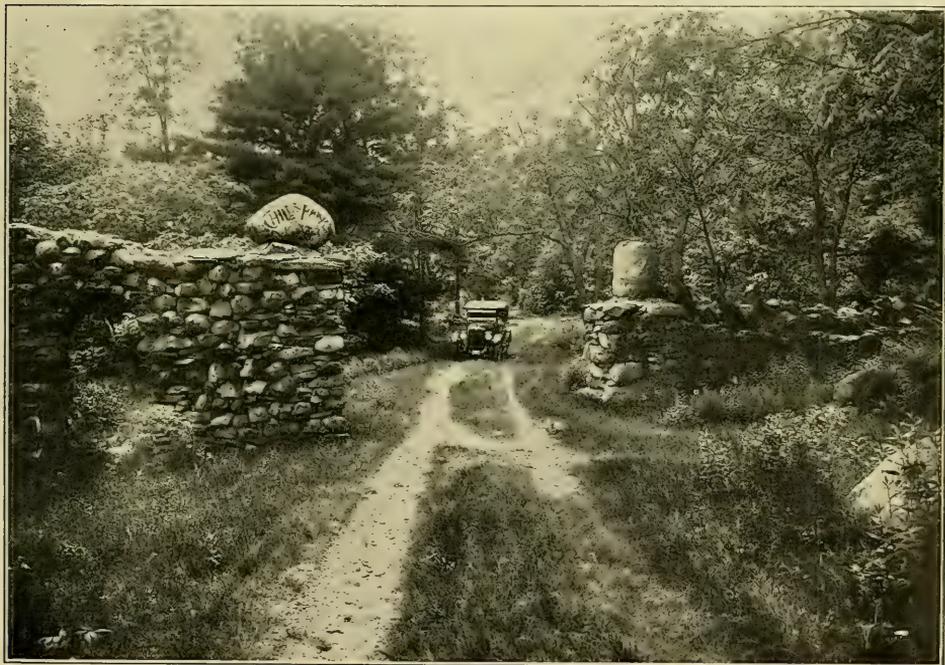


Indian pipe, pine-sap, and ferns

hepaticas and bloodroots and trilliums in earliest spring, and continuing through with brilliant bergamot, snowy white hydrangea, dainty wood lilies, blue closed gentian, white snakeroot and scores of other lovely things; consider that there will be not only laurels and rhododendrons to bloom gloriously, but that their evergreen foliage will be beautiful when snow comes; note that the making of this planting will be full of lessons in biology, in living botany, in plant relations, in soil economics, and in true love of a country whose rocks and hills, whose templed hills, are thus reverently memorialized! Isn't the picture worth painting in plants and trees, and won't it be more pleasing even to the dullest school director than the usual barren desolation we now possess?

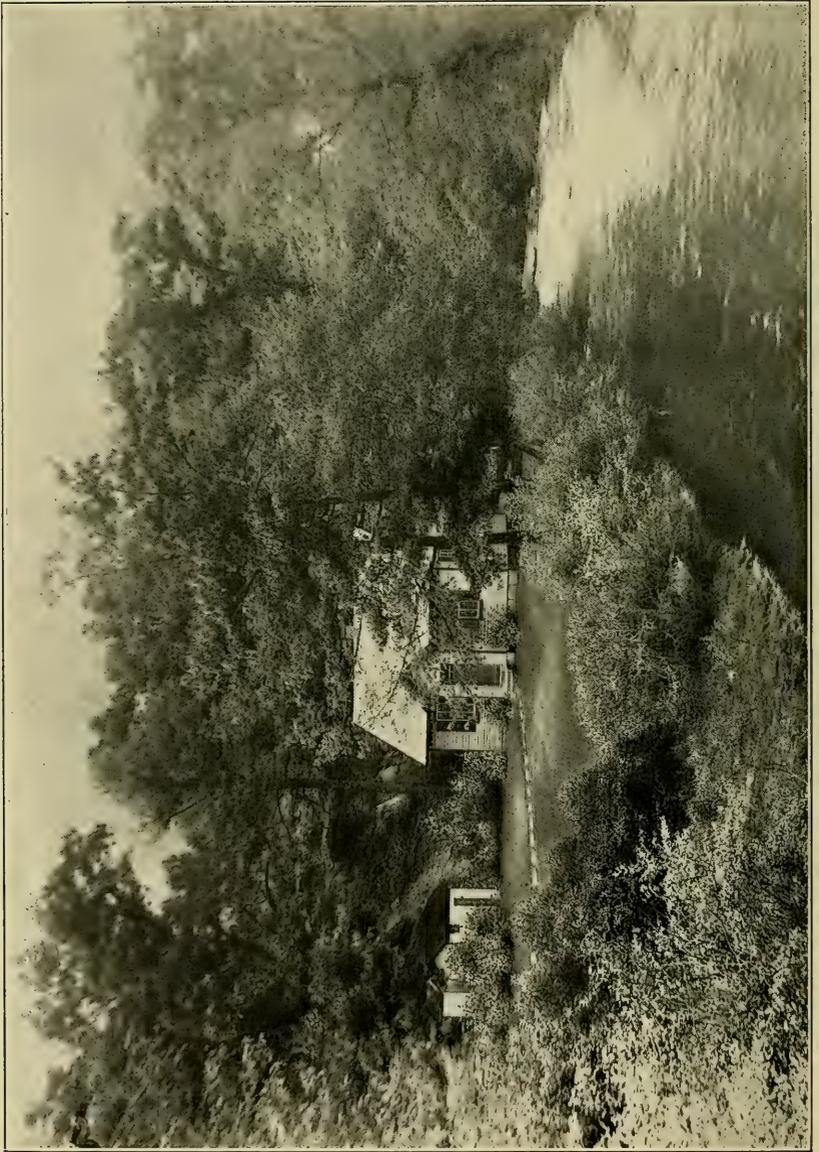
A lowland school, a suburban school, and certainly a city school—for cities are yet in the country—could be pictured, each surrounded with the plants and vines, the trees and shrubs of the neighborhood. With a devoted leader to so organize, this "local color" planting could be done largely by the pupils, and at far less expense than is usually incurred to produce a chromo garden effect, purely imitative and exotic.

Can we have the plants of Pennsylvania about the schools of Pennsylvania? Why not?



ENTRANCE TO CHILDS' FOREST PARK, DELAWARE STATE FOREST,
PIKE COUNTY, PA.

Play and rest places are being prepared on the State forests for you
and those who come after you.



Our school houses can be made more attractive by selecting proper sites and by using native shrubbery for plantings.



Every child should learn how to gather wild flowers without
destroying them.

CONSERVATION OF PENNSYLVANIA'S FORESTS

R. Y. Stuart

Commissioner of Forestry
The Commonwealth of Pennsylvania

A continuous supply of good forest products is necessary for our safety and prosperity in peace and in war. That such a supply will not be available in the future is now certain unless corrective measures are applied to the handling of forest land. Even a casual survey of the present timber situation will convince anyone that forest depletion has reached a critical stage.

The conservation movement is an effort to use the natural sources of the earth, whether they be forest, coal, or ore, for the greatest good of the greatest number for the longest time. There has been a fundamental misconception that conservation means nothing but the hoarding of resources for the future. There could be no more serious mistake, for the first principle of conservation is use; but it refuses to recognize needless waste and destruction as normal and necessary processes in the proper development and full enjoyment of natural wealth.

A great change has taken place in the forests of Pennsylvania, the only state that embodies the word "forest" in its name. The early settlers of Penn's Province were confronted on all sides with forests. Dense and unbroken stands of big trees covered almost every acre of land in the valleys and on the mountains. Of the State's entire land area (28,692,480 acres) at least 28,592,000 acres originally contained timber. The forest was then an obstacle to development and had to be removed to make way for settlements, agricultural crops, and other necessary and profitable uses of the land. The practice of forest destruction by axe, saw, and fire became so general among the pioneers that it was accepted as normal and necessary.

As late as one hundred years ago there still stood in the State about twenty acres of forest land for each inhabitant, from which could be secured at least 500,000 board feet of fine lumber. Pennsylvania was so richly endowed with timber that the supply seemed inexhaustible to her citizens. This heritage was theirs at little or no cost and they proceeded to use it unsparingly and treat it carelessly. Before coal and iron were discovered, before the great ore beds were uncovered, and before the railroads were constructed, there began to flow forth from the forested hills of the Keystone State a large and continuous stream of useful forest products. A great lumber industry arose. Sawmills and lumber camps abounded. Streams were the carriers for the large volume of timber cut. In 1850 Pennsylvania stood second among the States of the Union in lumber production; and in 1860 she took first place. The drain upon the forests increased to supply the wood needs of an enlarging population and wider market. The trees removed were the best ones. Those that were left were regarded as of no value and no care or protection was given to them. Protection of the forests in those days was unknown. It was thought that the future could well take care of its own timber needs.

The effects of a continued policy of forest destruction without provisions for forest renewal had to be felt sooner or later. About 1890 Pennsylvania's position as a lumber-producing state started to decline. In that year she dropped to third place in lumber production.

Her subsequent decline as a timber-producing state was rapid, because her forests were being eaten away without any provisions for their future. She has passed from a position of leadership to a place of dependency in the production of a vital product to her citizens. Today the State is twentieth among the states in lumber production; her forests yield but one-fifth of the lumber she consumes; former lumbering centers are deserted; and most of the timber she uses must be brought by rail or water at great cost from distant states and foreign lands. There are now left less than 25,000 acres of original timber within the State, that is, less than one acre for every 360 inhabitants of the Commonwealth.

We are proud of the prosperity that the forests of Pennsylvania brought to her industries and the benefits that have come from them to her people; but we must face the present situation squarely. Our natural resources must be regarded as wealth not merely to be exploited but also to be conserved. The results of forest destruction are evident on every hand. Where once stood matchless miles of the best and most useful timber found in eastern North America, there now remain vast stretches of unproductive waste land. Lands once covered with fine white pine, hemlock, and many other valuable forest trees, are now entirely



Vast stretches of devastated forest land must be made productive.
To permit them to remain idle is an economic crime.

devoid of valuable tree growth. Nature's forest gifts have been used up, burned up, wasted, and destroyed. It is high time to arrest the destructive tendencies and to restore Penn's Woods.

No more important problem confronts the people of Pennsylvania than forest conservation. To exist as a Nation, to prosper as a State, and to live as a citizen, we must have forests. Nothing comes out of the earth or grows upon its surface that surpasses wood in its adaptability to man's needs. We cannot have forests unless we protect and care for them. Forest fires must be kept out of the woods; forests must be used and treated wisely, not destructively; and unproductive waste lands must be made to work. We must produce not only more forest trees but better forest trees; trees that are free from fire scars, from worm holes, and from rot. Forests like human beings may be healthy and strong or sickly and weak. It is our social and economic duty to place our forests in order; to restore them to the production of useful wood; to make them attractive; and to keep them sanitary.

Forests are not only wood producers; from them come other of man's benefits. We need them for the cheer, health, shade, shelter and food they give, and for the wild life they harbor. There is no better place to rest and play than among the trees. Trees live to give, and everybody needs their gifts. They are benefactors alike to townsman and countryman. Treeless lands are as cheerless as creedless lands are hopeless.



There is no better place to play than among the trees.

A start has been made toward the up-building of Penn's Woods. The State now owns 1,126,237 acres of forest land which is being protected and cared for by the Department of Forestry. These State Forests are being made productive for you and those who come after you. Forest protection by the State is extended to private as well as State lands by means of the Department's State-wide Forest Protection organization. The Federal Government, other public agencies, private associations and individuals are cooperating in the protective work. The Department advises timberland owners, upon request, on the proper methods of caring for and cutting their timber. Forest trees are distributed free for planting.

While some progress has been made, it is a bare beginning toward the goal of forest restoration. There must be a large increase in State Forests. Pennsylvania should own and make productive its five million acres of idle forest land good for nothing else than tree production. Pennsylvanians should unite in the determination to prevent forest fires. All timberland owners should protect and care for their timber, learning to harvest the crop without devastating the land. Planting should be done where nature unaided cannot produce the trees. State and citizen must participate in building up the forests.



The best water supplies flow from forested hills.

Forest conservation is forest thrift—the wise use and care of the forest. It meets the needs of today but provides also for tomorrow. The State as the individual must be thrifty to secure lasting prosperity. There must be a forward-looking plan in forest production. Pennsylvania cannot continue as a prosperous, forward-looking State unless she protects the forests she has and restores forests on the vast areas of devastation. She must provide for the present and safeguard the future by fighting forest fires, forest waste, and forest idleness. Her faith in the future demands that provision be made for the timber needs of her future citizens. Each generation must meet its responsibilities to the future. No responsibility rests more clearly upon the present generation than to use thrifly the timber resources available to it and to restore forest production in Pennsylvania.

The conservation of Pennsylvania's forests concerns every Pennsylvanian. Townsman or countryman, old or young, all need the products of the forest and can play some part in the restoration of Penn's Woods.



(Courtesy Pennsylvania Department of Forestry)

A YOUNG FOREST.

A natural seeding of white pine.

THE WATER POWER OF PENNSYLVANIA

George H. Ashley

State Geologist

The Commonwealth of Pennsylvania

The civilizations of today may be gauged by the power they consume. Primitive nations used little or no power except that of man or of animals. As civilization advanced, nations began to use the power of wind or falling water. Later came the use of the steam engine, burning wood, coal or other fuel. Ultimately, we shall have to depend largely on power derived directly from the sun's heat.

At the present time our principal source of power is derived from the burning of coal. In 1919 the United States used about 30 million horsepower, exclusive of water power, of which over 18 million horsepower was derived from coal, and the rest from oil and gas. To obtain this horsepower 400 million tons of coal were used. In contrast with that it is estimated that 55 million tons of coal would have yielded all of the power derived from falling water. Furthermore, it may be noted that in recent expansion in power consumption, only 10% has been in the direction of water power.

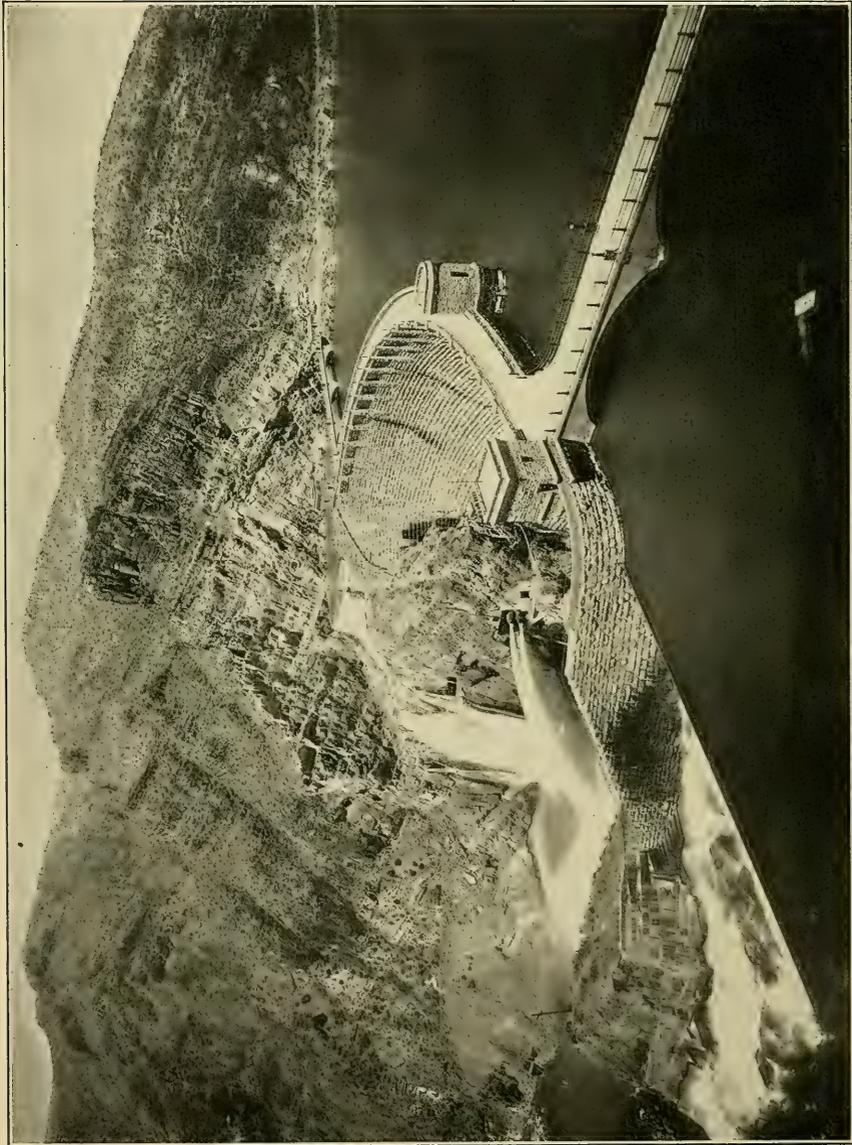
Our knowledge of the water power of the State or nation is as yet very meager. It has been estimated that the developed water power of the country is only one-seventh of that readily available, or one-fourteenth of that available under conditions of maximum storage. It has been estimated that Pennsylvania has a little under 700,000 horsepower readily obtainable, but probably double that amount if all possible storage were to be used. Of this, a total of 173,000 horsepower has been developed. The horsepower developed in Pennsylvania ranges from small mills on creeks, a few of which still use water wheels, to great power plants, such as that on the Susquehanna River at McCalls Ferry. Here are eight water wheels with a total capacity of 118,000 horsepower and eight main generators with a total capacity of 86,000 kilowatts. (A kilowatt is 1.34 horsepower).

In general, Pennsylvania is not a favorable place for the development of water power. There are practically no falls of large volume and the larger streams have cut their channels down until the fall per mile is relatively small. Thus, the Susquehanna has a fall above Columbia of less than 2.5 feet per mile, and in part of the upper waters the fall is less than half that. Below Columbia, the fall is 5.17 feet per mile. It is in that part of the river where water power has been and will be developed. What is true of the main stream is largely true of the tributaries.

In the second place, the valleys of Pennsylvania present few narrow places with rocky cliffs that would allow water power development at a moderate cost. In contrast with the narrow unoccupied canyons of the west, the valleys of Pennsylvania are moderately wide and commonly occupied by railroads and manufacturing towns. Many places, such as the "water gaps," that might serve as sites for water power dams, could be used only at very great expense: for in addition to the cost of the dam there would be the cost of elevating railroads, usually involving the securing of new rights-of-way, and of moving any towns that would be flooded by the waters above the dam.

Conservation of the State's water powers will be along four lines:

1. The utilization of possible power sites for the development of power not now used.
2. The building of storage dams in the upper valleys of the rivers for storage of water during the spring floods, to be let out during low water periods, and thus to equalize the flow.
3. It is now customary to design water power plants so as to utilize only such portion of the power as can be depended upon for eight or nine months of the year, using a "standby" steam plant to help out during the extreme dry season. In this way often more than half of the possible available water power is not utilized. By building a steam plant that will carry



(Courtesy United States Reclamation Service.)

ROOSEVELT DAM, ARIZONA

The Salt River project in Arizona that has made a garden of a desert.

all of the desired load except that to be furnished by the water-power plant during extreme low water, and then building a water plant to utilize all of the power of the stream, except during extreme flood periods, the water power plant becomes the "standby" plant in a sense, the two supplementing each other, so that all the power possible from the stream is obtained. By this method the power derived from any stream may be greatly increased or even multiplied two or three times.

4. Ordinarily, a local water-power plant and its auxiliary steam plant form a separate unit. It has recently been proposed to link together all of the power plants—water and steam—in the eastern part of Pennsylvania and in adjoining areas, into a "superpower system." As a rule, power plants have to meet an uneven load, with a "peak" load during certain hours of the day or during certain seasons of the year, and periods of small demand during other hours or seasons. The "peak" loads will differ for different localities according to the industries served. By combining the available power from a large area the "peak" load at one point may be met from some distant power plant where the peak load comes at a different hour or different season. In this way it is possible not only to avoid the extra equipment to meet extreme peak loads, but emergency equipment as well. Again, by the development of power in large units, vastly greater efficiency is obtained. Thus, a large modern power plant may develop four times as much horsepower from a given weight of coal as a small power plant.

At the present time the largest undeveloped power sites in Pennsylvania appear to be on the upper Delaware River above Easton, on the lower Susquehanna below Ferry, and on the Clarion River.



Dam and Power Plant of Pennsylvania Water and Power Co. McCall's Ferry, Pa.

MINERAL RESOURCES OF PENNSYLVANIA

Fred Crabtree

Dean of School of Mines
Carnegie Institute of Technology

Pennsylvania is a State that is notable for many things, among which may be mentioned its scenic beauty, its fine agricultural development, its educational institutions, its great industries and millions of skilled workers, and, as a basis for its industries, vast mineral resources. The products of its mines and mills are distributed throughout the whole world, serving mankind everywhere and bringing great wealth to the State. To know Pennsylvania, then, and her relations to the rest of the United States, it is necessary to know something of her mineral resources and mineral products.

The early colonists who came to America from England, France, and Holland lived in a very simple way. They worked long hours, and did not, as a rule, travel far from home. Most of them were farmers; nearly all of their simple needs were supplied from the animal and plant life of their own immediate neighborhood, and mineral products were of small account to them, outside of the few iron tools they used. Even with the greatly increased numbers that built the towns and cities of the Revolutionary Period the needs, and methods of living, though more varied, were quite simple, and luxuries so common now were unobtainable because they were the product of, or depended on, mineral industries.

About the time of the Revolutionary War, and during a few succeeding years, certain events took place that led to a complete change in the methods of working and of living of a great portion of the people in both Europe and America—a change vastly greater and more important than the political change brought about by the separation from England. When



(Courtesy Pennsylvania Geological Survey)

Pennsylvania mines one-fourth of the limestone of the Country.



(Courtesy Pennsylvania Geological Survey)

An iron ore mine in the mountains of Pennsylvania.

Henry Cort invented his methods for making wrought iron and rolling it into shaped bars, James Watt perfected his steam engine mechanism, Hargreaves Arkwright and Cromplin their spinning machine, Cartwright his power loom for weaving cloth, Eli Whitney his cotton gin, Robert Fulton his steam boat, and George Stevenson his locomotive, they made possible and started, the modern industries that have given employment and wealth to hundreds of millions of people, have greatly favored the growth of large cities, and have placed within the reach of the ordinary workingman conveniences and luxuries that were beyond the reach of George Washington, and the other wealthy men of his time, or even of the richest and most powerful kings and emperors of other nations of that, or earlier times.

These industries are all based on the use of minerals—on power generated from coal or oil, on machinery made of iron or other metals, and on innumerable ways of utilizing other mineral products in addition to the vegetable and animal products used by our forefathers. Fuel—which usually means coal—is the real basis of our industrial life and progress. Inexperienced men are apt to think of gold and silver mines, or diamond mines and copper mines, as the mineral sources of great wealth; as a matter of fact, these are of vastly less industrial importance and value than coal mines, limestone quarries, clay beds, and iron ore.

Dr. George H. Ashley recently told* in an interesting way of many kinds of minerals that are mined in Pennsylvania. The following excerpt is worth quoting:

“Pennsylvania is rich in that she has both the natural resources and the will to work, in very large measure. It is not that her resources are so much greater than those of her sister states but that the knowledge of her resources through public and private surveys has been coupled with a restless energy, an untiring ambition, and an unconquerable desire for achievement.

*Proceedings of the Engineers Society of Western Pennsylvania, February, 1921.

"This explains why, with less than four per cent of the coal in the country, she annually mines 46 per cent of the country's needs, and in days gone by met two-thirds of the country's need. With no better limestone than many of her neighbors, she annually mines one fourth of the limestone of the country, and produces one fourth of the Portland cement of the country. She mines one seventh of the sand and gravel used, and one third of the glass sand. She makes 60 per cent of all the metallic paint, 84 per cent of all the paint from slate and shale, and quarries more than one tenth of all the stone quarried—and so on, down the list."—

The following figures and information are also taken from Dr. Ashley's address.

Coal, of course, heads the list in order of tonnage and commercial value. Each year more than 200,000,000 tons are mined; and it is estimated that anthracite coal may continue to be mined for one hundred years, while the known supply of bituminous coal would yield 150,000,000 tons a year for about five hundred years.

Petroleum and natural gas, found in the western part of the State, have also been of incalculable value to its industries and its people; but unfortunately only a small supply of each remains.

Limestone is used in enormous quantities, for different purposes. It furnishes the chief part of Portland cement, of which about \$30,000,000 worth is made annually in the State. Limestone is indispensable in the making of pig iron and steel, it is used in road making, as ballast for railroad tracks, in concrete and mortar for foundations and walls, and as lime or pulverized limestone on farms to increase the yield of crops. The burnt lime alone—one fourth to one third of all that is produced in the United States—has a value of \$6,000,000 or more each year.

Clay is another mineral very widely and extensively used. A single year's production of building brick was valued at \$6,500,000, and of fire clay brick at \$24,000,000. Fire-proof tile, terracotta pipe, electrical conduits, and china are among the other clay products that bring the yearly value up to about \$50,000,000. Shale and slate, minerals closely allied chemically and geologically, are also mined in considerable quantities, and for varied uses.

Sandstone, sand, ganister, and quartzite are all forms of silica, varying principally in the degree or manner of cementing the grains together. They are used in building, in iron and steel foundries, and in lining steel-making furnaces, in making glass, and in grinding and polishing plate glass—all very important industries in the State.

Among the other minerals mined in smaller quantities are magnetite iron ore, which also contains a little copper and has been worked for nearly two hundred years; graphite; feldspar, used in making enamelled wares; kaolin, marble, mica, chromite, soapstone, pyrites and talc. Some of these, and a number of others, are produced in very small amounts; one government publication listed 37 minerals as being produced in Pennsylvania during 1916. Salt, nickel, and bromine were formerly produced here, but are now obtained more cheaply in other places.

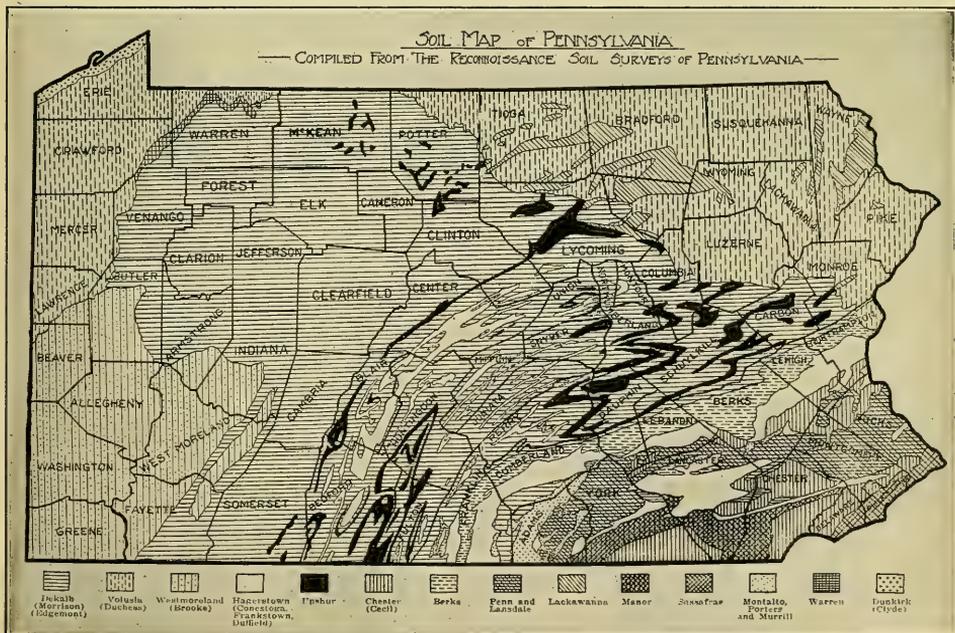
Gold and silver do occur, but in such small amounts as to be unprofitable; and gem stones are occasionally found, but too rarely to justify any mining operation. But these are much less desirable commercially than the less romantic minerals on which our industries and wealth have been based.

THE CONSERVATION OF PENNSYLVANIA SOILS

R. L. Watts

Dean of the College of Agriculture
The Pennsylvania State College

The conservation of our soils is of vital importance to the people of Pennsylvania. We look to the land for all our food and raw materials for manufactured articles, and though our people are well supplied at present, the problem which should concern each one of us is, will the land produce adequately for the increased millions of people who may be living in Pennsylvania 100 years or more from now. We have no right to abuse or neglect the land when the welfare of all future generations is dependent upon its careful and intelligent management. Lands may waste and become practically useless, as have millions of acres in China, and we must avoid any such calamity in the great Keystone State. It is well for us to remember that the earth is God created. A prominent educator has written a book* on "The Holy Earth."



Soil map showing the different soils found in the State.

*L. H. Bailey: The Holy Earth.

Pennsylvania is a large state of 28,821,120 acres of land. Of this great area, however, only 61% is in farm land. This leaves 11,000,000 acres that are mountainous, stony or hilly and are not satisfactory for farming purposes.

Forty-seven different kinds of soil have been found and mapped in the State. These different soils are divided into what is called soil series and are named for some town or natural feature near which they were first found. As an example, Westmoreland, Warren and Montalto soils take their names from the location in which they were first found. This soil series is again divided into soil types. The term type is used to describe the texture of the soil. As an example, Westmoreland is the name of a soil series and Westmoreland silt loam is a type name. Many of these soils vary from a heavy clay to a sandy loam, so we must have type names to describe the texture of the soils, such as clay, clay loam, sandy loam, etc.

Seventy-four per cent of the soils of the State are known as residual soils, that is, they are found where they were originally formed from the rocks and have not been moved by the action of streams or other agencies. Twenty-two per cent of the soils are glacial, formed and carried by the action of great masses of moving ice sheets which covered northern Pennsyl-



A typical area of DeKalb mountain land where erosion is severe. Such land should be reforested.

vania many centuries ago. The remaining four per cent of the soils is what is known as alluvial and lacustrine. Alluvial soils are those that have been carried and deposited by streams, while lacustrine soils are transported and deposited in the bottom of lakes.

Reference has been made to the millions of acres of waste land in China caused by erosion. When vegetation is burned or removed from the land year after year, the supply of soil organic matter soon becomes practically exhausted and the heavy rains are certain to wash deep gulleys, thus making the land of little value for agricultural purposes. The sound policy of good farmers is to keep the land covered with a growing crop from early spring until late fall, which prevents washing and erosion and also conserves available plant food in the soil.

The proper use of a soil is favorable to its conservation. The growing of big crops under good farming conditions will not reduce the future productiveness of a soil. On the other hand, bad management of land is certain to lower future yields. The depletion of plant food and soil organic matter invariably leads to lighter crops. Almost every community has striking demonstrations of this fact.

The most extensive soil area in the State is known as the DeKalb, formed from sandstone and shale. It is found in twenty-three counties, from Monroe to Butler, on narrow ridges and along ridged valleys. Throughout the DeKalb area, the land is hilly to mountainous and



A view of the Snow Shoe experiment fields on DeKalb soil showing the increased yields of wheat as the result of fertilizer treatment.

is normally not very productive, but responds well to scientific treatment. On the experimental plots of The Pennsylvania State College, it has been found that Dekalb soil of a very low type is capable of high development when properly managed. For example, corn yields have been increased from less than five bushels per acre to fifty-two bushels, and oat yields as high as seventy-two bushels per acre have been obtained on this soil, which constitutes forty-three per cent of the State's area.

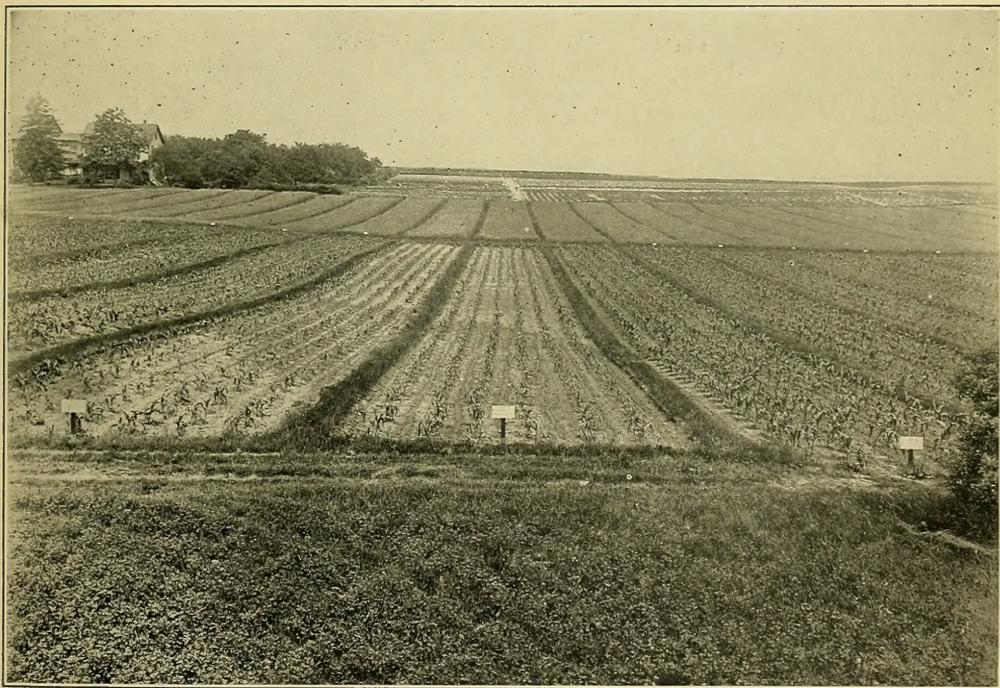
Volusia soil ranks next to Dekalb in area, extending through the northern tier counties and including 19.4 per cent of the state's soil area. On this soil a great dairy industry has developed, famous for its herds of pure bred cattle. The area is occupied by beautiful rounded hills, flanked by steep sided valleys and, in the northwest, rolling plateaus with steep slopes to the streams below. Dotted here and there among the hills may be seen large numbers of creameries, cheese factories, and condenseries, which handle the enormous quantities of dairy products produced in this picturesque country.



Showing the increased yield of pasture grasses on Volusia soil as the result of fertilizer and manure treatment.

The success of the dairy industry is largely dependent upon the summer pastures, and although the land is well adapted to grasses, improper methods of farming have brought about soil depletion until the grass lands no longer furnish sufficient forage and the farmers are forced to supplement the cattle feed with expensive mill products. As a result of continuous cropping without the return of plant food to the soil, the green succulent grasses which once thrived on this soil have been replaced by native weeds. Many of these hillside pastures, robbed of their covering of natural grasses, are exposed to excessive erosion, which, in too many cases, leaves the land in a condition beyond repair.

The soil fertility experiments conducted by our State College Experiment Station on typical areas of this land have demonstrated beyond question that these depleted pastures are capable of quick rejuvenation through the liberal use of lime, manure, and acid phosphate, or lime and mineral fertilizers.



A view of America's oldest soil fertility experiments established at State College on Hagerstown soil in 1351.

Westmoreland soils are found in the extreme southwestern part of the State and include 8.5 per cent of our total soil area. This soil occupies a topography similar to Volusia and comes within the Kentucky blue grass belt. This section of the State was at one time famed for its excellent blue grass pastures, which, however, in recent years have become depleted until at the present time large acres of soil that formerly were used for pasture have been either abandoned or devoted to the growth of inferior hay. Experiments similar to those conducted on the Volusia and Dekalb soils have shown that this soil responds quickly to manurial treatment and is capable of rapid rejuvenation.

The most fertile farm land in the State where agriculture is found highly developed is located on Hagerstown soil of limestone origin. This soil is found only in the limestone valleys and represents 4.3 per cent of the soil area of the State. Throughout these beautiful limestone valleys, stretching in broken areas from Northampton southwest to Bedford, are found farms that are unequalled in the east. On this soil settled the thrifty Dutch, the people who have made Lancaster County the garden spot of the country.

The oldest soil fertility experiments in America are located on this soil at State College. These famous experiment fields have just completed their fortieth consecutive year and have become the source of information which has played a large part in the upbuilding and maintenance of soil fertility on this, the State's most noted soil area.

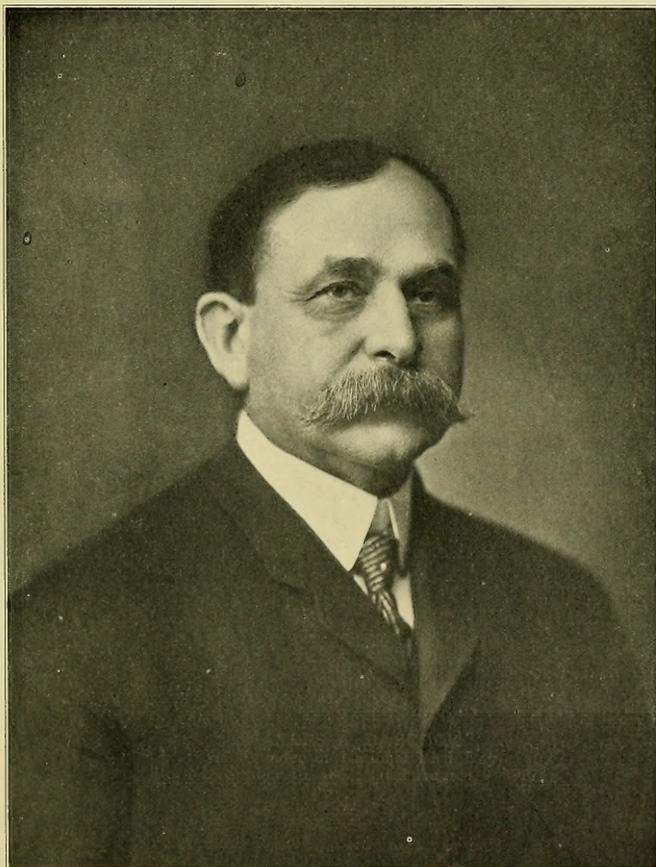
The heavy annual drain on the fertility of our soils through the loss of plant food removed in crops may be illustrated by the following significant facts: To replace the nitrogen, phosphorus, and potash removed by the annual crop of wheat grain grown on 1,424,951 acres of the soils of our State would require an annual application of the equivalent of 100,000 tons of nitrate of soda or 3,000,000 tons of manure, 49,031 tons of acid phosphate, and 7,174 tons of muriate of potash. To return to the land of the State the plant food annually sold from the farms in the milk supply would require in round numbers the application of the equivalent of 42,000 tons of nitrate soda, 14,000 tons of acid phosphate, and 3,500 tons of muriate of potash. In other words, these two farm products remove annually from the farms of the State 47,000,000 pounds of nitrogen, 7,000,000 pounds of phosphorus, and 9,000,000 pounds of potassium.

Such heavy drains on the soil, however fertile, will lead to the depletion of the land unless ample provisions are made to replace the plant food thus removed. It is much more economical to keep up the fertility of the soil by the frequent addition of plant food in whatever form applied than to allow the land to become depleted and be compelled to resort to heroic measures in an attempt to restore to the land its original crop producing power.

Pennsylvania has been peculiarly blessed by Nature in the provision of her many fertile soils stretching across the great Commonwealth and affording an opportunity for almost any phase of agricultural practice. "To use the soil and not abuse it" should be the motto of every farmer. Successful farming is the joint work of theory and practice and there should be no conflict between the two. The Agricultural Experiment Station, the chosen guardian of the soil, has pledged itself to continue unabated all lines of research that may lead eventually to the complete rejuvenation of the soils of the State through the adoption of more scientific practice.

CHARLES A. BABCOCK

Charles A. Babcock, the originator of the idea of National Bird Day, died at his home in Oil City, Pennsylvania, August 9, 1922. Mr. Babcock gave to the world a record of unusual service. He was born at Petersburg, New York, December 16, 1847. He was graduated from Hamilton College, and later taught for nine years in the Normal School at Fredonia. His education in the classics was supplemented with training in chemistry and in law and he practised in the courts of New York State as a chemical expert prior to beginning his educational work. After a time he decided to give his attention to public school work and was elected Superintendent of Schools in Oil City, Pennsylvania, which position he held from 1883 to 1908.



CHARLES A. BABCOCK
The Founder of National Bird Day
Born December 16, 1847; Died August 9, 1922



SOME SUGGESTIONS FOR OBSERVING ARBOR DAY AND BIRD DAY.

This number of the Arbor Day Manual emphasizes in every article the conservation of natural resources, those gifts we have enjoyed in such abundance in past years, but which we now realize cannot last forever unless we use them most carefully.

The statutes provide in Section 4001 of the School Code, "That those days set apart by the Governor as Arbor Days shall also be known as 'Bird Days' in Pennsylvania and it shall be the duty of every teacher in the public schools * * * * to devote, together with the pupils, at least two hours of such school day to the study of wild birds * * * *, and the best methods through which the conservation and increase of useful birds may be secured; and it shall be the duty of all school superintendents within this Commonwealth, either county, city or otherwise, to see to it that the requirements of this act are complied with."

Let us make this the banner year by observing Arbor Day, Bird Day, and Roosevelt Day in one hundred percent of the schools in Pennsylvania, October 27th. Superintendents and supervising principals may render a helpful service at this time by cooperating with classroom teachers in planning suitable programs.

A few suggestions are submitted for the guidance of teachers in preparing for the observance of this day:

A. Preliminary Suggestions.

1. Consult again pages fifty-four to fifty-eight of the Arbor Day Manual of April 14, 1922, and pages twenty-one to twenty-three of the Arbor Day Manual of October 28, 1921, for numerous helpful suggestions on exhibits, reports by children, poems, plays, and music.
2. In honoring the memory of Theodore Roosevelt refer again to the Arbor Day Manual of October 27, 1920, using it as source of information for talks and readings.
3. Use the various articles in the present manual as the basis of talks and readings by the pupils. Let them discuss and become acquainted with these articles before presentation in the formal program.
4. In honoring the memory of Charles A. Babcock, refer again to the Arbor Day manual of April 14, 1922, page eleven, for a story of "The Origin of National Bird Day."
5. As a means of giving permanent effect to the lessons of Bird Day, form a Junior Audubon Club in your school. The following by-laws are suggested by the Audubon Society:

Article I. This organization shall be known as the "_____ Junior Audubon Club".

Article II. The object of its members shall be to learn all they can about wild birds, and to try to save any from being wantonly killed.

Article III. The officers shall consist of a President, a Secretary, and a Treasurer.

Article IV. The annual fees of the club shall be ten cents for each member; and the money shall be sent to the National Association of Audubon Societies in exchange for educational leaflets and Audubon buttons.

Article V. The Junior Audubon Club shall have at least one meeting every month.

Write to Mr. T. Gilbert Pierson, President of the National Association of Audubon Societies, 974 Broadway, New York City, for information as to club activities.

6. Save this manual. It should be retained as the permanent property of the school for use in future years.