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Forest Leaves

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The Pennsylvania Forestry Association,

FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, Two dollars.
Life membership, Twenty-five dollars.

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 1012 Walnut Street, Phila.

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County Organization, Samuel Marshall, Chairman; Eugene Ellicott, James C. Haydon, Dr. J. Newton Hunsberger, and Richard Wood.

OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIALS.

THE month of January, 1907, will be remembered by many who suffered from or witnessed the ravages of freshet conditions on the Ohio River and its tributaries.

In Pennsylvania the Allegheny River and the Monongahela River attracted general attention on account of the high stages, and in the former stream part of a settlement was carried away, because of the construction of a regulating dam by the United States government.

It would be impossible to say to what extent the flood damages would have been lessened by a more liberal proportion of forest cover, but it is certain that some amelioration would have resulted. Sudden variations in temperature followed each other, rain succeeded snow, and the run-off was phenomenally rapid, but this run-off was undoubtedly accelerated by a relatively small proportion of the drainage basin being covered by forests. During weather conditions similar to those described the forest floor holds much of the moisture which would otherwise be carried off, and the protection given by the evergreen trees, and also by the multitudinous trunks, branches and twigs of deciduous trees deters the melting of snow and lessens the freshet volume.

A series of weather conditions, such as prevailed during January, would cause heavy discharges in all streams, and there would have been freshets in the larger ones, but the severity of these freshets would be mitigated if a liberal proportion of the water-shed was maintained in forests. The records of the late freshet is another evidence of the interest which all residing on a stream should have in the protection which would follow the maintenance of a large wooded area on its water-shed, for as this is written the high water is passing out of the Ohio into the Mississippi River, concerning which prophecies of injury and damage there are made in the daily press.

J. B.

THE epidemic of typhoid fever, reported as prevailing in Scranton, suggested to some editors the importance of policing the water-sheds, and this is surely worthy of careful consideration. The policy of the Pennsylvania State Forestry Reservation Commission is to educate men to give proper oversight to the forest reserves, and such inspection would not be confined to watching for fires, studying the best methods of obtaining value from the tree growth, inspecting the young trees which have been set out, or removing those which are dead, but the patrolling of forested areas would result in the removal or prevention of much that is objectionable and go far towards maintaining the water sheds within the forest reserves free from contamination.

The purification of water supplies by filtration methods has lately attracted wide-spread attention and some enthusiasts claim superiority for water filtered from a foul source, to that obtained from a protected natural drainage. We are conversant with the results obtained by the various filtration methods, and while recognizing their value we also appreciate the cost of maintaining filters, and the uncertain human factor which necessarily enters into their operation. The money expended each year in filtering a given amount of water would pay liberally for close patrolling of areas to supply the same quantity, and the risk due to imperfect inspection or patrol, is no greater than that which may be anticipated in bacterial determinations, which become, perforce a mere matter of routine. Further, artificial filtration is practically copying natural filtration, such as the forest floor and pervious strata below produce.

We believe in a thorough patrol of our forest reserves. If they are worth securing, they are worth protecting, and they should not be left to grow without specific care or method of administration, but should be made productive by thinning so as to secure development of the better growth, by planting to replenish the forest cover, and by provisions to keep fire from the reserves and limit the damage done thereby.

It is, however, our belief that the forest reserves will be of equal value to the State in connection with its water supplies, decreasing their freshet discharges, increasing the minimum flows, and providing a source of potable water from well protected forest covered areas. J. B.

* * * * *

OUR readers will be interested in the text of legislation approved by the Forestry Reservation Commission which has been submitted to the General Assembly of Pennsylvania now in session. They are worthy of careful consideration, and of such support as each reader can give.

No. 1 and No. 2 are intended to encourage individual owners to protect forest growth by making all wooded lands which are properly cared for auxiliary forest reserves, removing the incentive to clear land because of the burden of heavy taxation, and yet have the tracts when cleared bear a proper share of the assessment.

No. 3 is an effort to improve existing laws concerning forest fires, placing definitely the burden of combating these destructive conflagrations upon certain officials.

Each of these proposed laws are advanced steps in the interest of progressive forestry in Pennsylvania. J. B.

Proposed Pennsylvania Forestry Legislation.

AS by the decision of the Pennsylvania courts former laws partially relieving from taxation lands which were being reforested are declared unconstitutional, and a suit has also been brought to test the constitutionality of the law making constables ex-officio fire wardens, new acts have been carefully prepared and introduced into the Legislature in the endeavor to provide suitable laws.

We hope that these acts, which are given below, will receive the support of our members, and that they will use their influence to secure their enactment.

No. 1.—An Act to define and establish auxiliary forest reserves.

SECTION 1. Be it enacted, etc., That in order to encourage the growing of such trees as will at the proper age be suitable for merchantable timber and sawed lumber, whether such be of natural reproduction, or from seed sown, or trees planted out, or all combined, all surface lands not suitable for agriculture which may be set apart according to the provisions of this Act and exclusively used for growing such trees, are hereby constituted a separate and distinct class of lands to be known as Auxiliary Forest Reserves.

SECTION 2. When any owner of surface land upon which trees suitable for merchantable timber or sawed lumber shall be growing, and which if cleared would not be suitable for agricultural purposes, shall desire and elect to have such land placed in the class established by section one of this Act, such owner shall notify the Commissioner of Forestry of his desire in manner and form to be prescribed by said Commissioner. Said notice shall contain a description of the land, its location, boundary, and character, and state as far as practicable the species, number and size of trees per acre, and also their condition, and whether they are of natural reproduction or are from seed sown for the purpose, or have been set out on said land, and such other information as the Commissioner of Forestry may require. If, upon receipt and consideration of this notice, the Commissioner of Forestry may deem the conditions such as to warrant action on his part to determine whether such land should rightfully be placed in the class established by section one of this Act, he shall cause the same to be examined by some person learned in the principles and practice of forestry and a report made to him thereon; and if upon receipt and consideration of such report, he shall conclude that such land should be placed in the class established by section one of this Act, he shall so declare and certify to the commissioners of the county in which said land is located.

SECTION 3. Upon the receipt by the county commissioners of such certificate of the Commissioner of Forestry, it shall be their duty at once to place said surface land in the class established by section one of this Act, and keep the same therein until the trees growing thereon shall become sufficiently large and suitable for merchantable timber and sawed lumber, or the land shall be devoted to other purposes; provided, however, that the certificate of the Commissioner of Forestry shall not become operative to place said surface land in the class established by section one of this Act until the owner of said surface land shall have agreed in writing with the county commissioners to care for and treat the trees growing thereon according to the instructions and directions of the Commissioner of Forestry, and until such trees shall become suitable for merchantable timber and sawed lumber; and if any such owner shall at any time fail to care for and treat the trees growing on said land as agreed with the county commissioners, and due proof thereof shall be made to the Commissioner of Forestry, the county commissioners shall, after receiving a notice to this effect from the Commissioner of Forestry, remove said surface land from the class established by section one of this Act.

SECTION 4. Whenever the trees growing on said surface land shall become suitable for merchantable timber and sawed lumber and the owner thereof shall desire to cut and market the same, he shall give to the Commissioner of Forestry at least three months' notice prior to the time when it is his desire to begin such cutting and marketing. The Commissioner of Forestry shall then make an examination of said lands and designate for the owner the kind and number of trees most suitable to be cut for the purposes for which the owner desires to place the same upon the market, if in the judgment of the Commissioner of Forestry there be any such, and the cutting and removal of said trees so designated shall be in accordance with the instructions of the Commissioner of Forestry.

SECTION 5 If the owner of said surface land shall faithfully carry out the instructions of the Commissioner of Forestry with regard to the removal and marketing of such mature or other trees as may be designated in the instructions of the said Commissioner, and shall immediately replant other trees of valuable species for timber and sawed lumber, or so protect the young growth and stool shoots that the said land may immediately become covered with young forest growth, and shall do so in accordance with the instructions of the Commissioner of Forestry, then such surface land shall remain in said class established by section one of this Act; otherwise, the Commissioner of Forestry shall notify the county commissioners that the said lands are not being maintained in accordance with the written agreement of the owner and the instructions of the Commissioner of Forestry, in which event the county commissioners shall immediately remove said lands from the class established by section one of this Act. All expenses attendant upon the examination of the said surface lands by the Commissioner of Forestry, shall be paid out of moneys appropriated for the maintenance of the Department of Forestry in like manner as all expenses of said Department are now paid.

SECTION 6. Failure, neglect, or refusal on the part of the commissioners of any county to classify surface lands as provided for in section one of this Act, after receiving the written agreement of the owner as provided in section three of this Act, and after receiving due notice so to classify from the Commissioner of Forestry, is hereby declared to be malfeasance in office, and upon conviction thereof any such person so convicted shall incur the penalty provided therefor by existing law, and in addition thereto shall be liable for such damage as may have been sustained by reason of such failure, neglect, or refusal.

SECTION 7. That all acts or parts of acts inconsistent herewith be and the same are hereby repealed.

No. 2.—An Act to provide for the taxation of Auxiliary Forest Reserves.

SECTION 1. Be it enacted etc., That all surface lands which shall hereafter be classified and set apart as Auxiliary Forest Reserves shall be assessed for the purpose of taxation in an amount not in excess of one dollar per acre and shall continue to be so assessed so long as the said lands shall remain within the class designated as auxil-

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iary forest reserves; provided, however, that if said surface lands be underlaid with coal, iron ore, oil, gas, or other valuable minerals, said mineral or minerals may be separately assessed on the same basis as similar minerals in other parts of the same county.

SECTION 2. It shall be the duty of the County Commissioners to furnish each year to the several assessors of the county a statement of the names of the owners and a sufficient description of the tracts which have been classified as auxiliary forest reserves, and the several assessors shall place no greater value per acre upon such surface lands than is provided for in this Act.

SECTION 3. Failure, neglect, or refusal on the part of the assessors or of the commissioners of any county to fix and declare such valuation for the purpose of assessment for taxation as is provided for in this Act, or in any other manner to comply with the provisions of this Act, is hereby declared to be malfeasance in office and upon conviction thereof any such person so convicted shall incur the penalty provided therefor by existing law, and in addition thereto shall be liable for such damage as may have been sustained by reason of such failure, neglect, or refusal.

SECTION 4. This Act shall take effect only beginning with assessments which shall be made for compensation of the said wardens and their assist- the purpose of levying taxes for the fiscal year 1908.

No. 3.—An Act making constables of boroughs and townships, justices of the peace in boroughs and townships, and the employes of the Department of Forestry ex-officio fire wardens for the extinguishment of forest fires, prescribing the duties of such fire wardens and their punishment for failure to perform the same, empowering them to procure the assistance of others in the extinguishment of such fires, and providing for the ants.

SECTION 1. Be it enacted, etc., That all constables of boroughs and townships, justices of the peace in boroughs and townships, and the employees of the Department of Forestry are hereby constituted ex-officio fire wardens, whose duty it shall be when fire is discovered in or approaching forests or wild land, whether the same be owned by individuals, corporations, or by the Commonwealth, immediately to take such measures as are necessary for its extinguishment and who shall have and are hereby given authority to employ such other persons as in their judgment may be necessary to render assistance in the extinguishing of such fires.

SECTION 2. The said fire wardens, with the exception of the employees of the Department of Forestry, shall, while engaged in performing the duties imposed by this Act, receive twenty-five cents per hour, and the persons so employed to assist such wardens shall receive twenty cents per hour as compensation for their services.

SECTION 3. All such fire wardens shall render to the commissioners of the respective counties an itemized statement under oath or affirmation, giving the names of the persons engaged, the number of hours each was employed, and the amount of expense incurred in the extinguishment of each fire, and the commissioners of the said counties upon presentation thereof shall immediately pay to the fire wardens for the use of the persons so entitled the respective amounts in full so ascertained to be due.

SECTION 4. At the end of each calender year after all fire bills shall have been received for the current year and settlements made by the county commissioners, the said commissioners shall furnish under oath or affirmation to the Auditor General of the Commonwealth a written itemized statement of all such payment made; and the said Auditor General, after the same is approved by him, shall draw his warrant upon the State Treasurer in favor of the said county commissioners for one half of the total expense incurred by the said commissioners in manner provided by this Act for the extinguishment of forest fires, which said expense shall be paid by the State Treasurer out of moneys not otherwise appropriated.

SECTION 5. The said ex-officio fire wardens shall not be limited in their jurisdiction as fire wardens to the townships, boroughs, and counties for which they were elected or within which they may reside or are stationed, but shall have power and authority to enter adjacent or other townships, boroughs, or counties, and there to exercise the authority and perform the duties conferred and imposed by this Act.

SECTION 6. Whenever any such fire warden or his assistants shall have rendered service in two or more counties in extinguishing any fire which shall have burned in two or more counties, said warden shall render statements to the commissioners respectively of the counties wherein such service was rendered, setting forth the facts required to be stated by section three of this Act, as accurately as may be, which said amounts so ascertained to be due shall be paid by the respective commissioners in like manner as is provided by section three of this Act.

SECTION 7. Whenever any fire warden by reason of physical disability, unavoidable absence from home, or imperative necessity shall be unable to perform the duties required by this Act, said warden is hereby empowered to appoint a suitable person to act in his stead who shall be paid

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twenty-five cents per hour for his services thus rendered, and who when so appointed shall be charged with all the duties and liabilities of said warden; provided, that in making returns to the county commissioners said returns shall be made by the warden upon report rendered under oath or affirmation by the person so appointed.

SECTION 8. Whenever in the absence of a fire warden a forest or wild land fire shall be extinguished or combatted by persons without first having been employed by said warden, such persons shall receive the compensation provided by this Act; provided, that after a thorough investigation by the fire warden wherein he shall have power and authority to examine persons under oath or affirmation, he shall have ascertained if possible, as a result of his investigation the origin of the fire, the amount of services rendered by such persons, and that such service was necessary for the extinguishment of the fire, and shall certify the facts to the county commissioners in like manner as herein before provided.

SECTION 9. In case of the death of a fire warden before the making of any return to the county commissioners as provided for by this Act, or in case of his total physical disability said return may be made by another warden after first ascertaining the facts, and in making such examination or investigation said other warden is hereby empowered to examine persons under oath or affirmation.

SECTION 10. If any such ex-officio fire warden or other officer shall fail to perform his duty as set forth in section one of this Act or shall wilfully or negligently refuse to perform such duty, or shall render a false or fraudulent statement of services alleged to have been performed under the provisions of this Act, or shall fail or refuse to pay the respective amounts due those who have assisted him in extinguishing fires after said amounts shall have been paid him by the county commissioners, such fire warden or other officer shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined in a sum not exceeding one hundred dollars or undergo imprisonment not exceeding three months, both or either at the discretion of the Court.

Mr. Gifford Pinchot states that the forests of the United States covered an area of 699,500,000 acres, or more than 35 per cent. of the surface of the country. Before so large a part of them was destroyed they were perhaps the richest on the earth, and with proper care are capable of again being so, their power of production being exceedingly good.

Suggested Amendment to Charter of the Pennsylvania Forestry Association.

—

AT the January Council meeting of the Pennsylvania Forestry Association a statement and resolution was presented by Miss Mira L. Dock to the effect that the Pennsylvania Forestry Association amend its charter so that it could hold lands in different sections of the State for park purposes.

This proposition if carried out would change the scope of our organization, which has heretofore been devoted strictly to forestry. If lands as parks were held in trust in various parts of the State it would be necessary for our Association to raise the funds to care for them.

This matter has been referred to the Law Committee for its consideration.

The greater portion of the text of the statement and the resolution in which Miss Dock has admirably presented the attractive side of the proposition is given below, and we would welcome the opinion of members as to its desirability:

Statement.

In Pennsylvania, at present, so far as I can learn, the laws regarding tracts of land held for the use of the general public are of two classes: those relating to the State Forestry Reservations, and those relating to parks and parkways, owned by cities of the first, second and third classes.

There is no State Board at present which possesses authority to hold in trust land which may be either purchased for, or devised to small towns or villages for the purpose of affording recreation, or for the specific purpose of preserving tracts of unusual beauty.

The history of every town or city shows that in early stages of growth there are portions of land used naturally for purposes of recreation, but which in later stages of growth became absorbed, sometimes to again be opened, but at heavy expense.

In order to preserve these natural recreation grounds, there is at present a world-wide movement for the protection of beautiful and historic places, and especially for the preservation of woodlands and river-shores by means of chartered societies, all of which are, I believe, enabled to hold land in trust.

According to the census of 1900 more than half the total population of Pennsylvania (over 6,350,000) live in towns, boroughs or cities with a population of 3,000 and upwards.

Almost without exception the figures given in 1900 are very far below the population at present.

This great increase in the growth of towns has

followed an industrial development without parallel, which is now extending to remote villages, and which it is hoped will continue.

In the majority of instances the rapid growth of towns and cities has been effected without regard to the future health, pleasure or recreation of the large majority of the population, who for many reasons are unable to have the amount of space about their dwellings which would be both wholesome, pleasant, and desirable to have.

There is then but one means available for affording opportunities for fresh air, sunshine, rest, and wholesome recreation, which is absolutely essential to the maintenance of health in any community, viz.: public open spaces, such as river-shores, squares, parks, parkways or play-grounds. *As a rule*, provision for public open spaces is postponed, until the necessity of procuring land for such purposes is forced upon the community.

It also frequently happens that, although public-spirited persons may be ready to purchase or devise land needed for open spaces, yet the fact of there being no central authority or body, empowered to hold such land until the tract, or tracts, can be transferred to properly-constituted bodies authorized to hold, control and manage them, has resulted in the loss of many such tracts to the public and to posterity.

Having learned from correspondence and from personal experience of the desire of many persons in our State that there shall be some central authority with power to hold in trust small tracts of land not adapted for forest reservations, yet of great value to their communities, I beg to present the following resolution:

Whereas, There are in and throughout the Commonwealth of Pennsylvania many tracts of land which would be of great benefit to adjoining communities if maintained as public open spaces, or preserved because of their special beauty,—be it therefore

Resolved, That the Pennsylvania Forestry Association shall so amend its Charter that it may be authorized to accept gifts of land and hold the same in trust until such time as the same may be transferred to a properly-constituted local body of citizens or officials.

Respectfully submitted,

MIRA L. DOCK.

Recognizing the importance of the forest preserves of the State as health resorts for the people, and the increasing appreciation of these, space is given to the text and illustrations of a contribution by Dr. J. T. Rothrock, who is devoting his time and abilities to the establishment of sanatoria in the wooded areas of Pennsylvania.

Annual Meeting of the American Forestry Association.

THE Annual Meeting of the American Forestry Association was held at Washington, January 9th. The opening address was made by the Hon. James Wilson, who was followed by Dr. Edward Everett Hale. The Annual Report of the Association was then presented, showing a large addition to the membership, and increased revenue.

It stated that the largest accomplishment of the year has been the application of conservative forest management in the administration of the National forests, now comprising an area of over 122,000,000 acres exclusive of those in Alaska and Porto Rico.

The receipts from sales of timber during the calendar year aggregated $386,458.86. Prices have a gradual upward tendency, as high as $5.53 per thousand having recently been received. For settlement of timber cut in rights of way, etc., $12,008.72 was received; for trespass, $42,320.29; for grazing, $551,528.49; and for special privileges, $11,868.56. Thus for the first full year under technical forest management the reserves yielded revenues exceeding a million dollars. But far greater than the revenue, secured without injury to the future value of the reserve, is the demonstration that "forest reserve resources are for use of the people and no privileges will be denied unless their exercise materially interferes with reserve interests."

The planting of open places in the reserves—a large task—has been begun in the establishment of six large planting stations, in Nebraska, Colorado, New Mexico, Utah, and southern California, where about five and one-half million seedlings are growing. Two more large stations are projected, and plans have been made for the establishment in the spring under the care of forest rangers, of 100 or more smaller nurseries, to secure stock for local planting. One thousand acres are to be planted to trees on the reserves the coming year.

The report also referred to forestry in the various States, and the work of the different State Forestry Associations.

Mr. Gifford Pinchot, Forester of the U. S. Department of Agriculture, presented a paper on "What the Forest Service Stands For"; Mr. Enos Mills, on "The Forestry Situation in Colorado," while a number of other gentlemen spoke on different subjects.

The following officers were elected for the ensuing year: President, Hon. James Wilson, Secretary of Agriculture; Vice-Presidents, Dr. Edward Everett Hale, F. E. Weyerhaeuser, James W. Pinchot, Dr. B. E. Fernow, John L. Kaul; Treasurer, Otto Luebkert; Board of Directors, Secretary James Wilson, Wm. L. Hall, George P. Whittlesey, James H. Cutler, Rutherford P. Hayes, Prof. Henry S. Graves, F. H. Newell, Mr. Gifford Pinchot, N. J. Bachelder, Albert Shaw, W. W. Finley, George K. Smith, Wm. S. Harvey, H. A. Pressey, and George Foster Peabody.

New Jersey's Forestry Reservations.

GOVERNOR Edward C. Stokes, of New Jersey, is much interested in forestry and during his term of office the State has acquired forest reserves. In his message he says:

The work of the State Forest Park Reservation continues conservatively, but progressively. The entire forest holdings of the State at the present time make a total of 2,772.59 acres. These have cost the State $10,927.00, and are located both in Southern and Northern New Jersey. Appropriations have not been sufficiently large to warrant extensive purchases. It is perhaps wise that public sentiment in behalf of this movement should outrun the appropriations rather than that large expenditures should invite thoughtless criticism and jeopardize such an important public work.

The woodlands of our State will become one of its great assets, and will, under scientific cutting, soon begin to return a revenue to the State and eventually show a handsome profit on the investment. They will, moreover, furnish game preserves, pleasure parks, healthful camping grounds and picturesque drives which the people at large may enjoy as their own.

The destruction of our woodlands by fire in the past has resulted in a great loss of property, in the impoverishment of our soil and the drying up of our potable streams. The Legislature last year passed an act authorizing the forest fire service. That act has been in effect since July 4th last. Under it fire wardens have been appointed, and extracts from the law have been posted in the woods and given publicity through the press. While the law has not yet had a severe test, the result has been most gratifying. Numbers of fires have been extinguished before they became dangerous, and no extensive conflagration has been reported. Policing the woods by the fire wardens has undoubtedly been a great preventive. The entire cost of actual fire fighting to November 1st was $5.30, one-half of which was paid by the State.

Further development of our forestry reservations and the protection of our woodlands from fire is commended to legislative support.

Governor Pennypacker on Forestry.

GOVERNOR Samuel W. Pennypacker in his biennial message to the Legislature of Pennsylvania makes the following reference to forestry. It will be interesting to note that the Governor advocates having the railways put out fires along the right of way, legislation on somewhat the lines mentioned at the annual meeting of the Association:—

Up to the beginning of 1903 there had been purchased as a forestry reserve, 333,015 acres of land. Since that time there have been added 370,595 acres. Contracts have been made for the purchase of 105,779 acres, so that at the present time the Commonwealth owns for this purpose 703,610 acres, and the forestry reserves, including the lands under agreement, comprise 809,389 acres. In the main these lands are upon the mountain sides, unfit for agricultural purposes, and they extend through about the centre of the State from the northern to the southern boundary. In the lapse of years, as the trees mature, these lands must necessarily increase in value, but this is a trifling consideration in comparison with their importance in preserving the water supplies and streams. They serve likewise as a protection to the game and the fish, which it has become the policy of the Commonwealth to care for, and as a place of resort for invalids. Ultimate success in forestry depends upon our ability to prevent the destruction caused by fires. In my message of 1905 I made two recommendations upon this subject, the first that the railroad corporations of the State and those having railroad lines passing through it be required, under fixed penalty and the payment of resultant damages, to put out all fires within 100 feet of their tracks except within municipalities, and the second that all persons and corporations who may hereafter for any reason fell forest timber be required to remove from the woods when they take away the lumber the slashings, light material and all other parts of the trees, and that sufficient penalty be imposed upon failure to comply. I now renew these suggestions.

During the past two years the lumber interests of Maine have established six lookout stations on high mountains in the Moosehead Lake region, from which, during the danger season, the first appearance of a fire is quickly detected. It is hoped to extend the stations to strategic points throughout the State. The damage during the past year is estimated at $20,919. Considering that the woodland of Maine embraces 20,000 square miles, this is a good showing for the expenditure of the State appropriation of $10,000 for the suppression of fires.

"Consumptive Camps" and State Forestry.

CARE of the consumptives has, by precedent, become the established policy of Pennsylvania. It is creditable to the humanity of the State that it should be so. It is wise on the part of the Commonwealth to lend its powerful assistance in stamping out the White Plague which annually destroys more of its citizens than all other contagious diseases combined, for, without such aid other efforts would be unavailing.

With a singular unanimity the leading political parties have pledged themselves to a furtherance of the policy.

"It costs money" to pursue such a policy. Already the charities of the State receive almost as much money as is expended upon the common schools, and the demand, properly enough, is for still larger appropriations. The country is now in a period of remarkable financial prosperity, and the State can well afford to be liberal to its citizens, because they are the source of its thrift, and whatever diminishes the health, strength, or working efficiency of the people, by just so much diminishes the income of the State government.

Probably not more than one-third of our tuberculous citizens who should receive State aid, are obtaining it. To care for all, in well equipped, permanently built sanatoria, is beyond the resources of the treasury. This fact is so clear that it may as well be accepted without dispute. And yet such institutions are doing a work which is of vast importance and which cannot safely be left undone. Witness for example, the splendid results at White Haven under the management of Dr. Flick. No appropriation which the State can make will enable such an institution to receive all who should be received. The waiting list will always be ahead of the receiving capacity. Meanwhile what is to be done for those who are, when they apply for admission, in a curable condition, but who pass into the incurable class before their turn for admission comes? Every sanitarian of experience knows of scores of such cases. "Whether you cure these indigent sufferers, or whether you support them in hospitals, or county homes and finally lay them to rest in a plain coffin, you must and do ultimately bear the expense. It is cheaper to cure them and restore them to the ranks of productive citizenship than it is to board and bury them." If any are cared for, all should be. It is not just to discriminate.

It appears, then, that there is something required to supplement the great work which is being done by well established sanatoria! Fortunately Pennsylvania is in a position to do this.

Years ago it was shown by Dr. Hinsdale that there existed a "health region" in this State in which the proportion of deaths from tuberculosis is smaller than in the Adirondack region of New York. Almost the whole of our forestry reservations lie within this region. This land belongs to the people by the divine right of purchase, for they have paid for every acre of it. There is, therefore, no reason why they should not receive every benefit from it which will not conflict with the purpose for which it was set apart. To say that they would abuse the privilege is to acknowledge that the State has not properly educated the law-abiding portion of our population, or to admit that we are powerless to control the law breakers; and no properly constructed Pennsylvanian will rest under either allegation.

Restrain the citizens from access to the State lands and they will have no more interest in them than the law requires. Open them to the people and they will love them, because thousands will spend the happiest days of their lives in the mountain gorges, or by the swift-flowing streams, where they have gone to find the health and recreation which will give them new strength for the duties of life.

The institution known as South Mountain Camp Sanatorium was started in 1902 with one cabin, which was nine feet square. In less than one year it grew to ten cabins, before receiving any State aid. We furnished the inmates nothing but the cabin. They found food and prepared it. It soon came to be known as White Pine Camp, because it was located on the edge of a beautiful grove of pine trees. The results of simply turning the sufferer from incipient tuberculosis out to shift for himself were gratifying beyond our expectation. The reputation of the place spread until now with a capacity of thirty-three patients, our waiting list is always longer than the list of those actually in Camp.

It is true that since August, 1905, we have opened a dining room and feed our patients, at the South Mountain Camp Sanatorium, and it is safe to say that in from seventy to seventy-five per cent. of the cases, the disease may be fairly called arrested. But this does not invalidate the statement that wonderful results were obtained by simply providing a shelter for our people. The original cabins were built from second-hand lumber and cost on the average less than fifty dollars each. They were regarded merely as shelters from the storm. And it was intended that the very unattractiveness of the place should drive the inmates into the open air, except during inclement weather. Yet in spite of this, delicate men wintered safely and comfortably in them, sleeping

"DOING CURE" IN WINTER, ON PORCH OF ASSEMBLY BUILDING.

MILK AND EGGS. 10 A. M.

THESE CABINS COST SIXTY DOLLARS TO BUILD.

INTERIOR OF CABIN FOR TWO, COST ONE HUNDRED DOLLARS TO BUILD.

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INTENTIONAL SECOND EXPOSURE

every night with windows wide open and in at least sixty-five per cent. of the inmates the disease was arrested.

It is too late to say that this inexpensive method is too primitive, and that is beneath the dignity of the State. The Camp idea has passed from the list of experiments into an astounding success, which no honest, competent observer can fail to recognize.

These facts are beyond dispute, and being so, the question arises: Can the State afford to cast the idea aside without further trial? The cost is small and the locations are available. I would, therefore, suggest that at least two other Camps be opened on the State forest reservations under the direction of the Commissioner of Health and the Commissioner of Forestry, and that a medical officer, and a superintendent, to act under the physician, be appointed for each Camp. Such places will serve at least to receive those who are waiting their turn for admission to fully equipped sanatoria. The plan is so reasonable that it is hard to see how it can be rejected.

The illustrations make sufficiently clear the general character of the buildings and modes of life at the South Mountain Camp Sanatorium.

It remains for us to present some opinions concerning the Camp idea, of those whose experience entitles them to a respectful consideration:

"The Camp has simply done wonders." See "Outlines of Practical Sanitation," Bashore; page 128.

"Pennsylvania has an object lesson worth studying in the colony at Mont Alto. In shacks and inexpensive cottages the colonists get the maximum benefit of sanitation treatment at small expense."—N. Y. *Evening Globe.*

"New York, November 28th, 1906.

"The idea is a splendid one.

"Sincerely,

"Paul U. Kellogg,

"Secretary Publication Committee, Charities and the Commons."

"The Agnes Memorial Sanatorium,
Denver, Colo., Oct. 15th, 1906.

Dear Dr. Rothrock:—

"The work in this connection [consumptive camps] is of unusual interest and opens up a wide field, which had never occurred to me before. You are to be congratulated upon this special line of work, and I trust it will be possible for me to visit one of these Camps during one of my Eastern trips. I trust you will meet with the success you deserve.

"Believe me, with kind regards,

"Very cordially yours,

"G. W. Holden, Medical Director."

"And this little colony [at Mont Alto] is composed exclusively of consumptives. It is probably the most cheaply founded and at the same time the best natural sanatorium in the world."—Correspondent of Philadelphia *Record*, October 14th, 1906.

"I am convinced that the only practical solution of the tuberculosis problem lies at South Mountain, and that you have discovered the one feasible method of stamping out the disease."—Francis DeWitt, in letter October 26th, 1906.

In a large percentage of tuberculosis patients, cure, after the disease is arrested, is the work of years. There is a constant tendency to a return of the malady unless this is outgrown by a long-continued life under proper conditions in the open air. It is a serious problem what to do with such cases. And this leads naturally to what follows.

There are not many, even among those who for years have been friends of the forestry movement, who have fully realized the urgency of the forest reservation work. Unless our naked, rocky hillsides are speedily covered with trees, the only crop which they will produce, the most serious injury is sure to come to the Commonwealth. No intelligent man doubts that to-day. There is no alternative left us. We must clothe these poor ridges and mountains with timber, or our children will suffer the consequences of our misuse of the resources of the State. Certainly not less than a million of trees should be planted annually. This would be a mere drop in the bucket, and would not suffice to head off the ravages which floods are working upon the surface of the State. It is quite within limits to say that it would be a wise policy, and money well expended, if the State were to plant ten millions of trees every year. Before this could be done the seedlings must be grown. To do this would require a large force of men. There is no work better suited to such convalescent consumptives, as I have described, than raising seedling forest trees. It is light, in the open air and in contact with the soil, and it would remove these patients from where they might infect other people, if the nurseries were located on a State forest reservation.

It would be a great help to the forestry work

and a great boon to the convalescent consumptive if he were offered the chance to do light work in a forest nursery until well, for his board and lodging. Taking all of the forest reservations of the State, it is safe to say that suitable work could be found for a thousand such people and that the State would be the gainer if the work were commenced.

Up to this time the South Mountain Camp Sanatorium has received by State appropriation $23,000 which has been expended in buildings and in maintenance. In addition to this up to January 1, 1907 the Sanatorium has received money contributions from our citizens which aggregate $2,544.77. Most of the money thus received from private sources has been from the women of the State; and by far the largest portion came through the Federated Women's Clubs of Pennsylvania.

The consumptive camp plan has proved to be an amazing suecess. It has attracted the attention of thoughtful people in our own and in other States. To fail to enlarge its sphere of usefulness would be little short of a crime against the community. Let it be pushed to the utmost limit, until something in its place has been proposed, tried and found to yield better results.

J. T. ROTHROCK.

Value of Roads from the Standpoint of Forestry.

ROADS in forestry will, of course, include steam, electric and gravity railways, tramways, water-courses, wagon-roads and trails, but we are interested at present only in the latter, namely, wagon-roads and trails. Wagon-roads are the safest in forestry, because less damage is done in transportation, in sinkage, etc.

From the standpoint of the State, independently of its position as a forest owner, roads are valuable by bringing increased civilization into forest districts where the most backward, and sometimes the most lawless, people are usually found. Land values are increased and consequently add to the prosperity of the community as a whole. The opening of forest areas for the sake of sport, health and contentment of its people is also worthy of the State's consideration.

But we are more interested in the value of good roads from the standpoint of a forest owner, whether he be a State or an individual. Forestry means such an investment in a piece of forest as will yield the utmost percentage in return; consequently, the amount of money spent for any purpose in forestry is determined by the return which is obtained therefrom. Further, everyone who invests money looks to the future, and especially so in forestry; therefore, the idea of permanency in the matter of improvements must be considered. It is possible, of course, to build roads which may be called good roads, which serve their purpose admirably and are gone in a short time. Such, for example, are the ice-roads made in the northern woods. Where such possibilities exist it is policy to use them, but in our State such conditions are rarely met, consequently, in the idea of good roads in connection with forest management must be included that of permanency, for various reasons.

It has been said that forestry without roads is an impossibility. Historically it can be shown in many instances that foresty began to be developed at that day when roads were developed, and that its profits increased as the roads extended and were improved in condition. "The little city of Goslar, in the Harz Mountains, owns a spruce forest of 7000 acres, which, by careful management, permits an annual cut of 300,000 cubic feet of wood and pays a net revenue of $25,000 per annum. Within a few years the city has macadamized the leading roads through the forest, and a very careful system of accounts shows the following results: Full load on old road, 85 to 100 cu. ft.; full load on new road, 175 to 250 cu. ft.; average cost of hauling per 1000 ft., B. M., old road, $2.70; average cost of hauling per 1000 ft., B. M., new road, $1.70; saving per 1000 ft., B. M., $1.00; cost of improvement $25,000; profit per annum, 10 per cent." (Fernow to Roy Stone, Bureau of Road Inquiry Circular 14).

James Brown in the *Forester* says: "There is nothing that facilitates forest operations so much as judiciously laid-out roads. We have so frequently seen the very great loss sustained by proprietors from the want of roads in their plantations, that we have to condemn in the strongest terms the extremely narrow policy of planting any enclosure of considerable extent without laying out, and that in a proper and judicious way, roads in it. The necessity of roads in a plantation is not, of course, felt at first when it is planted." But what he says refers to the fact that if plantations are made, and no roads provided for, they are not usually provided at the time they are most needed. This is most frequently the case. He speaks further: "In caring for Lord Seafield's woodlands at the beginning of management, few or no roads in any of his extensive forests were found, and in consequence of this no timber merchant of any standing would come into the country to make a purchase. Our very first work, therefore, was to have roads made so as to completely open up the forests from all points, and since this important work has been accomplished there has been no difficulty in getting purchasers of the most respectable class to come into the country and settle in it so as to do a large business. Where roads are not present at least 25 per cent. of the value of the produce is lost."

Owing to the fact that forest products are usually bulky, that there is usually a great amount of waste in its manufacture, and that these products are found at great distances from markets, the question of transportation enters largely into the financial calculation, and it not infrequently happens that the difference between cost of production and market price is more than taken up by the cost of transportation. Indeed, there are many products which may not be removed and marketed at a profit because of high cost of transportation. Individuals cannot easily change market prices nor labor prices for production, but they may by an additional investment reduce cost of transportation to a minimum, and thus make a profit on operations which beforehand were impossible.

The possibility of reduced cost of transportation shows itself first in price of stumpage, and this applies to all manner of products. Woods which were formerly of value sell now at a value higher by an amount which represents the decrease in the cost of transportation. The trees of such species can be used farther into the tops. New species, not formerly considered, may now be placed upon the market. Certain silvicultural operations for the improvement of the forest may be done at an immediate profit by getting rid of small material which commands at best a small price. In times of fire or other accidents to trees they may be utilized before they get to such a condition in which they cannot be used. Altogether a more intensive management is possible, which not only brings in present profits but which reacts in increased productiveness for the future. Productiveness determines land value; consequently, as a whole, the investment shows an increased value as an asset.

A permanent and complete net-work of roads would make possible the use of that silvicultural method which is most profitable for any given locality. It would insure the possibility of marketing each tree when it became financially mature. It would also make possible the taking advantage of any sudden, or rather unusual, fluctuations of the market.

Further, to a forest a net-work of roads yields a fair rate of interest on the investment by reason of the protection from fire which is effected by means of it. Directly it tends to limit fires to small areas, even the smaller roads and trails helping considerably in this. It makes even the most distant hill or valley quickly accessible to a body of fighters in time of fire, and the clean surfaces of the roads offer the best of positions from which to back-fire.

In forest regions where proper forest surveys have not yet been made roads and trails aid materially in the actual work of the survey and reduce the cost of survey. In certain sections it may be a wise policy to have roads so built as to serve as boundary lines to the reserve. The attraction which a forest traversed by roads offers to sportsmen and visitors is not infrequently of direct remunerative profit to the owner, and the opening up of desirable mountain homes is certainly not to be overlooked.

Again, from the consideration of labor, a necessity at all times, roads make possible the inducement to have laborers live within the confines of the forest without any additional cost or inconvenience in having their wants supplied. Farms may be opened, etc.

An example showing the increased value of land resulting from the building of roads is given by Dr. C. A. Schenck, taken from conditions in North Carolina. Mr. Vanderbilt owned Pisgah forest, which represented an investment as follows:

Land,	$225,000
Fees,	25,000
Protection,	15,000
Total,	$265,000

Without roads, as it was when obtained, the investment yielded no revenue. By increasing the investment $35,000 for roads, making it total $300,000, a return of $16,000 per year was obtainable, or 4 at per cent. the investment would then be worth $400,000.

GEORGE H. WIRT,
State Forester.

The Premier of New Brunswick, Canada, has sent a cordial invitation to the members of the Pennsylvania Forestry Association to attend a Forestry Convention to be held at Fredericton, New Brunswick, February 20-21st, 1907. At this meeting the following subjects will be discussed: The general need of forest preservation, the attitude of educational institutions towards forestry, dependence of business interests on forests, the lumbermen's interest in the preservation of forests, the development of water power as related to forests, the forest policy of the United States and other countries, and addresses upon subjects relating to forestry protection embodied in the Public Domain Act.

Forest Reserves of the United States.

DURING the year 1906, the forest reservations of the United States were largely increased, until now the grand total of 136 forest reserves in the United States, not including Alaska, is 123,850,161 acres, while the two Alaskan reserves have an acreage of 4,909,880.

Through the courtesy of Mr. Gifford Pinchot, Forester of the U. S. Department of Agriculture, we are able to present below a table showing the acreages of the reserves in the different States and the total for each State.

Area of the National Forest Reserves on February 1, 1907.

Reserve.	Area. Acres.
Arizona.	
Baboquivari,	126,720
Black Mesa,	2,030,240
Chiricahua,	287,520
Grand Canyon,	2,267,300
Huachuca,	314,125
Mount Graham,	118,600
Pinal Mountains,	45,760
Prescott,	423,680
San Francisco Mts.,	1,975,310
Santa Catalina,	155,520
Santa Rita,	387,300
Tonto,	1,115,200
Tumacacori,	203,550
Total,	9,450,825
California.	
Diamond Mountain,	641,137
Klamath,	1,896,313
Lassen Peak,	897,115
Modoc,	288,218
Monterey,	335,195
Pinnacles,	14,108
Plumas,	579,520
San Bernardino,	737,120
San Gabriel,	555,395
San Jacinto,	668,160
San Luis Obispo,	363,350
Santa Barbara,	1,982,100
Shasta,	1,523,770
Sierra,	5,049,934
Stanislaus,	1,296,800
Tahoe,	1,394,772
Trabuco Canyon,	109,920
Trinity,	1,243,042
Warner Mountains,	306,518
Total,	19,882,487
Colorado.	
Battlement Mesa,	797,720
Cochetopa,	1,133,330
Fruita,	7,680
Gunnison,	901,270
Holy Cross,	990,720
La Sal,	29,502
Leadville,	1,219,947
Medicine Bow,	1,155,909
Montezuma,	576,719
Park Range,	757,116
Pikes Peak,	1,681,667
San Isabel,	321,227
San Juan,	1,437,406
Uncompahgre,	478,111
Wet Mountains,	239,621
White River,	970,880
Total,	12,698,825
Idaho.	
Bear River,	415,360
Bitter Root,	3,860,960
Caribou,	733,000
Cassia,	326,160
Coeur d'Alene,	2,331,280
Henrys Lake,	798,720
Kootenai,	165,242
Lemhi,	1,344,800
Payette,	1,460,960
Pocatello,	49,920
Priest River,	812,040
Raft River,	293,044
Salmon River,	1,879,680
Sawtooth,	3,340,160
Weiser,	1,059,520
Yellowstone,	177,960
Total,	19,048,806
Kansas.	
Garden City,	97,280
Total,	97,280
Montana.	
Big Belt,	630,260
Big Hole,	1,612,960
Bitter Root,	691,920
Crazy Mountains,	234,760
Elkhorn,	186,240
Ekalaka,	33,808
Gallatin,	888,660
Helena,	782,160
Hell Gate,	1,582,400
Highwood Mountains,	45,080
Kootenai,	887,360
Lewis and Clark,	4,670,720
Little Belt,	1,062,120
Lolo,	1,211,680
Long Pine,	111,445
Madison,	958,800
Missoula,	194,430
Pryor Mountains,	204,320
Snowy Mountains,	126,080
Yellowstone,	1,226,680
Total,	17,344,883
Nebraska.	
Dismal River,	85,123
Niobrara,	123,779
North Platte,	347,170
Total,	556,072
Nevada.	
Charleston,	149,165
Independence,	135,019
Ruby Mountains,	423,660
Tahoe,	59,115
Total,	766,959
New Mexico.	
Gallinas,	38,212
Gila,	2,823,800
Jemez,	1,460,245
Lincoln,	545,256
Magdalena,	146,240
Manzano,	459,726
Mount Taylor,	110,525
Pecos River,	430,880
Peloncillo,	178,977
Portales,	172,680
San Mateo,	424,663
Taos,	233,209
Total,	7,024,504
Oklahoma.	
Wichita,	60,800
Total,	60,800
Oregon.	
Ashland,	21,120
Blue Mountains,	2,675,620
Bull Run,	142,080
Cascade Range,	5,355,320
Chesnimnus,	220,320
Fremont,	1,235,720
Goose Lake,	630,000
Heppner,	292,176
Maury Mountain,	54,220
Siskiyou,	713,702
Wallowa,	747,200
Wenaha,	413,250
Total,	12,500,728
South Dakota.	
Black Hills,	1,163,160
Cave Hills,	23,360
Short Pine,	19,040
Slim Buttes,	58,160
Total,	1,263,720
Utah.	
Aquarius,	639,000
Bear River,	267,920
Beaver,	261,593
Dixie,	465,920
Fillmore,	399,600
Fish Lake,	288,800
Grantsville,	68,960
La Sal,	128,960
Manti,	777,920
Payson,	167,280
Raft River,	117,203
Salt Lake,	95,440
Sevier,	710,920
Uinta,	2,187,550
Vernon,	68,800
Wasatch,	85,440
Total,	6,731,306
Washington.	
Mount Rainier,	1,943,520
Olympic,	1,466,880
Priest River,	103,960
Washington,	3,952,840
Wenaha,	318,400
Total,	7,785,600
Wyoming.	
Big Horn,	1,551,680
Black Hills,	46,440
Caribou,	7,740
Crow Creek,	56,320
Medicine Bow,	418,759
Sierra Madre,	370,911
Uinta,	4,596
Yellowstone,	6,580,920
Total,	8,637,366
Total of forest reserves in the United States,	123,850,161
Alaska.	
Afognak,	403,640
Alexander Archipelago,	4,506,240
Total,	4,909,880
Porto Rico.	
Luquillo,	65,950
Total,	65,950
Grand total of 139 forest reserves,	128,825,991

In the Hawaiian Islands there are also about 300,000 acres of forest under the administration of the Territorial Government. Approximately half of this is owned by the government, and half is private land placed under the control of the government. It is thought that 100,000 acres now similarly divided as to ownership, will be placed under the same administration.

In the Philippine Islands there is but one formally proclaimed forest reserve, called La Mao, having an area of between 10,000 and 12,000 acres in the Province of Vapoau, near the entrance of Manila Bay, where only such cutting is permitted as will improve forest conditions. There are, however, in these islands nearly 48,000,000 acres of public forest lands, also under administration, where cutting is done under permit, but is not so strictly limited, since some of the land will be permitted to be cleared for agricultural purposes.

The above statement does not include any State forest reserves, in which New York and Pennsylnia lead.

Forest Reserves of Wisconsin.

HON. JAMES O. DAVIDSON, Governor of Wisconsin, calls attention to the growth of the forest reserves in that State, and in his annual message says:

"The small beginning which the State made in scientific foresty in 1903 has grown until the forest reserve now comprises 254,072 acres under the supervision of the State Board of Forestry. The importance of foresty as a preservation of public wealth and a probable source of State revenue cannot be overestimated. No State is more bountifully provided with great rivers and lakes, and geological surveys show that Wisconsin is the greatest water power State in the Union. When it is borne in mind that the forests of the northern part of the State preserve the head waters of these great streams and prevent both drought and

floods, the necessity of a wise forestry policy is at once apparent. The financial returns in those States and countries which have practiced forestry often show an annual income of from $2.50 to $3.90 per acre.

"Under the Swamp Land Grant of 1850, Wisconsin was granted all such lands within the State which were owned by the federal government. In 1854, however, the United States government set aside certain lands for Indian reservations, including therein many thousands of acres which had previously been granted to the State. While admitting that the title appears to rest in the State, the United States Department of Interior holds that the Indians have the possessory right so long as the reservation remains intact, and even goes so far as to contend that this power carries with it the right to the timber for their own use, and to sell it. Under the State forestry law of 1905, all State lands north of Town 33 were set aside as a forest reserve, and therefore, all the disputed land within the Lac du Flambeau, Lac Courte Orielle and La Pointe Indian Reservations, come under the control of the State Board of Forestry. The land which is thus held in dispute amounts to over 47,000 acres, and since a large part of this is still heavily timbered, it is conservatively estimated to be worth over $1,000,000.

"I would recommend that a law be enacted providing that if recompensed by the Federal government the State will relinquish its claim on these lands, and the amount so received from the government shall be used exclusively for forest reserves. In this way the State would have a large sum with which to purchase lands, so as to consolidate its forest reserves and the Indians would receive what in justice should be theirs."

New Publications.

Eleventh Annual Report of the Forestry Commissioner of Minnesota. 1905. 8vo, 142 pages, illustrated. St. Paul, Minn.

The report for 1905 contains summaries of forest and prairie fires, a review of the operation of the law for preventing fires, extracts from reports of fire wardens, sketches of forests that have been investigated, including the Burntside forest; also, as object lessons in forestry, practical accounts of forestry management in sixteen different European countries.

Reports of fire wardens show that the number of acres (mostly cut-over land) burned over by forest fires in this State in 1905 was 102,968; damage, $58,680. Number of acres burned over by prairie fires, 39,449; damage, $7,515. Most fires are caused by clearing land and burning meadows. Persons ought to know better than set fire to these in dry and windy weather. To kindle a fire on or near forest or prairie land and leave it unquenched is punishable by fine not exceeding $100, or imprisonment in jail not exceeding three months. Town supervisors, village presidents and mayors of cities are fire wardens, and are responsible for the enforcement of the law in their districts. If they interest themselves in their duties (and instructions are annually sent them by the Forestry Commissioner), they can be effective in having people exercise care. The majority of fire wardens are attentive to their duties. The State now pays fire wardens and those who help extinguish fires for their services, and collects half the amount from the counties in which the service is rendered.

The Commissioner says: "Considering the great activity in our forest regions in the development of the country in so many ways, I think we have been very fortunate in the comparatively small number of damaging fires that have occurred. Increased care each year appears to be exercised."

While there are about 12,000,000 acres of arable land in Central and Northern Minnesota not yet under cultivation, there are fully 3,000,000 acres in scattered localities of waste, rocky, hilly or sandy land that is only suitable for the production of coniferous forest, and which the State should acquire as an investment and hold perpetually in forest. On an average, only about 20 per cent. of cut-over pine land reforests itself with pine naturally. The greater part requires artificial planting.

Tree-planting can be done only during a few weeks in the spring, and lack of labor prevents its being done on a large scale; consequently, a beginning should be made without further delay. Progress depends on appropriations by the Legislature.

Pennsylvania was one of the best timbered States in the Union, reckoning the crop of three centuries ago as the lumbermen of today would do, it may be said that a yield of 30,000 feet B.M. of hemlock per acre was not uncommon. White pine often greatly exceeded this, and 50,000 feet B.M. was no unusual yield for an acre of good timber of this species. Mixed with the hemlock, the various hardwoods, such as beech, maple and birch aggregated from 2,000 to 3,000 feet additional lumber to the acre.

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CONTENTS.

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The Pennsylvania Forestry Association,

FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, Two dollars.
Life membership, Twenty-five dollars.
Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 1012 Walnut Street, Phila.
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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIALS.

THE substitution of metal for wood in railroad ties has been prophesied for many years and various forms have been experimented with, and renewed attention has been prominently drawn to the subject by the derailment of a fast train. A commission which investigated this accident claimed that the metal tie in use was responsible for the disaster. This we understand is mainly a reflection upon the special design of tie and fastening rather than condemnation of the substitution of metal for wood. However, it is now asserted that the track was probably tampered with by the miscreants who have in other cases put life and property in jeopardy by such villainous procedures.

Officials of prominent railroad companies claim that nothing has yet been in use which will fulfill the function of a railroad tie as well as a white oak sleeper; there being a resilience and a lasting quality which no other commercial wood or substitute therefor seems to possess. In metal ties there are shearing strains which are more pronounced than in wooden ties. Wooden ties serve as a base for the rails and also keep the two rails in alignment better than metal ties, which are affected by expansion and contraction due to changes in temperature.

We believe that in the near future metal ties will be largely used in our railroads, and such occurrences as we have chronicled will go far towards encouraging inventions to meet the deficiencies which have developed.

Recognizing the enormous demand for railroad ties in the United States some important transportation companies have with forethought planted large numbers of trees from which it is expected to obtain ties for the future, and one of the more prominent railroad companies has lately secured a trained forester to look after its tree planting and timber interests. Even with this provision, the scar-

city of available material causes the cost of ties to be greatly advanced, and any substitute which meets the requirements will be welcomed. The steel manufacturing interests also recognize the conditions and appreciate that good wooden ties now closely approximate the cost of metal ties. They see in the metal tie a product which, owing to its duplication, can be produced at low cost, and which will aggregate a large tonnage.

The inroads which are being made on the remaining standing timber raise the market value of anything produced from wood, and as a consequence the use of what would make desirable lumber is considered a sacrifice if converted into railroad ties. With the transportation companies anxious to secure a substitute for wood, and steel manufacturers willing to expend money in the endeavor to produce this substitute, it would seem that in the near future the demand upon the forest areas for this feature of railroad construction may be expected to decrease.

* * * * *

THE Pennsylvania State College has taken a step forward in establishing a regular course in forestry, and has wisely added to its faculty Prof. Bernard E. Fernow, who is recognized by all familiar with the forestry problem as splendidly equipped for this purpose.

FOREST LEAVES congratulates the Trustees of the State College upon their foresight and progressive spirit, and Prof. Fernow upon his association with an institution which recognizes that the forestry problem is of sufficient importance to command the services of one so thoroughly posted as to theory and practice. J. B.

Arbor Day Proclamation.

IN the name and by the authority of the Commonwealth of Pennsylvania. Executive Department. Proclamation. The custom of observing Arbor Day has become well established throughout the State of Pennsylvania. It has stimulated an interest in the planting and care of trees and created public sentiment in favor of the protection and restoration of our forests. The State now owns over eight hundred thousand acres of forest lands. The frequent recurrence of destructive floods, the extension of parks as breathing places for the multitudes in crowded cities, the opening of school grounds to children for purposes of play during vacation, and the dependence of man upon trees for use, for shade and for ornament emphasize the importance of the annual observance of Arbor Day.

For the purpose of perpetuating a custom which has been in vogue for several decades, and which has resulted in untold benefits,

I, Edwin S. Stuart, Governor of the Commonwealth of Pennsylvania, do hereby, in accordance with law, issue this my proclamation, designating Friday, the fifth day of April, and Friday, the nineteenth of April, A. D. 1907, to be observed as Arbor Days throughout the Commonwealth, two days being named in view of differences of climate, so that all sections of the State may find a day suitable for tree planting.

Given under my hand and the Great Seal of the State, at the City of Harrisburg, this twenty-first day of March, in the year of our Lord, one thousand nine hundred and seven, and of the Commonwealth the one hundred and thirty-first.

By the Governor: EDWIN S. STUART.

ROBERT MCAFEE,
Secretary of the Commonwealth.

Inexcusable Destruction of Young Trees.

IF the lumbermen of the past, as well as those of the present day, have been guilty of wastefully cutting down our virgin forests, what shall be said of parties who are now engaged in the wholesale destruction of our so-called second growth trees, a growth varying from 25 to 50 years of age, and which has sprung up in spite of fire and wanton neglect? If the former deserves criticism what does the latter deserve?

One can hardly conceive it possible that men owning young pine, basswood, cherry, cucumber, tulip, hickory, ash, oak, or other valuable species of trees, should allow them to be cut down when they can now yield but little lumber or valuable timber, and when a timber famine is rearing its form immediately in front of us. Yet such is the fact. That kind of work is going on all over our state. No sooner does an oak or chestnut tree become large enough to make a post or a railroad tie, a mine prop or sprag than it is cut when it is so small that only the very butt can be used, and which, if allowed to grow a few years longer, would yield two or three times as much.

But the case is not so bad with these, because the chestnut will always sprout up and the oak quite frequently, as it is with such species as will not sprout, like the pines, cherry and ash. The worst destruction is going on with the young pines. Portable sawmills are being moved from place to place, as are threshing machines, and wherever a grove of pines may be found will be set down and operated until every tree above six inches in diameter is ruthlessly destroyed. There may be seen all along the railroads leading through the former pine timber regions of our state car loads and car loads of lumber cut from these small trees, and many sticks show that the trees were not 25 years old.

Nor is this all. The latest device for the destruction of young pines, cucumber, tulip, hemlock and basswood trees is a small portable mill, run with a gasoline engine. The whole outfit can be carried on two wagons. The trees are cut into logs four feet long and whenever a stick will make a thin board four or more inches wide, such is cut and sold for box boards, and the remainder of the log made into lath—the machine for doing this being a part of the outfit. If the stick shall not be large enough to make a four inch board it is, nevertheless, used for lath. Trees only five inches in diameter are cut for that purpose.

Owners of these small trees are induced to cut and haul them to these little concerns where they get but little more pay than for their labor. The box boards are sold wherever they will bring the most money, some of the glass works of our state receiving a thousand or more feet per day, while the plasterers are glad to get the lath.

Throughout the bituminous coal regions of the state, ash, hickory, oak, cherry and other valuable species of trees may be seen at the pit mouth where they have been brought and sold by farmers for sprags, ties and props. Thousands and thousands of acres are being annually denuded of all valuable trees for this purpose alone.

We cannot stop this by law, nor should we, if we could, prevent judicious cutting of timber if it shall be needed, and it is absolutely needed in the mines, but there is no excuse for cutting and destroying the young growth of pines and other soft woods at the present time.

In a certain sense the owner of the young trees cannot be wholly blamed for disposing of them. The assessor will tax him so heavily that practical confiscation will result if he shall attempt to keep them. A case in point in this, Jefferson county, is an illustration. A man owns 50 acres of young pine, running from five to twenty-five years of age,—none large enough for boards but some would make lath. Three years ago it was assessed at $15 per acre; this year it is put down for $30 per acre, while briar and brush land in that vicinity is assessed at $2.50 per acre.

It looks as though nothing short of absolute want of forest products will ever bring the people to a full and correct understanding of what we should do. That will be necessary, for nothing but experience will teach us.

S. B. ELLIOTT.

Forestry Convention in New Brunswick, Canada.

AS mentioned in the last issue of FOREST LEAVES, a Forestry Convention was held at Fredericton, New Brunswick, on February 20th and 21st. An address of welcome was made by Lieutenant Governor Snowball, who expressed his gratification at seeing so many present in the interests of forestry, and then introduced the Hon. L. J. Tweedie, Premier of the Province, who occupied the chair, and presented an interesting paper on the past history of lumber in the province, showing its importance. He stated that New Brunswick has 10,000 square miles of timber lands containing 6,000,000 acres, which produced a revenue of $250,000; in addition to large amounts received from stumpage, game licenses, and other sources. Unless some means were taken to preserve this forest wealth, great loss would be sustained by the wasteful methods of former times.

Addresses were made by Hon. J. D. Hazen, ex-Governor A. R. McClelan, Elihu Stewart (whose paper on the "General Need of Forest Preservation" appears in another column); the Hon. Wm. Pugsley, who spoke of the necessity of having lands at the headwaters of the streams forested; Dr. G. U. Hay, who referred to the value of the black walnut and the rich soil carried away by freshets. Chancellor C. C. Jones, of the University of New Brunswick, took up "The Attitude of Educational Institutions Towards Forestry." Robert Connelly urged the division of the province into districts, with a fire ranger in each. Dr. J. R. Inch spoke on the "Relation of Forestry to our Public Schools." T. B. Kidner on "What the Manual Training Schools Can Do in Arousing Interest in Trees and their Protection." Lieut. Col. T. G. Loggie spoke on "Forest Reservation." Prof. H. R. McMillan, of the Yale Forest School, on "Economic Methods." In the evening there was an illustrated lecture on the "Pulp Industry of Canada," prepared by Prof. Penhallow, of McGill University. Hon. C. N. Skinner made a witty speech on "Forestry in its Relation to Agriculture." Hon. H. R. Emerson, Minister of Railways and Canals, spoke on "Opportunity and Outlook," stating that transportation and forestry were closely allied, and a scheme was being worked out to prevent locomotives starting forest fires.

On the following day Hon. C. W. Robinson spoke on "Lumbering Methods." James Beveridge read a paper on "The Dependence of Business Interests on the Forests." W. B. Snowball on the "Value and Importance of the Lumbering

Business to New Brunswick." H. M. Price on "The Lumbermen's Interests in the Preservation of the Forests." A. E. Hanson on the "Protection and Preservation of Forests." A paper prepared by Charles E. Oak was read by the Premier, treating of methods of felling trees, and losses from forest fires and their control. Prof. Austin Cary presented a paper on "The Forest Policy of the United States and Other Countries." Charles E. Fish made an address on the "Protection of Forests from Fires." C. E. Lund spoke on the "Forest Fire Law of Westmoreland County." W. H. Barry read a paper on "Practical Forestry;" while John Robinson presented the subject of "Forest Fire Ranging."

After some discussions, the following resolutions were adopted:

"We recommend the formation of a New Brunswick Forestry Association in affiliation with the Canadian Forestry Association on terms to be hereafter agreed upon and having for its object the obtaining and disseminating of information with the view of protecting the lumber lands of the province from undue and unnecessary exhaustion in the process of lumbering therein, from destruction from fire and to promote generally throughout the country the reforestation by private owners of lands, not only for the growth of trees, but the planting of shade trees, the growth of trees on the banks of rivers and along the sides of highways, and also to influence the department of education to introduce lessons whereby the scholars may be taught the need of forest protection, reforestation and things necessary to be done in preserving the trees of the country for economic and picturesque purposes.

"That in order to make as attractive as possible and to beautify the cities, towns and villages throughout the province, the civic and municipal authorities in New Brunswick be strongly urged to adopt a systematic policy of planting ornamental trees.

"That in order to render attractive the different roads throughout the province, legislation be passed for the encouragement of persons in setting out ornamental shade trees along the highway roads throughout New Brunswick, and in this connection call attention to the laws in force in the Province of Ontario, whereby it is understood that a bonus of a small amount is given for each tree set out along the highway road in the province according to the directions given by the Public Works Department, or by some other plan.

"That the movement of planting trees on school grounds, which has been in force for many years, but has produced but few results, be strongly sanctioned by this Forestry Convention as a means calculated to secure the interest of the people.

"Realizing the enormous injury that in the past has been caused by forest fires resulting from the construction and operation of railways in the province, it is strongly recommended that effective laws be passed for the purpose of preventing in the future a repetition of such losses, and that such legislation should include adequate protection against carelessness during the work of the construction of railways, and that there should be a provision that when roads are in operation during the dry season between the first of May and the first of November in each year, section men on all railways should be required to patrol the road at least twice a day, and that railway companies be compelled to issue special instructions to all section men and employees to do all they can to guard against grass or forest fires and to promptly report any which may occur.

"And it is further recommended that the Department of Railways and Canals and the C. P. R. R. be strongly urged to take necessary and effective means to prevent forest and grass fires being caused by the operations of their respective railways.

"That one or more officials be appointed with the title of 'Inspector of Scalers,' whose duty it shall be during the lumbering season to visit the different camps and lumber operations throughout the province for the purpose of seeing that the scalers are faithfully carrying out their duties and are taking proper account of the amount of lumber that is cut and that undersized lumber is not being cut, and that the laws with regard to the cutting on Crown Lands are being strictly enforced, and it shall be the further duty of such inspectors to carefully observe the methods of cutting carried on by different lumbermen, and to report to the Crown Land office if, in their opinion, wasteful methods in cutting are being used by any of the operators.

"It was further recommended that the inspectors discharge their duties, so far as the times of visiting the operations are concerned, along the lines adopted by inspectors of banks, so that scalers and the persons whose lumbering operations they are to inspect will have no means of knowing beforehand the date or dates at which the inspectors will make their inspection.

"We urge upon the Lieutenant-Governor in Council the desirability of carrying out the law already upon the statute book authorizing the setting apart of a portion of the public domain for a forest reservation.

"Whereas, There is not at present any institution in our province providing a forestry course, and

"Whereas, Practical men are required, trained in theoretical and practical knowledge, to conserve our forest wealth,

"Therefore Resolved, That this convention recommend the government to assist the University of New Brunswick to provide such a course, and also that the government provide forestry instructors to give short courses throughout the province of, say, 90 days in each district, on the same principle as the dairy school instructors.

"Inasmuch as there is at the present time no adequate system of fire protection for Crown Lands in the province of New Brunswick,

"Therefore Resolved, That the government be requested to take prompt action towards the establishment of organized fire protection, so that the same may be in operation by May 1st next."

After the meeting it was decided to form a New Brunswick Forestry Association, and a committee was appointed to draw up a constitution and by-laws.

The General Need of Forest Preservation.

THE following extracts are from a paper read by Elihu Stewart, President of the Canadian Forestry Association and Chief of the Dominion Forestry Bureau at the Foresty Convention at Fredericton, N. B.:

Canada has been blessed with many fine gifts from the bounteous hand of nature not the least of which was the subject of the text, the forests. Of all gifts it was the freest. The wealth of the lumberman lay open before him, he reaped what nature had prepared. It was with him simply a matter of appropriation in which he usually had the government as a partner. It was worthy of note that only about one per cent. of the food contributing to tree growth was derived from the soil. Trees did not deteriorate the land on which they grew and no rotation of the crops was necessary.

Forest preservation and forest perpetuation were necessary for two reasons, first on account of the effects of forests on climate and water, and second on account of the product that the forest yielded in the wood it produced.

Referring to the effects of forests on climate and water Mr. Stewart spoke of evaporation, the transport of vapor, condensation, precipitation, and dissipation. By the last term was meant the disposal of water after condensation. This could take place in two ways either by evaporation into the air or by the agency of gravitation which would ultimately carry it back to the sea.

The forest assisted in retarding dissipation in both cases. The shade and consequent lower temperature made evaporation many times less in the forest than in the open field and the absorbing qualities of the forest floor were much greater than in the open. By means of the roots which acted as pipes a great natural reservoir was formed whose outlets were the thousand of perennial springs that continuously fed the streams. If this timber was removed the water instead of being absorbed rushed down the mountain side in torrents and disastrous floods followed. That was the result of interfering with nature, which had woven a net work for the run off of the supply, All she asked was that they did not interfere in her operations.

The people of North America had been exceedingly profligate in this regard and the penalty was paid every spring. Inundations occurred which were never experienced before the lumber was removed. It was useless, however, to recall lost opportunities and New Brunswick had recently taken decided action as shown in the act of last session. If carried out it would be attended with excellent results. It was suggested that in any future patents of timber lands a proviso should be inserted that at least ten per cent. of the area conveyed should be left in forest, that the timber growing thereon should be the property of the owner of the land but to be cut only under the direction and supervision of the government and in such a way as not to impair the land as a forest reservation.

Mr. Stewart then took up the second phase of the subject—the need of forest perpetuation on account of the wood product. It was thought years ago that the increased use of iron and brick would lessen the consumption of wood but the per capita consumption was greater than ever before. The manufacture of pulp and cellulose alone was consuming immense quantities, and taking the whole consumption of wood the world over the outlook was not reassuring. If the timber producing countries did not at once commence to husband the forest wealth a time of great scarcity must occur in the near future.

The present was the time for action. The woodman's growing crop must be looked after with as much care as the agriculturist bestows on his field crops. Forestry claimed the careful attention of the State for several reasons. First, on account of the commercial interest in the forestry of a country being so large compared with the individual interest. Secondly, forestry belonged to the State on account of the length of time required for trees to attain maturity. There was little incentive to the individual, as his career would be closed long before the return of his labor could be

realized. With the nation whose existence was calculated by the centuries, the case was different.

"Let me in conclusion, even at the risk of repetition, emphasize the fact that the natural forests of the country belong not specially to one generation, they are a heritage given us for frugal use and not for profligate waste. How many of us labor to leave our families comfortable, but fail to remember that every Canadian boy is the common inheritor of a vast heritage that nature has given to the Canadian people, and which in many cases we have allowed to be despoiled in our hands. Let us see to it that henceforth we do our part to hand down to our successors the portion of the forest inheritance that is their due. Fortunately we are dealing with that kingdom of nature where reproduction and growth are found. The life forces are working with us and there is no reason why future generations for all time may not continue to reap an annual harvest from our forests, no less certain and no less profitable than that derived from the field."

The Oregon Forest Protective Association

THROUGH the efforts of a number of public spirited citizens who believe in the protection and perpetuation of Oregon's forests there has been formed the Oregon Forest Protective Association. The object of this organization is to do whatever may be possible along reasonable lines and with due regard for the commercial claims upon Oregon's timber to conserve the forest resources of this state. Although realizing that procrastination in the matter of legislation has lost to the state hundreds of thousands of acres of valuable timber land it is believed that much still can be done to protect and preserve the forest interests of the state.

At a meeting held in January the new organization took formal shape in the adoption of a constitution and by-laws and the election of the following officers:

President, Prof. E. R. Lake, State Agricultural College, Corvallis; Vice-Presidents, M. W. Gorman, E. F. Applegate; Treasurer, A. D. Monteith; Secretary, A. E. Cohoon; Directors, D. D. Bronson and J. B. Knapp.

Provision is also made in the constitution for an executive council to consist of one member from each county in the state.

The State of Georgia has also fallen in line, and on March 11th an organization was formed at Athens, to be known as the "Georgia Forest Association."

Chemical Works and Their Relation to Forestry in Pennsylvania.

IN lumbering a large percentage of the total contents of the tree is left as slashings in the woods, together with imperfect trees, or those of varieties not desired, and if these could all be utilized for various purposes, instead of forming fuel for forest fires, a decided advance could be made.

As at present practiced in Pennsylvania, wood chemical works usually follow the hemlock lumber mills, securing large tracts of land from which this variety of timber has been removed, but in places fine ridges of hardwood are left, while in others there is but little remaining. Thousands of acres of such land have been purchased for one or two dollars per acre. The best body wood only is cut, the tops, inferior and scattering timber, being left to be destroyed by fire. Nothing but body wood and good straight limbs are taken, and after the logs are taken out the balance of the tree is seldom touched. Where the hardwood is removed, the chemical works usually take the trees under ten inches in size, also any defective trees.

When the wood chemical works were first started, about nine years ago in this instance, the wood was cut and piled in the yard for use, then it had to be hauled a short distance, then still farther, until now it is brought by rail a distance of 3 to 7 miles. The additional distance precludes the removal of any but the best wood, as the freight charges, cost of cutting, etc., is as great for body wood, which gives a larger yield, than the tops, etc. A cord of limb wood will not weigh within 20 to 50 per cent. as much as body wood, and therefore will not produce as much charcoal or by-products. It also takes as much labor to run it through and the same amount of fuel to treat it. At present it costs about $1.25 per cord for cutting, 35 cents for stumpage (25 cents is the regular price), $1.00 for hauling to the standard gauge log railroad, and $1.00 for loading on cars, freight, and unloading in the yard, or a total of $3.60 per cord.

The wood is usually cut 50 inches long and should range from 3 to 6 inches in diameter. Any kind of hardwood will answer, such as maple, birch, beech, oak, etc., but the three first mentioned are at present principally used in this State.

In the softer woods, such as soft maple or even cherry or ash, I have always noticed a decided shortage in products amounting to 10 to 15 per cent. or even more according to the amount used.

Any extra large, burly wood, is placed in the retorts by itself, for if charred with fine wood the latter would be reduced to dust before the former would make charcoal.

There are two kinds of retorts or ovens used, the cylindrical retort, holding 5/8 of a cord, and the "Jumbo," which will receive 3 or 4 iron cars, each car holding about 2 cords of wood. The retorts are made of steel or iron, with an opening to receive the wood, which is closed by an iron door, made tight by means of an asbestos packing, or sometimes by mud. There is also a connection leading the gases resulting from the charring to a condenser, made of copper tubes submerged in water.

One cord of seasoned wood (green wood is not often used) will produce several barrels of raw or unfinished liquor, and enough wood gas to half char it; 10 per cent. of this liquor is tar, which is removed by settling and boiling, and can be used for fuel; 3 per cent. of the balance of the liquor may be methyllic alcohol and as much more "acid." These products are obtained by neutralizing the boiled liquor with lime and then distilling, the alcohol going over, and the acid remaining, which in turn is boiled down in an open pan, and redried on a kiln ready for sacking. The balance is water, except that at several points in manufacturing wood oil is procured, amounting to two or three quarts per cord. The charcoal is taken from the retort, and sealed from the air for 24 hours or more before being put in cars for shipment.

One cord of good wood will produce 40 bushels of charcoal (not including screenings, etc., which are burned), 10 gallons of alcohol and 220 pounds of acetate. The prices vary, the average for several years past being: charcoal, 5 cents per bushel; alcohol, 30 cents per gallon; acetate, 1½ cents per pound. The cost of labor is about $2.00 per cord, while the fuel averages $1.50. At the works described in Sullivan County (12 cord capacity) 5 to 7 tons of buckwheat coal are used per month, while in Elk County natural gas and soft coal are used for fuel. To this expense should be added one car of lime for every 300 cords of wood, cost of acetate bags, interest on investment, 6 per cent. for insurance, cost of boiler inspection, etc.

The retort plants usually range in capacity from 12 to 64 cords in 24 hours (being run day and night). The capital invested is about $1,000 per cord for the plant, and the same amount for a stock of wood. The plant must be made over new at least once in 7 years. The iron or steel will not stand the attacks of the raw acid, and even the best of copper will not last long. In times past the manufacturer has been able to make a fair profit unless losses are met, such as often happens when thousands of cords of wood are burned in the forests, and sometimes in the yard.

Of the resulting products methyllic alcohol is used largely as a dissolvent at paint and furniture works; acetate of lime at dye works for setting colors; charcoal in blast furnaces and rolling mills. The wood oil has to be taken out or it will spoil the alcohol.

The time has now come when this awful waste must cease; why longer continue this mad race to leave to posterity money, a promise to pay, why not turn about, and instead of bonds and denuded worthless lands, leave thousands of acres of beautiful available forests. Trees covered with magnificent foliage, every leaf a "greenback" that points to its giant trunk for security. In order to do this, wood chemical works must be reconstructed with this end in view. The still-house will remain the same, but the retort plant must be enlarged sufficiently to produce the same amount of manufactured liquor, from tops, limbs, etc., as did the body wood. The furnace must be constructed to use soft woods, decayed wood, wood tar, wood gases, etc., thus avoiding the use of natural gas or coal for fuel. All the good body wood should be made into lumber, and the remainder into cord wood. Crooked limbs and tough parts should be cut into shorter lengths and accounted for by weight, or measured in cone-shaped piles, as it would need to be handled in a rough-and-tumble way. In this manner cleared strips could be made through the forest, utilizing everything. These strips could then be seeded and used for grazing purposes, also acting as a protection against forest fires.

The ground which has been gone over at this place can be again cut over, so as to secure as much wood as in the first instance, by using the scrubby trees that were left, etc., but this could not be made into 50" wood, but must be used in 16" to 20" lengths. I, however, think it would pay, using the soft and decayed wood for fuel.

At Cadillac, Michigan, retort works have been erected to utilize the inferior body wood, slabs, and coarse edgings obtained from a hardwood lumber mill, which is a move in the right direction, but sawed wood is not apt to char well, because the two straight edges come in contact with each other, making almost a solid block. Wood will char 10" deep in the end grain as easily as 2" deep in the cross grain of wood. The waste from the mill, such as saw dust and small pieces of wood, is used for fuel in the retort plant which is modeled after, and an improvement on, one in Elk County in this State. In this instance the wood is brought 80 miles on cars, to the mill.

S. E. DUNN.

The Mexican Cypress.

THE Mexican cypress, *Taxodium mucronatum*, is a tree which grows over the whole table-land of Mexico from an elevation of 5,000 to 8,000 feet. It is found in situations far removed from each other, and grows best in the alluvial soil of river bottoms, or along the banks of streams. The writer has seen trees of this species at three places in Mexico. The most celebrated groves visited by him being at Chapultepec, five miles west of the city of Mexico, and at Las Canoas, a station on the Tampico branch of the Mexican Central Railroad. An isolated tree was seen at Tacuba. The grove at Chapultepec is the most celebrated. It consists of many trees growing together in an almost pure growth at the base of the cliffs, which were stormed by our American troops during the Mexican war, when the castle of Chapultepec was taken. Two trees in this grove are worthy of mention; one tree has a trunk nineteen and one-half feet in diameter, shown in the illustration, and the so-called "Montezuma" cypress has a diameter of about sixteen feet. As will be noted in the view of the "Cypress Walk" all of the trees of this grove are draped with the Florida moss, *Tillandsia usneoides*, which in some places hangs in long festoons.

The trees seen by the writer at Las Canoas had medium-sized stems, eight to ten feet in diameter, and were growing along a stream formed by the junction of smaller streams from several large springs that gushed out of the mountain side. These trees are seen after the train leaves the station at Las Canoas on the down grade to the "hot country." Two other cypress trees are celebrated in the history of the country. When Cortez, in 1520, had been repulsed in his first attack on the City of Mexico, the story goes, he retreated to the higher ground west of the city and slept the first night under a large cypress tree. This tree was called, therefore, the tree of the sad night, "arbol de la noche triste." The largest tree in Mexico, one which rivals the big trees of California in size, is the Mexican cypress tree at Tule, a town on the road from Oaxaca to Guatemala by way of the Isthmus of Tehuantepec. Illustrations of the tree appeared in the December, 1906, issue of FOREST LEAVES. The measurements of this tree in the year 1890 are as follows: Circumference of the trunk 5 feet from the ground, following all the sinuosities, 146 feet (while in 1906, 6 feet above the ground, the circumference was found to be 154 feet); actual circumference 5 feet from the ground, 104 feet; total height of the tree, 150 feet; longest diameter of the trunk, 40 feet; shortest diameter of the trunk, 20 feet; spread of branches, 141 feet. The Mexican cypress forms with the two other species of bald cypress the sole representatives of the genus *Taxodium*. Our two eastern species are *Taxodium distichum* and *T. imbricarium*, both of which trees have deciduous leaves. *Taxodium imbricarium* has rounded stem buttresses and grows away from the coast and the larger rivers, while *T. distichum* has angular buttresses and grows usually in the coastal strip along the largest rivers. *Taxodium mucronatum*, the Mexican cypress, has evergreen leaves and grows only at a considerable elevation on the Mexican plateau. In general, it may be said that in these trees the leaves are linear, usually two-ranked, the flowers are monoecious, small; staminate flowers, catkin-like, spirally arranged, with four to nine anther sacs. The pistillate flowers are solitary, or in pairs at the ends of branchlets of the previous year, composed of imbricated scales bearing two ovules. The cone is globose, or nearly so, maturing the first year, consisting of spirally arranged woody scales enlarged at the apex into an irregularly four-sided disc. Two triangular winged seeds are found enclosed.

JOHN W. HARSHBERGER.

The Present Status of Forestry Legislation.

IN the last issue of FOREST LEAVES the text of two proposed laws (Acts 69 and 70) were given. Since that time both of these bills have been amended.

Act 69, which provided for the establishment of auxiliary forest reserves, has had two important amendments. One which has been added to Section 3 gives the right, when lands are removed by the Commissioner of Forestry from auxiliary forest reserves, to recover from the owner, by the county and township by an appropriate action at law, the difference in the amount of tax which would have been paid by the owner under the prevailing rates which existed on similar lands in said county and the rate established for auxiliary forest reserve lands with costs of suit, and to be recoverable from the time when such lands were placed in the class of auxiliary forest reserves. The original Section 6, providing a penalty for the failure of the commissioners to classify the lands as auxiliary forest reserves, has been removed, and a new one inserted which gives the owner of the auxiliary forest reserves the right to remove trees which may be killed by fire, thrown or broken by the wind, or injured by other natural

THE "CYPRESS WALK" CHAPULTEPEC, CITY OF MEXICO, MEXICO.

TRUNK OF THE "BIG CYPRESS." (TAXODIUM MUCRONATUM.)
CHAPULTEPEC, CITY OF MEXICO, MEXICO.

THE "CYPRESS WALK" CHAPULTEPEC, CITY OF MEXICO, MEXICO.

TRUNK OF THE "BIG CYPRESS." (TAXODIUM MUCRONATUM.)
CHAPULTEPEC, CITY OF MEXICO, MEXICO.

causes, and under the direction of the Commissioner of Forestry, make the necessary thinnings or remove undesirable trees, also remove under the same direction such timber as is necessary and essential for use upon the cleared lands of the owner for general farm purposes. This bill has passed the house and is now in the Senate. There are, however, it would seem cases where the changes mentioned might be undesirable.

Act 70 provided for the taxation of auxiliary forest reserves, and this has also been amended in the original bill as printed, the important change being in Section 3 where the penalty for the neglect of the assessors or commissioners to do their duty is stricken out, and in lieu thereof a paragraph is inserted that whenever lands are removed from the class of auxiliary forest reserves, the owner shall pay to the County Commissioners an amount which shall be equal to 50 cents per 1,000 feet stumpage for coniferous timber, and 25 cents for such hardwood and broadleaf timber as may be found upon said lands at the time of removal from the class, a sworn statement to be furnished by the owner to the Commissioners, giving the number of acres removed from the class and the number of feet of each class of timber. If the Commissioners are dissatisfied they have the right to appoint three appraisers who shall estimate the amount of timber, and either party who is dissatisfied with the report of the appraisers has the right of appeal to the court of Common Pleas. The appraisers are to be allowed expenses and a compensation to be fixed by the Court, both to be paid by the County Commissioners. It would also seem that this amendment is undesirable, as if the state is to receive a stumpage tax, it would be best to remove all taxes and rely simply on the stumpage tax when cut, and not tax the property, with an additional tax when the trees are cut, leaving the owner all the risk of fire, insects, etc., possibly making the timber cost more than the owner will receive. This bill was defeated, lacking four votes of the necessary two-thirds in the House.

The new Fire Warden bill is ready to go into conference of the two houses.

The following Act has also been filed in the House of Representatives.

An Act declaring the liability of railroad companies for loss or damage by fire, providing a remedy therefor and relating to evidence thereof.

SECTION 1. Be it enacted, etc., That any railroad company operating a railroad, or any portion of a railroad, wholly or partially within the State of Pennsylvania, shall be liable for all loss or damage by fire originating upon the land or right of way belonging to such railroad company caused by operating such railroad. Such railroad company shall be further liable for all loss or damage by fire originating on land adjacent to such land or right of way of such railroad company, caused in whole or in part by sparks from an engine passing over the tracks of such railroad, to be recovered in an action of trespass in the county wherein the lands on which such loss or damage may occur are situated.

SEC. 2. Existence of fire upon the land or right of way of any railroad as described in the first section of this act shall be prima facie evidence that such fire was caused by operating such railroads.

SEC. 3. In all actions against any railroad company for the recovery of damages on account of any injury to any property, real or personal, occasioned by fire communicated by any locomotive engine while upon or passing along any railroad, the fact that such fire was so communicated shall be taken and deemed as prima facie evidence to charge with negligence the railroad company which shall at such time have the care and management of such engine, and it shall not in any sense be considered as contributory negligence on part of the owner or occupant of the property injured, as such owner or occupant had used the same in the manner or permitted the same to be used or to remain as if said railroad did not exist, except in cases of injury to personal property which shall be at the time upon the land or right of way of said railroad company.

Another proposed act establishes precautionary regulations to prevent forest fires on lands in which oil and gas wells are situated and diminish the danger therefrom, making certain violations misdemeanors and prescribing penalties and damages. The legality of this act is somewhat doubtful, as it rather leans to special legislation.

A plan has been prepared by Mr. S. J. Flintham in co-operation with the State of California, for planting eucalyptus trees on the cut-over redwood lands of the Union Lumber Company, near Fort Bragg, Mendocino County. This company has extensive holdings sufficient at the present rate of cutting to last from 80 to 90 years. The cut-over land grows up rapidly in brush, and the plan provides for dividing it into planting sites, clearing, and planting. The Company will raise the necessary seedlings in a nursery under the supervision of the State Forester. Provision is also to be made for protection from fire, and for the planting of windbreaks.

Lumbermen and Forestry.

—

AT the Annual Meeting of the National Wholesale Lumber Dealers Association held at Washington, D. C., on March 6th, a report was presented by George F. Craig, Chairman of the Forestry Committee, from which abstracts have been taken :—

Acting on the conclusions reached in our report of last year, we took up the subject of legislation for the regulation of taxation and the prevention of fires on deforested lands, and finding the subject of taxation to be full of difficulties and of absorbing interest, the less knotty problem of fires was pushed into the background.

Such legislation being entirely under state control, and the state of Pennsylvania being for many reasons best prepared for experimental purposes, an effort has been made to frame a taxation law for this state which will fill all vital requirements and, with slight modifications to meet varying conditions, be adaptable for other states.

Through the active co-operation of Hon. S. B. Elliott, the matter was brought to the attention of the Pennsylvania Forestry Association and at a meeting held in Wilkesbarre in June last a committee was appointed to draft the necessary law. The chairman of your committee was accorded a place on this committee.

In framing this act, suggestions were received from representatives of the National Forest Service, Pennsylvania State Forestry Commission, Yale Forest School, and from a number of members of this association and other individuals, and when completed it was finally submitted to the Pennsylvania Forestry Association.

There were three important requirements to be met : to have an act which would afford the necessary relief ; to have an act which would pass the Legislature ; and to have an act which would stand the test of constitutionality ; the three are far from being synonymous.

These labors finally brought forth two acts, the first establishing a class of lands to be known as "auxiliary forest reserves" and the second regulating the taxation of all lands in this class.

The gist of the first act is that any owner of surface lands suitable for forestry purposes may, on application to the Commissioner of Forestry, have said lands certified to the County Commissioners as auxiliary forest reserves, upon entering into an agreement to treat said lands in accordance with the instructions of the Forestry Commissioners. The second act provides that no lands so certified shall be assessed in excess of $1 per acre for the purposes of taxation.

These two acts were introduced simultaneously in the House on Jan. 30, 1907, were referred to the Committee on Forestry, and were reported out from the Committee on Feb. 4. They passed first reading without debate, but on second reading, meeting with expected opposition, were referred back to the Forestry Committee. The greatest objection arose from the fact that the low assessed valuation on these lands would naturally reduce the revenues applicable to school and road purposes.

To meet this objection Mr. Elliott has offered to the committee a third bill, under the provisions of which the state shall pay to municipalities an annual charge of 1 cent per acre and to school districts an annual charge of 2 cents per acre on all auxiliary forest reserves situate within their respective limits. While the principal objection has thus been met, it is impossible to predict the fate of these bills, and we are reduced to the consolation of hope.

The Pennsylvania Department of Forestry has prepared a fire act which was introduced in the House on Jan. 31, 1907, and also referred to the Committee on Forestry. This bill constitutes all constables, justices and employees of the Department of Forestry *ex officio* fire wardens with power to employ other persons for the purpose of suppressing forest fires, and apportions the expense thereof equally between the state and the counties in which said fires occur, and without limiting the amount which may be so expended.

Within a few days we have been advised that a bill regulating taxation on somewhat the same lines as our Pennsylvania bill has been introduced in the Legislature of the state of Iowa, but we have not had opportunity of obtaining a copy of it.

The liberal subscription pledged at last year's meeting to the fund for the endowment of the Chair of Applied Forestry and Practical Lumbering in Yale Forest School, has not been called in by the association, and we have been unable to obtain any information as to the present status of the fund.

A resolution was passed at our last meeting indorsing the southern Appalachian and White Mountain Forest Reserves. At the session of Congress which expired on March 4 the bill authorizing these reserves was unanimously passed by the Senate, but failed to come up in the House. Some opposition to forest reserves generally has been found to exist among lumbermen. This appears to be based on the possibility of reserves conflicting with lumbering operations, in which case it is questionable whether the federal government could afford and would be willing to pay a price which would fully represent the value of a timber tract in active operation.

While your committee does not feel competent to pass final judgment on this question it believes that lumbermen are able to cope with each individual situation as it may arise, and further that lumbermen as a body are sufficiently broad and liberal to risk a minimum of personal profit for a maximum of general benefit.

Bearing on this question we have received from Mr. Gifford Pinchot a letter explaining the position of the government with regard to forest reserves. Mr. Pinchot's attitude in forestry matters has always been so practical and so universally fair to the lumbermen that we have taken the liberty of inserting the full text of his letter : —

"Reserves and the government reserve policy are decidedly to the front just now. It seems to me that the western lumbermen who criticize this policy ought to take a broader view. Were the timber on unreserved public lands lumbermen would doubtless find a way to secure these lands when wanted, as they have other lands from the public domain ; but they could not secure them legally, and, having secured them, it is highly improbable that they would manage them conservatively. Waste by fire and destructive lumbering would repeat the old story, and in one region after another the lumber business would be self-exterminating. Is it not better for the lumbermen to be able to buy stumpage from the government at a fair price and cut under regulation, knowing that the forests will always be there for them to draw upon, than to connive at fraud, or perhaps take the timber in order to get it at all, and make an end to the forests, even though they may realize a larger immediate profit on this operation? Is it not essentially a choice between honesty and a steady business and growing rich on public plunder?

"In the East, of course, the case is different. If the southern Appalachian and White Mountain Reserves are created the government would have to pay a fair price for the land, since this is already in private ownership. I believe, however, that these reserves also, will in the long run, benefit the lumbermen by making the industry more stable. There is no reason why lands now held by lumber companies should not be purchased subject to the removal of the standing timber, under such regulations as would preserve the forest itself. As you of course know, the present measure for creating these reserves is killed, yet the same question must come up again, I think. Too much sentiment has been aroused to let the matter drop, and the evils of deforestation in their relation to water power and floods must, as they become more progressively felt, sooner or later compel government intervention."

A year's education and experiment have modified but have not materially changed what may have been regarded as our ultra-conservative views on practical forestry from the lumberman's standpoint. Our present conclusions are advanced not as facts, not as definite laws, but as theories deduced from a modest attempt to discover the best methods of handling cut-over lands. The experiment in the higher Appalachian forest must confine these theories to the timber of similar regions.

Practical forestry is an experiment, a problem whose solution may be as varied as the value of "X," and it is therefore of paramount importance that our lumbering show the best possible financial results and that present profit be not sacrificed to posterity. Therefore we believe that the "preservation of the smaller growth of the forest" and the "natural reforestation of cut-over lands" must remain as the basis of lumbermen's forestry, with only such modifications as experience may justify.

Hemlock seems doomed to disappear with the exhaustion of the present crop. It is not only uncertain of reproduction, but exceedingly slow in growth. Existing conditions illustrate this.

Narrow fire strips in dense stands of virgin hemlock have grown up to birch and beech, and natural reproduction of the hemlock is entirely wanting. This transitory type of hardwood might again give place to hemlock, but not within the limit of time for commercial purposes. On the basis that at least no harm will result, and primarily for the purpose of fire protection, strips of standing hemlock about 300 feet in width may be left in selected locations, extending from top to bottom of the slopes and at intervals of about half a mile. They will be of some value for seeding purposes, though possibly only from the spruce and hardwoods which occur in mixture with the hemlock and for economic reasons must be removed before logging improvements are abandoned. They should be kept free from slash in felling the adjacent timber and will be more effective for fire protection if the adjoining skid row on each side be burned over.

In spruce stands the only advisable method is clean cutting. The second crop would, as a rule, be insufficient to justify the improvements necessary for its removal. The small timber, subject to damage in the first cutting, is later liable to destruction by insects, fire and wind, particularly where the soil is thick humus. Therefore al timber which is profitably marketable for any purpose should be removed, using such care as is possible to preserve the unmarketable saplings. A portion of the extra revenue derived by clean cut-

ting may be expended in artificial reforestation with better ultimate results.

By thus eliminating hemlock as a future forest tree and reducing to a minimum the amount of young spruce left for natural reproduction, it apparently becomes necessary to assist nature in her efforts to re-establish the coniferous forest. Present conditions will not warrant the more expensive experiment of setting out young stock, and we must be content with artificial seeding.

While the ground is still frozen, the slash between the skid roads should be burned, or perhaps better, the slash between every second or third skid road, care being taken to select the strips which contain least natural reproduction. These burnt areas form an excellent seed bed and act as a fire break for the protection of the growing forest.

On the bed thus prepared, reliable seed selected to fit the conditions of soil and climate should immediately be sown. Spruce, particularly Norway spruce, fir, larch and white pine has been selected for first experiment. Black locust is suggested in mixture with the conifers as producing earlier revenue by conversion into ties, while furnishing protection from sun and frost to evergreen seedlings.

Interspersed with spruce and hemlock areas on these higher altitudes occur pure stands of hardwood, consisting of ash, chestnut, oaks, beech, birch and maple, with some cucumber and basswood. Were it practicable to do so the best management might be to allow these hardwoods to remain for future operation, or, at most, to confine present operations to improvement cuttings. This, however, would violate the rule to consider first of all the present financial returns.

The smaller trees of these species, producing as they do lumber of the lowest grades, may consistently be left on the ground. It may be as well, however, to remove as far as possible even the smaller trees of the less valuable kinds, such as beech and maple, in order to give better opportunity to more desirable woods.

Where the young growth is not sufficiently dense selected seed trees may be left in addition, but as these may be either defective timber or of but moderate size, little loss will be occasioned. Ash and red birch are recommended both on account of their value for a second crop and their ability to reproduce themselves readily.

Wind is essential for tree growth, it brings the rain clouds, drives the pollen on stigma to fertilize the seed, and also distributes the seed. It also helps to trim the branches making a clear bole. Severe winds, however, dwarf trees, forcing the branches to grow in the leeward direction only.

President Roosevelt on Forest Reserves.

THE agricultural bill signed early in March by President Roosevelt contained a provision that in the future no forest reserves should be created except by act of Congress, thus abolishing the authority of the President, to establish reserves by executive order. This power was given by a clause providing that "the President of the United States may from time to time set aside and reserve in any state or territory having public lands bearing forests, any part of the public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reservations, and the President by public proclamation shall declare the establishment of such reservations and the limits thereof."

The American *Lumberman* says: It has been urged with some force that this power was too great to place in the hands of the executive, and further that reservations which could be so easily established could be as easily abandoned and that a greater continuity and persistance could be given to our forest reserve policy by putting the matter of establishment and maintenance of the reservations in the hands of Congress. This now has been done. However, there are manifest disadvantages in this policy, particularly in the establishment of the reservations. The very large area now thus included, inadequate as it still is for the timber needs of the future, would probably never have existed but for the grant of executive power. Presidents Cleveland, McKinley and Roosevelt have all been in hearty sympathy with the forest reserve idea and so rapid progress has been made toward the preservation of the forests on lands still in the possession of the national government.

The Geological Survey, the Forest Service and the Interior Department have all been at work on the determination of lands which properly might be included in the reserved area and, the President decided before the new policy should be inaugurated, under which the establishment of reserves would be subject to all the caprices of legislative action, to complete the work already in hand. Therefore, by proclamation, the President added an area estimated at from 15,000,000 to 17,000,000 acres to the reserve. Thirty three reserves were thus created or added to, eight or ten being entirely new.

Undoubtedly there will be much criticism of this action on the part of interested people who will claim that the President was precipitate and also officious in thus anticipating congressional authority, but we believe the action was wise and that the people at large will stand back of the President in the matter. When public lands are so rapidly being taken over by private interests every year and month and day of delay is dangerous and costly. Furthermore, any mistakes that have been made may and will be rectified; but we may leave explanation of this action to the President himself, who, in memorandum attached to the proclamation, gives the following for his course:

These forest reserves were determined upon and the preparation of the necessary papers ordered some months ago—in two-thirds of the cases some years ago—in the exercise of the duty imposed upon me by the act of Congress of March 3, 1891. The utmost care and deliberation have been exercised in deciding upon the boundaries of the proposed reserves; in all but a very few cases long continued and detailed field examinations have been made, and in the remainder examinations amply sufficient to justify the proposed action.

The necessary proclamations under existing law now come before me, and the question is presented whether I should refrain from acting under the existing law because there is now under consideration by Congress a proposal to change the law so as to require congressional action upon the establishing of such forest reserves. If I did not act, reserves which I consider very important for the interests of the United States would be wholly or in part dissipated before Congress has an opportunity to consider the matter; while under the action I propose to take they will be preserved; and if Congress differs from me in this opinion it will have full opportunity in the future to take such position as it may desire anent the discontinuance of the reserves by affirmative action, taken with the fullest opportunity for considering the subject by itself and on its own merits.

If by any chance land more valuable for other purposes than for forest reserves is shown to have been included in the reserves I shall forthwith restore it to entry.

Failure on my part to sign these proclamations would mean that immense tracts of valuable timber would fall into the hands of lumber syndicates before Congress has an opportunity to act; whereas the creation of the reserves means that this timber will be kept in the interest of the homemaker; for our entire purpose in this forest reserve policy is to keep the land for the benefit of the actual settler and homemaker, to further his interests in every way, and, while using the natural resources of the country for the benefit of the present generation, also to use them in such a manner as to keep them unimpaired for the benefit of the children now growing up to inherit the land. This is the final and exclusive object not merely of our forest policy but of our whole public land policy.

Whatever influence may avail hereafter to prevent the proper extension of the national forest reserves, as they have availed to prevent the establishment of the Appalachian forest reserve, the country now has in the west a reserved area which will go far towards settling the many problems of the future which will depend upon them. There will be timber for another generation to use, and protection for the water sheds, and the vast irrigation projects which mean so much to the prosperity of the semi-arid west will be secured. We believe one of the chief facts to the credit of President Roosevelt's administration will be his prompt and decisive act of March 2.

The Maine Forestry Association.

ON March 15-16th meetings were held at capital at Augusta, Maine, for the promotion of the forestry interests of that state, and the Maine Forestry Association inaugurated under most favorable auspices, it being reported that over 200 applications for membership had been received.

Prof. Henry S. Graves made an address on the forest reserves of the United States and their value to the West, also of the state reserves, etc.

Dr. H. M. Hale, of the U. S. Forest Service, gave a resume of the magnitude and value of the lumber industry in Maine, and made the following summary of the forestry work in the various states as follows:

"Twenty-four states now maintain an organization of some character that has the interest of the timber of the state under its supervision and at least seven of these have a technically trained forester in this organization—there should be 24 instead of seven. Nine states have state forest reserves varying in area from 2000 acres to over 1,000,000 acres. In this matter New York and Pennsylvania lead, New York having about 1,400,000 acres and Pennsylvania, 850,000 acres. The other states owning reserves are Wisconsin, Michigan, Minnesota, Maryland, New Jersey, Indiana, and Connecticut. The other 15 states, though as yet owning no reserves, are doing good work in caring for the timber within their boundaries."

A brief description was given of the National forest reserves together with a suggested outline of what Maine should do and why.

Hon. J. P. Bass, Austin Cary, Charles E. Oak, E. E. Ring, Prof. G. E. Towers and others made remarks.

The officers elected were: President, F. E.

Boston ; Vice-President, Charles E. Oak ; Secretary, E. E. Ring ; Treasurer, W. W. Thomas ; Executive Board, Chas. H. Bartlett, W. R. Brown, H. B. Buck, F. W, Butler, G. B. Dunn, G. A. Eaton, and E. P. Viles.

Cedar Wood for Lead Pencils.

THE lead pencil is one of the most common articles in everyday use, and nearly 320,000,000 pencils are made in this country every year. To manufacture these millions of pencils there are required 110,000 tons, or 7,300,000 cubic feet, of wood, so that each day in the year 300 tons, or 20,000 cubic feet, of wood are used for pencils. Since practically all of the wood is red cedar, and since the pencil industry is steadily growing, the supply of red cedar is greatly depleted ; yet no substitute has been found for it. Leaving out of consideration the imported pencils, the average educated American over 10 years of age uses six pencils of home manufacture each year. Ten years ago he used less than five.

Red cedar has a soft, straight grain, and when grown under best conditions is very free from defects. Because of its peculiar qualities no equally good substitute for it has ever been found, and it is doubtful if any other wood-using industry is so dependent upon a single species as the pencil industry is dependent upon red cedar. In fact, red cedar suitable for pencil manufacture is the only wood the price of which is always quoted by the pound.

No steps have heretofore been taken to provide for a future supply of red cedar. This has been largely due to a lack of information on the rate of growth and the habits of the tree, and to the widespread belief that second-growth red cedar never reaches merchantable size.

In accordance with its policy toward the conservation and economic use of commercial woods, the Forest Service has made a careful study of red cedar and has come to the conclusion that it can profitably be grown in regions of its development. Several changes are recommended in present forest management in order to secure the desired growth. In the southern forests the cedar will have to be given a better chance instead of being considered, as now, a negligible quantity in its younger stages, and many of the forest-grown trees which are now cut for fence posts can profitably be left to attain their full development and thus become available for pencil wood.

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CONTENTS.

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EDITORIALS.

THE Spring Meeting of the Pennsylvania Forestry Association at "Alverthorpe," on June 10th, was a demonstration of the growth of the Association. This handsome, impressive, and well forested estate was visited by the Executive Committee of the organization in 1887, when the membership of the Association could have been accommodated in one of the smaller rooms of the mansion. With a membership scattered throughout the State, it is not expected that a full attendance can be had at any meeting, but the large number that visited "Alverthorpe" on June 10th, filled the spacious rooms, and overflowed onto the wide porches and broad lawn was encouraging. Where there was so much of interest in tree life, protracted discussions would have been undesirable, and the session was limited to brief statements of the progress of the work, urging continued interest, and inviting co-operation in securing forest reserves in the eastern part of the country.

The opportunities for forming new and cementing old friendships, and for group discussions, did much to awaken enthusiasm among the members.

* * * * *

THE important position which forestry has taken is evidenced by the bills which were presented before the Pennsylvania Legislature, lately adjourned. That there should be differences of opinion as to details is to be expected, and therefore the friends of forestry need not be surprised that all the bills which had been prepared in the interest of the forests failed of approbation. It is a source of regret that some which had the endorsement of the State Forestry Reservation Commission did not impress the Legislature favorably.

Possibly the success which has attended the efforts of the friends of forestry caused them to be too ambitious, for the history of the movement in Pennsylvania has done much to give encourage-

ment. The improved fire warden service, for which provision was made by the Legislature, the appropriation for and acceptance of the responsibility of the Camp Sanatorium at Mont Alto by the Department of Health, the recognition of the intimate association of forest reserves, road maintenance and game protection, the appropriation of $600,000 for the purchase of additional reserves, the grant for the Forest Academy, are all in the line of advances, and the total appropriations which are applicable to the forests of the State amount to approximately $1,500,000, show the interest which the State Legislature has taken in the subject. J. B.

Meeting of the Pennsylvania Forestry Association.

A WELL attended meeting of the Pennsylvania Forestry Association was held at "Alverthorpe," the country residence of Dr. Henry M. Fisher, near Jenkintown, Pa., on Monday afternoon, June 10th.

The purpose of the meeting was more to permit of social intercourse between members than to have them listen to set addresses. However, after the Council had met and transacted business, those present assembled for a brief session, over which President John Birkinbine presided.

In opening the session, Mr. Birkinbine mentioned the fact that 20 years ago the Executive Committee of the then infant Pennsylvania Forestry Association held a meeting at "Alverthorpe" and discussed the best means of awakening an interest in the forestry movement. The large assembly present was evidence that that interest had been awakened, and further proof of the appreciation of the movement was in the number of laws affecting forestry which were presented at the late meeting of the Pennsylvania Legislature.

Regret that all of the laws endorsed by the Association failed to pass the Legislature was, however, tempered by the liberal appropriations made for the Forest Reservation Commission, the Sanatorium for sufferers from tuberculosis, the Forest Academy, etc.

Mr. Birkinbine, while congratulating the assemblage upon the advance made in the State, and directing attention to the practicability of the forest laws of the State, claimed that there was work ahead for the organization, and that its membership should continue to grow. He stated that the Council which had met a short time previously had admitted sixty new members, which shows that the field is still large, and urged the co-operation of all to enlarge the membership.

The President introduced Dr. J. T. Rothrock, General Secretary of the Association, as one whose name is closely identified with the entire forestry movement in the country. Dr. Rothrock, by the series of Micheaux lectures, taught how trees grow. As the first Forestry Commissioner of Pennsylvania he instructed us how to care for and protect our forests, and his life work now is to make these forests of service to the Commonwealth, and to utilize the State reserves as sanatoria for those who are suffering.

After mentioning the warm welcome extended in 1887 by the former mistress of "Alverthorpe," Dr. J. T. Rothrock spoke of the great changes which had occurred in 20 years. It was remarkable how a work undertaken in the face of dense ignorance and of opposition, in that space of time had triumphed over all obstacles, and now could not be halted, for the perpetuation of Pennsylvania was dependent on it. He mentioned a Canadian government official who said that the work done in forestry in Pennsylvania was without a parallel in history, where a State bought treeless ground back for a price three times greater than it originally sold for when covered with timber. The Commonwealth was buying back the acres which should belong to it. He said the Pennsylvania Forestry Association was facing a new issue, which he hoped it would meet in the further education of the people. The State was now securing and opening up the reserves, which were necessary for the welfare of the State, and in addition to maintaining the lumber industry, regulating stream flow, and other incidental advantages, they could be used as sites for camps for persons suffering from tuberculosis. At the Mont Alto Camp Sanatorium in Franklin County, started in 1903, with a single cabin, there were now 31 patients. Of the total of 200 persons treated 60 per cent. had been discharged, the ravages of the disease having been arrested. At the last meeting of the Legislature $600,000 had been placed at the disposal of the Department of Public Health, and Dr. Dixon, the Commissioner of Health, had just informed him that he proposed expending $300,000 in the improvement of this camp. The Association could teach people how to gain health and recreation by the use of these public outing-places, which they were instrumental in securing, and permits could be granted to any citizen, so long as the laws governing the reserves are obeyed.

Mr. Wm. S. Harvey, President of the Philadelphia Museums, Vice-President of the Pennsylvania Forestry Association, and also of the American Forestry Association, spoke of how, from an inspection of this fine old place, new inspiration could be gathered for greater achievements. The

Pennsylvania Forestry Association should feel proud of the results obtained here and in other States which had patterned after our organization, also of the forestry laws which had been enacted, for much of which we were indebted to Dr. Rothrock. Also to Mr. Birkinbine, who had devoted 20 years in the interest of the cause, when such fighting meant much, and whose pen had been used for the success of the forestry cause. The forestry movement had now become popular, and was now being looked upon as far-seeing and public-spirited.

Much has been accomplished by both the Pennsylvania and American Forestry Associations, and the forestry question is regarded as the most important economic question in the country to-day. Mr. Gifford Pinchot, Forester of the U. S., has now under his direction about 147,000,000 acres of land, from which an income was derived in the last 12 months of over $1,250,000. This income was increasing at the rate of $600,000 per year. The timber on these reserves is estimated as being worth $1,000,000,000, and is the most valuable asset of the Government of the United States.

After speaking of the need of increased membership, he instanced the value of forest reserves in the protection of the water-ways, the climate, water-powers, and the capital invested in them and the industries dependent on them. He asked the assistance of Pennsylvanians in securing laws creating the White Mountain and the Appalachian Mountain reserves. These laws passed the U. S. Senate and Committee of the House, but through opposition it had been impossible to advance them further. The benefits of these two proposed reserves were cited. The White Mountain reserve was the headwaters of streams on which were water-powers and industries capitalized at $250,000,000, while on the Appalachian drainage $350,000,000 of capital was involved.

After adjournment, the members were given opportunity to inspect the magnificent grounds, covering an area of 150 acres. On entering at the lower gate the drive led through a fine old woods with large rhododendrons and azaleas in full bloom. A plantation of black locust trees, planted about 15 years ago, and some fine white oaks in a meadow, attracted attention. There were numerous fine specimens of trees of different varieties, such as cypress, beeches, weeping beech, magnolia grandiflora, etc.; in the distance, was a background of fine timber. A feature of interest was a "doctored" elm, close to the mansion, which had been split by storm, but the damage repaired by iron bands, cement and asphalt.

After partaking of refreshments the visitors separated for their homes, well pleased with an instructive afternoon spent on one of the finest estates near Philadelphia, with hearty appreciation of the courtesy of Dr. and Mrs. Henry M. Fisher and Mrs. Brinton Coxe, who did so much for their entertainment.

The Timber Supply of the United States.

THE United States has been consuming timber at a rapid rate, and while substitutes are used in some instances the demand has continued to increase. In a general way it was understood that the available surplus was being used faster than timber was being reproduced, but no exact statistics were at hand. The Forest Service and Census Bureau have taken this subject up and endeavored to secure data as to the amount of lumber used annually which are given in Circular 97.

The value of the annual consumption of lumber is given as $1,075,000,000, and it is stated that the total quantity of wood cut to obtain these products was not less than 20 billion cubic feet. It is estimated that the United States is using annually 400 feet B. M. of lumber per capita, while the average for Europe is but 60 feet per capita. This does not take into account the consumption of fire-wood, mine-timber, cross-ties, etc., which are included in the valuation above given, but not in the consumption per capita, which only treats of the sawed lumber product.

The lumber cut of the United States for the the years 1880 to 1906, inclusive, is estimated as 706,712,000 M. board feet. Of this amount Michigan contributed 93,436,000 M. board feet, or 13.2 per cent.; Wisconsin, 70,647,000 M. board feet, or 10 per cent., and Pennsylvania is third with 53,589,000 M. board feet, or 7.6 per cent. of the total. It is pointed out in the circular that the increase in population since 1880 is barely more than half the increase in lumber cut in the same period. Two areas supplying timber have already reached and passed their maximum production—the Northeastern States in 1870 and the Lake States in 1890. To-day the Southern States, which cut yellow pine amounting to one-third the total annual lumber cut of the country, are undoubtedly near their maximum. The Pacific States will soon take the ascendency. The State of Washington within a few years has come to the front and now ranks first of all individual States in volume of cut, Pennsylvania ranking as sixth in 1905 with a lumber cut of 1,738,972 M. Board feet.

The total wooded area of the United States is given as 700,469,760 acres, of which 144,313,485

acres are National forests and 2,582,711 State reserves, the balance, 554,313,511 acres, being private and unreserved public forests; the reserves constituting 21 per cent. of the total wooded area. The circular states that no one who is at all familiar with the situation doubts for an instant that we are rapidly using up our forest capital. In fact, it is unquestionably safe to say that our present annual consumption of wood in all forms is from three to four times as great as the annual increment of our forests. Even by accepting the highest estimate of the amount of timber standing we postpone for only a few years the time when there must be a great curtailment in the use of wood if the present methods of forest exploitation are continued. Every indication points to the fact that under present conditions the maximum annual yield of forest products for the country as a whole has been reached, and that in a comparatively short time there will be a marked decrease in the total output, as there is now in several items.

Only one-fifth of our forest area is in National or State Forests; four-fifths is either in private hands or likely to pass into private hands. It has been shown that the present annual cut of forest products requires at least 20 billion cubic feet of wood. To produce this quantity of wood without impairing the capital stock our 700 million acres of forest must make an annual increment of 30 cubic feet per acre. Under present conditions of mismanagement and neglect it is safe to say that the average annual increment is less than 10 cubic feet per acre for the entire area. This means that each year's cut at the present rate takes the growth of more than three years. The average age of the trees which are being felled for lumber this year is not less than 150 years. The lumberman could not afford to replace them were he blessed with the prospect of unequaled longevity, since such long investments are unprofitable for private capital. In consequence there arises the need that the State and National governments, which do not need to look for so high a rate of interest as the private investor and which are concerned with the promotion of the general welfare, should assume the responsibility of providing a future supply of timber.

The forest area of the United States is sufficient, if rightly managed, to produce eventually timber enough to supply every legitimate need. There is no reason why it should not some day be brought up to the point of yielding an annual increment of more than 30 cubic feet per acre, which, as previously said, would supply the quantity of timber now consumed, and which if used economically will be sufficient for a much increased population. The experience of Germany well illustrates the possibilities along this line. The following quotations are from an article by Dr. B. E. Fernow:

"One hundred and fifty years ago Germany found herself in very much the same condition as regards her forest resources as we are to-day in the United States—all accessible portions more or less culled, or in poor coppice, burnt over, and damaged by cattle, the valuable virgin timber mostly confined to distant and inaccessible locations. Sporadic attempts existed here and there at protection, at regulation of the cut, at conservative lumbering, and still more sporadic attempts at reforestation."

"Yet until the beginning of the nineteenth century reduction of supplies without adequate reproduction proceeded, and around the year 1800 the wood famine had become acute, giving rise to the same kind of agitation and literature which we have experienced, even to bringing in the catalpa and other such small, rapid growers as the saviors of the nation."

The severity of the timber shortage in Germany at that time was temporarily relieved through increased production of coal and the building of railroads into hitherto inaccessible forest regions. Then came the vigorous organization of extensive forest reserves and the adoption of a settled policy of forest management, based upon the principle of sustained yield, or the cutting of the increment only, without lessening the wood capital. The results of this policy were, in the words of Doctor Fernow, that—

"In Saxony the cut increased during the years 1820 to 1890 just 50 per cent., and up to 1904 has increased by another 5 per cent., namely, to 93 cubic feet per acre, the increase through the whole period being at the rate of 0.5 per cent. annually.

"In Prussia the increase is still more pronounced. While in 1830 the cut was 20 cubic feet per acre, and in 1865 increased to only 24 cubic feet, in 1890 it was 52, and in 1904 it had grown to 65 cubic feet; forest management had increased the average acre production in seventy-five years more than threefold.

"An acreage of 15,000,000 of German State, municipal, and private forests, lately canvassed, produces an average net revenue of $2.40 per acre annually. In other words, every acre of this property, good, bad, and indifferent, productive and unproductive, represents a capital of $50, paying 5 per cent. interest, and this constantly improving.

"It must not be overlooked that these results have come largely from non-agricultural lands, the sandy plains, the swamps, the rough mountain slopes, and from forests which in part, at least, were mismanaged like ours.

"Can we expect to attain the same or similar results?"

Wood Used for Pulp in 1905–1906.

THE Forest Service, in Circular No. 44, gives some interesting data as to the pulp industry in 1905.

The following table of the quantity and value of wood used for pulp are compiled from reports made direct to the Forest Service by wood-pulp manufacturers. The number who neglected to report is less than 5 per cent.:—

Wood Used and Pulp Produced in 1905.

State.	Companies.	Wood Used.		Average Value per Cord of Wood at Timber Camps.	Pulp Produced.	Estimated Length of Supply.
		Amount.	Value.			
	No.	Cords.			1,000 Lbs.	Yrs.
New York	60	1,301,986	$8,137,412	$6.25	1,954,626	19
Maine	18	501,807	2,950,625	5.88	646,024	15
Wisconsin	30	382,471	1,686,697	4.41	481,314	13
New Hampshire	6	233,700	1,257,306	5.38	257,795	28
Pennsylvania	11	250,826	1,158,816	4.62	246,744	15
Michigan	8	109,764	475,278	4.33	126,551	20
West Virginia	4	96,357	497,202	5.16	99,713	23
Virginia	3	89,540	492,470	5.50	89,299	15
Ohio	3	54,000	274,320	5.08	58,100	.....
Minnesota	3	31,802	121,801	3.83	49,484	.....
Vermont	7	22,271	122,490	5.50	40,415	30
Massachusetts	4	34,362	171,810	5.00	33,989	25
All others	7	83,337	389 438	4.25	84,910	30
Total	a164	3,192,223	17.735,665	5.01	4,168 964	21

a Operating 237 mills.

The amount of wood used for pulp is small in comparison to the total lumber production, being about 4 per cent. of the annual production of lumber, and 3 per cent. of the value. Yet the wood-pulp industry is of much importance and has developed rapidly.

Statements by manufacturers indicate that the average amount of pulp produced from a cord of wood by the various processes is as follows: Mechanical, 2372 pounds; soda, 1033 pounds; and sulphite, 1009 pounds. The estimate of the quantity of pulp is not wholly satisfactory, since some companies reported dry pulp and others reported pulp containing various amounts of water. Averaging all processes, the figures given show a production of 1300 pounds of pulp per cord of wood.

The processes, broadly speaking, are two—mechanical and chemical. There are, however, two chemical processes, sulphite and soda, so called because they use sulphurous acid and caustic soda, respectively, in reducing the wood.

Spruce is the wood most used for pulp, furnishing more than 70 per cent. of the total amount, and the greater portion is reduced by the sulphite process. Cottonwood and poplar are reduced almost entirely by the soda process. Next to spruce and poplar, hemlock is most used. It has sprung into favor in a comparatively short time, and is reduced chiefly by the sulphite process. Pine is reduced by all processes. Balsam, a wood scarcely considered for pulp, is now widely used, mainly in conjunction with spruce. While it furnishes less than 2 per cent. of the total amount of wood used for pulp, it is practically as important as pine, and would furnish a much larger quantity were it not for the limited supply.

The totals for all processes show that more wood was reduced by the sulphite process in 1905 than by all other processes combined. The respective proportions are: Sulphite, 51 per cent.; mechanical, 34 per cent.; soda, 15 per cent.

One of the interesting features brought out by the returns is the sawmill waste and the different kinds of wood now being made into pulp. Among those were noted pitch, jack, and southern pines, maple, birch, beech, white fir, and some of the pines of the Pacific coast. Of sawmill waste, sawdust and veneer cores were mentioned. It is probable that other woods and waste material may be used for pulp.

The utilization of slabs for pulp appears to have become quite common, 138 establishments reporting their use. The percentage which slabs form of the total amount of wood, however, is small, since they rarely constitute over 10 per cent. of the total amount of wood used by a single mill.

The Bureau of the Census, in co-operation with the Forest Service, has also issued a preliminary report as to the consumption of pulp wood in the United States in 1906. The reports from 250 mills show a total of 3,646,693 cords used, of which 1,944,136 cords were treated by the sulphate process, 1,197,780 cords by the mechanical process, and 504,777 cords by the soda process. Of the total wood used, 2,507,002 cords were spruce, 562,549 hemlock, the balance scattering, principally poplar, pine, and balsam.

In a suburb of Philadelphia two fine tree specimens, each exceeding a century in age, were felled—to accommodate a side-walk along a public road. The walk could have been diverted around the trees, or its grade changed, but the supervisor wanted a straight, level walk.

Mischievous Views Concerning Our Forests.

IT is an old saying that "the darkest hour of the night is the one just before daylight," and it is certainly to be hoped that it will prove true in the matter of our conception of what is true forestry, and, as we are in deep gloom now, a light in the near future will be welcome. Happily there are strong indications that it will come. But however much we may hope and pray for that "good time coming" it will never fully come until we have broadened our comprehension of the actual condition of our forests, and the demands that are now, and in the future will be, made upon them. Furthermore there must be a more practical view held of what our forests stand for.

We all know and feel the sublime sentiments the forests inspire, and appreciate their beauty and grandeur; but we should not stop there. We all know how they conserve and regulate the flow of water in the springs and streams, and how they protect the soil from erosion and prevent uncultivated land from becoming a desert; but we should not stop there, either. There are other weighty matters to be considered, and a one-sided view will fail to bring forth good results.

The most mischievous thought of the times—mischievous because misleading—is that our present forests, if properly treated, will be ample to supply our wants. Unfortunately, this view is widespread.

The next is, that cutting the forests is nothing short of wanton destruction—a destruction that is neither wise nor necessary.

Both these views are, alike, erroneous, but the former is the most so; and, if persisted in, it will cause irreparable damage by delaying the endeavor—which endeavor must come—to restore them.

The fact is, if we will but see it, that we are consuming the products of our forests much faster than natural accretion adds to them. Those of us who have, for the past half-score of years, insisted on this being the case have been laughed at and ridiculed, and it has been said that we have cried "wolf" when there was no wolf. By far too many earnest advocates of forestry of some sort have joined in this belief. They did so earnestly but mistakenly for all that.

Proof of the soundness of the view that we are consuming our forest products faster than they naturally grow has been furnished recently by the Forest Service of the United States in the publication of Forest Service Circular, No. 97, entitled, "The Timber Supply of the United States," by Mr. R. S. Kellogg, Forest Inspector. No more important statement has ever been issued by our government concerning our forests, for it reveals the facts and conditions which confront us. It shows that we are consuming as much of our forest products in one year as can come to them by natural accretion in three years, and hence are lessening their productive capacity with frightful rapidity; and the logical conclusion must be that our forest area is only one-third what it should be to supply our wants!

[I am glad to be assured that the editor of FOREST LEAVES holds the belief that this Forest Service Circular conveys very important information to the people of this country, and that he has made copious extracts therefrom, which will appear in another column. This will obviate the necessity of any further reference to it here, except to say that copies of it can be had, free, by applying to its author, or to *The Forester*, Washington, D. C.]

With this confronting us is it not pertinent to ask, how long can our forests sustain such a drain? Is not the end near? Those who entertain that other mistaken idea—that our forests should not be cut—will probably declare that we should "cease cutting them, stop destroying them; that they are too noble, too grand, too sublime to be made the prey of mercenary greed!" Very well. That would, of course, save the forests, but what would become of our prosperity as a nation? What would the people do who must have the products of the forests? Must we put sentiment before need?

It grieves me to know that so many otherwise intelligent people see but one side of the problem. Only recently I read in the papers a plea for Congress to secure the White Mountain and Appalachian forests for reservations, by Rev. Edward Everett Hale, in which he was deploring their destruction. Speaking of what has been going on in that line he says: "Then, alas! Satan came walking up and down. And he devised methods of making paper from wood pulp. Before him, when the angels and archangels presided over that business, paper was made of such rags as busy housewives minded to see the end of, and haply of older paper which had served its turn. But now, alas! there is not a tree in the forests, big or little, old or young, from which you cannot make paper. . . . Big pines, little pines, big spruces, little spruces, big hemlocks, little hemlocks, all fall before the axe. All is grist for Satan's mill."

What would the good doctor have? Our country without a supply of paper? Would he be pleased to go without his favorite morning journal, or see children go to school without books? Certainly not. But why say Satan controls in the matter? We cannot eat our cake and keep it, too. We must have paper, we must have all the products of the forests so long as they can be had, and the time will come all too soon when we cannot have them, unless we at once engage in planting new forests where old ones have been destroyed. By doing this we shall not only secure all the sentimentalist can ask for, but we will be blessed with every economic result that the most practical can wish. S. B. ELLIOTT.

The Illustrations.

IN the Eastern section of the United States the country is well wooded, while in some sections of the West, particularly in the Great American desert, there are immense tracts which are entirely without timber, and in this section a tree, with its green foliage and grateful shade, is much prized, serving as a landmark for many miles.

The first illustration is of a big cottonwood tree beside the Old Immigrant Trail, in the Carson Sink Valley, Nevada. This tree is said to be the largest and oldest in the State, having a circumference of 23 feet 6 inches, at a height of 4 feet from the ground, which is more remarkable when the comparative slow growth of the tree in this locality is considered. In the early days, when the trains of wagons traversed the plains, it was a welcome sight, serving as a landmark, and a pleasant site for a bivouac at night or a noontide meal. At that time it was considered the only tree available in this section of the country, and served to point out to the traveller the site of water, as this was almost invariably found where there was a grove of these trees. The view was taken by Mr. F. H. Newell, Chief of the U. S. Reclamation Service, who is now engaged in erecting a large government reservoir to irrigate this section of Nevada.

Trees show a wonderful adaptability to conditions. Thus, in dry soil the roots may extend downward to considerable depths, while in wet ground a tree which would otherwise have deep roots seeks the surface. This is well shown in the accompanying illustration of an elm tree, situated on the highway about 1½ miles north of Boardman's Bridge, Litchfield County, Conn., on the east side of the Housatonic River. This tree was 75 feet in height, and had a diameter 4 feet above the ground of 2 feet. It stood on swampy ground, and was blown down in the latter part of September, 1906. The tree was sound in all respects, and while the oval formed by the roots showed diameters of 14 feet and 20 feet, the depth varied from 6 to 18 inches. Under other surroundings, there would no doubt have been quite a different root formation.

Pennsylvania Forestry Legislation.

A SYNOPSIS of the forestry legislation which was secured, and also that which was defeated, at the last meeting of the Pennsylvania Legislature will be of interest.

House Bills 69 and 70, the first mentioned giving the owner of lands which are being reforested the right, on application to the Commissioner of Forestry, and properly caring for such lands, to have them classed as auxiliary forest reserves; the latter, placing a lower rate of taxation on such auxiliary forest reserves, in order to encourage the growth of timber, both failed. The form in which they were presented was new, and, unfortunately, too few persons seem interested in the effort to make the restoration of the forests a financial possibility. Sooner or later, if the great timber industry of this State, now fast declining, is to be maintained, steps must be taken to reduce the taxation on forested and sprout timber lands.

House Bill 78, being the revised forest fire-warden Act, to take the place of the old law on the subject, was finally passed in probably better shape than when first introduced. It was signed by the Governor, and the text of this law will be found in another column under the head, "Act No. 86."

The Camp Sanatorium at Mont Alto, for the care of persons suffering from incipient tuberculosis, was established in the year 1903. Since that time the Department of Health has been created, and it was deemed proper that the Sanatorium should come under its control. Therefore, at the suggestion of the Commissioner of Health and the Commissioner of Forestry, with the consent of the Governor, a bill was introduced transferring the management of the camp to the Department of Health. This passed the Legislature, and has been approved by the Governor.

So successful has been the work at the Camp Sanatorium that the Legislature acted favorably on a bill making an appropriation of $600,000 for the establishment of additional camps which may be located upon forest reserves, and will likely be placed there. This bill was approved by the Governor, and will be found in another column under the heading, "Act No. 157." In order to meet the insufficiency of the appropriation allowed at the camp for the last two years, it was necessary to charge the patients $1 per week for board, but under the new conditions it is intended that the treatment and maintenance of the patients shall be wholly free, and that only those who come within the description of the indigent class may be admitted and share these benefits. It is proposed to

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greatly enlarge the South Mountain Camp, and after this is provided for, Dr. Dixon will no doubt take up the question of the establishment of an additional sanatorium.

Under the act of April 5th, 1905, the State is required to pay two cents per acre for road purposes and three cents per acre for school purposes to townships wherein it now holds lands for forest reserves. To meet this charge an appropriation bill of $80,000 passed the Legislature, and is now in the hands of the Governor.

House Bill 907, appropriating $600,000 for the purchase of lands for forest reserves for the next two years, also passed both branches, and is now awaiting the approval of the Governor.

A bill was passed by the Legislature appropriating $15,000 for the maintenance of the Forest Academy at Mont Alto for the next two years, and $15,000 for the erection of a new building to be used as a dormitory by the students, giving opportunity to increase the useful work of the Academy. The institution is in a flourishing condition, the seven young men constituting the first class being now at work in the reserves, and all doing well. The results of this most excellent provision for the care of the forest reserves are now being successfully shown, and it is hoped the difficult problem of the management of the reserves has been solved.

The appropriations for the current expenses of the Department of Forestry are not as liberal as was hoped, but sufficient to carry on the work uninterruptedly on several of the reserves for the next two years, provided the amounts are not reduced by the Governor. Lands for the reserves are being bought and paid for every week, and the total acreage is increasing at a fairly satisfactory rate.

Another law which passed the Legislature, and was approved by the Governor, incidentally relates to forestry, by the creation of Game Preserves within the limits of the Forest Reserves. These were first established by the Legislature of 1905, but their regulation is further provided for by Act 64, which will be found on another page.

A bill providing for the appointment of Shade Tree Commissions in cities, boroughs, and townships of the first class was passed by the Legislature and approved by the Governor. It is also given in full in another column.

The bill providing for a rebate of taxes on cut-over and sprout lands was passed by the Senate, but dropped from the calendar on third reading in the House. This was undoubtedly the proper disposition of the bill, as the Court of Tioga County declared a similar law passed at the last session unconstitutional.

A bill was introduced in the House in the endeavor to try to control forest fires started by railroads, which passed that body, but failed to get through the Senate.

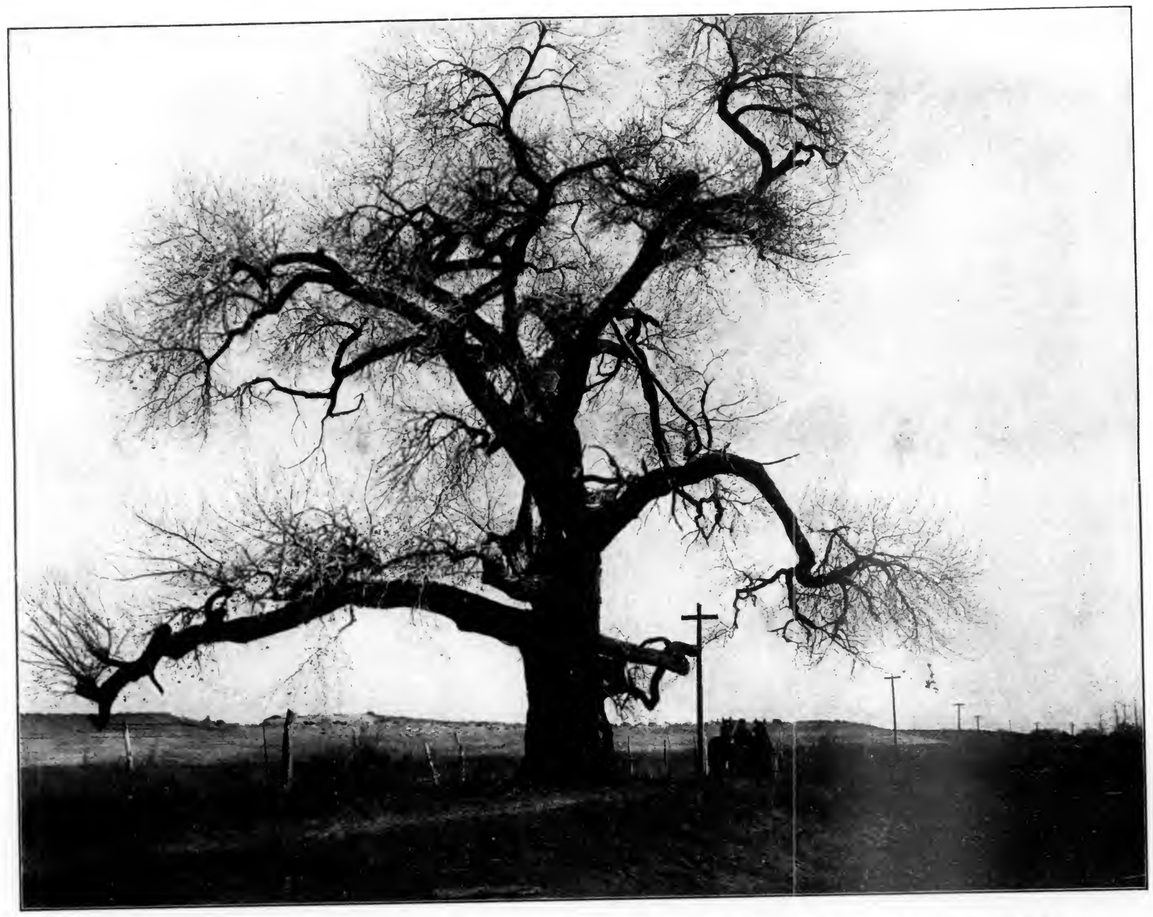
Nurseries in the Pennsylvania Forest Reserves.

THE Department of Forestry has been doing excellent work in three nurseries which it now has, two of them being lately established.

At Mont Alto this spring there were taken from the nursery 10,000 2-year old white pine plants and 2,000 honey locust hedge plants. The white pines were placed in a plantation on the Mont Alto Division of the South Mountain Reservation; 15,000 2-year old white pine seedlings, which were obtained from a western nursery to make up the loss of last year in seedlings obtained from the same nursery, were planted on the Caledonia Division of the South Mountain Reservation. In the nursery there are now about 300,000 1-year old white pines, 60,000 Norway spruce, 3,000 1-year old pignut hickories, and about 1,000 1-year old of miscellaneous species. Beds were made for the planting of the following seeds this spring: 121 lbs. white pine, 10 lbs. Scotch pine, 5 lbs. European larch, 3 lbs. cucumber tree, 5 lbs. persimmon, 2 lbs. hardy catalpa, 25 lbs. white ash, 50 lbs. tulip tree, 5 lbs. balsam fir, 30 lbs. sugar maple, 5 lbs. black locust, 5 lbs. sugar pine, making a total of 266 lbs. of seed. There are now about seven acres in nursery, which is under the direction of Ralph E. Brock, a graduate of the State Forest Academy. The nursery is in fine shape, and conditions point to a successful year.

The new nursery which has been established at Asaph, in Tioga county, is rapidly nearing completion. A six feet wire fence has been built around the tract, and arrangements are now being made to install a suitable water supply, a building for the accommodation of attendants, together with a tool-house and seed-house. The beds have been planted, and contain 175 lbs. of white pine seed, 25 lbs. of tulip poplar, 10 lbs. of Scotch pine, 4 lbs. cucumber (*Magnolia acuminatum*), 10 lbs. white ash, 5 lbs. balsam fir, 40 lbs. shellbark hickory, 40 lbs. pignut hickory, 5 lbs. persimmon, and 5 lbs. of sugar pine.

The nursery at Greenwood Furnace, in Huntingdon County, was begun last fall and enlarged this spring by planting the following seeds: 100 lbs. white pine, 40 lbs. pignut hickory, 40 lbs. shellbark hickory, 10 lbs. white ash, 5 lbs. European larch, 5 lbs. Scotch pine, and 3 lbs. of



LARGE COTTONWOOD TREE ON OLD IMMIGRANT TRAIL IN CARSON SINK VALLEY, NEVADA.

FOREST LEAVES, VOL. XI., NO. 3.

ELM TREE ON HOUSATONIC RIVER, CONN., BLOWN DOWN SEPTEMBER, 1906.

cucumber. There were also planted in that locality in their permanent positions last fall 29¾ bushels of black walnuts and 1½ bushels of white oak acorns.

The business of tree planting is in its infancy in the Department of Forestry, but with the three nurseries above described actively producing seedlings of various kinds, the permanent planting of seedling trees will soon become one of the most important duties of the Department. It is likely that additional nurseries must be established in order to produce sufficient seedlings, but the locations are not yet decided upon.

New Pennsylvania Forest Laws.

THE following acts relating to forestry were passed by the Legislature, approved by the Governor, and are now on the statute books of Pennsylvania:

Act No. 86.

SECTION 1. Be it enacted, etc., That all constables of boroughs and townships, and their deputies, and the employes of the Department of Forestry are hereby constituted ex-officio fire-wardens, whose duty it shall be, when fire is discovered in or approaching forests or wild land, whether the same be owned by individuals, corporations or by the Commonwealth, immediately to take such measures as are necessary for its extinguishment; and who shall have, and are hereby given, authority to employ such other persons as in their judgment may be necessary to render assistance in the extinguishing of such fires.

SEC. 2. The said fire-wardens, with the exception of the employes of the Department of Forestry, shall, while engaged in performing the duties imposed by this act, receive twenty-five cents per hour, and the persons so employed to assist such wardens shall receive twenty cents per hour, as compensation for their services.

SEC. 3. All such fire-wardens shall render to the commissioners of the respective counties, within two months from the date of any fire, an itemized statement, under oath or affirmation, giving the location of the fire, the names of the persons engaged, the number of hours each was employed, the amount of expense incurred in the extinguishment of each fire, and, if possible, stating the origin of the fire; and the commissioners of the said counties, upon presentation thereof, shall immediately pay to the fire-warden, for the use of the persons so entitled, the respective amounts in full so ascertained to be due.

SEC. 4. At the end of each calendar year, after all fire bills shall have been received for the current year and settlements made by the county commissioners, the said commissioners shall furnish, under oath or affirmation, to the Auditor General of the Commonwealth, a written, itemized statement of all such payments made; and the said Auditor General, after the same is approved by him, shall draw his warrant upon the State Treasurer, in favor of the said county commissioners, for two-thirds of the total expense incurred by the said commissioners, in manner provided by this act, for the extinguishment of forest or wild land fires.

SEC. 5. The said ex-officio fire-wardens shall not be limited in their jurisdiction as fire-wardens to the townships, boroughs, and counties for which they were elected, or within which they may reside or are stationed; but shall have power and authority to enter adjacent or other townships, boroughs, or counties, and there to exercise the authority and perform the duties conferred and imposed by this act.

SEC. 6. Whenever any such fire-warden or his assistants shall have rendered service in two or more counties, in extinguishing any fire which shall have burned in two or more counties, said warden shall render statements to the commissioners, respectively, of the counties wherein such service was rendered; setting forth the facts required to be stated by section three of this act, as accurately as may be, which said amounts, so ascertained to be due, shall be paid by the respective commissioners, in like manner as is provided by section three of this act.

SEC. 7. Constables of boroughs and townships are hereby empowered to appoint such deputies as are or may be necessary, not exceeding five in number, who shall be vested with the same authority as constables have under this act; and whenever any fire-warden, by reason of physical disability, unavoidable absence from home, or imperative necessity, shall be unable to perform the duties required by this act, said warden is hereby empowered to appoint a suitable person to act in his stead, who shall be paid twenty-five cents per hour for his services thus rendered, and who, when so appointed, shall be charged with all the duties and liabilities of said warden: Provided, That in making returns to the county commissioners, said returns shall be made by the warden upon report rendered, under oath or affirmation, by the person so appointed.

SEC. 8. Whenever, in the absence of a fire-warden, a forest or wild land fire shall be extinguished or combated by persons without first having been employed by said warden, such persons shall receive the compensation provided by this act: Provided, That after a thorough investi-

gation by the fire-warden, wherein he shall have power and authority to examine persons under oath or affirmation, he shall have ascertained, if possible, as a result of his investigation, the origin of the fire, the amount of services rendered by such persons, and that such service was necessary for the extinguishment of the fire, and shall certify the facts to the county commissioners, in like manner as hereinbefore provided.

SEC. 9. In case of the death of a fire-warden, before the making of any return to the county commissioners as provided for by this act, or in case of his total physical disability, said return may be made by another warden, after first ascertaining the facts; and in making such examination or investigation, said other warden is hereby empowered to examine persons under oath or affirmation.

SEC. 10. If any such ex-officio fire-warden or other officer shall fail to perform his duty as set forth in section one of this act, or shall wilfully or negligently refuse to perform such duty, or shall render a false and fraudulent statement of services alleged to have been performed, under the provisions of this act, or shall fail or refuse to pay the respective amounts due those who have assisted him in extinguishing fires, after said amounts shall have been paid him by the county commissioners, such fire-warden or other officer shall be deemed guilty of a misdemeanor, and, upon conviction thereof, shall be fined in a sum not exceeding one hundred dollars, or undergo imprisonment not exceeding three months, both or either, at the discretion of the court.

SEC. 11. That the sum of forty thousand dollars, or so much thereof as may be necessary, be and the same is hereby specifically appropriated for the payment of the Commonwealth's share of the expense incurred under the provisions of this act.

Approved—The 25th day of April, A. D., 1907. EDWIN S. STUART.

Act No. 157.

WHEREAS, Tuberculosis by its widespread distribution throughout this Commonwealth is causing untold suffering and distress, is affecting the health and prosperity of our citizens, is draining the resources of individuals, and causing an appalling waste of human life; and

Whereas, Modern science has demonstrated the possibility of minimizing this disease by measures of education, sanitary supervision, isolation, and early medical treatment; and

Whereas, The Department of Health has one physician in each of sixty-six counties of the State, and is about to authorize a sufficient number of health officers to see that the present health laws, under the rules and regulations adopted by the Department of Health, are carried out, and thereby care for those suffering from communicable diseases which are not now cared for by the hospitals of this Commonwealth; and

Whereas, The Department, with a sufficient appropriation and its present equipment, will establish dispensaries for the free treatment of indigent persons affected with tuberculosis, for the dissemination of knowledge relating to the prevention and cure of tuberculosis, and for the study of social and occupational conditions that predispose to its development; and

Whereas, There are always thousands of indigent people in this Commonwealth who have contracted tuberculosis, whose homes, lodging-places, and means will not permit them to take advantage of the advice and education dispensed by the Department of Health, as outlined above; therefore,—

SECTION 1. Be it enacted, etc., That one or more sanatoria or colonies be established in the State, for the reception and treatment of indigent persons affected with incipient tuberculosis, and those so far advanced with the same disease, that may be made comfortable, and removed from their families and the people at large to prevent the spread of the contagion.

For these purposes the Department of Health, with the approval of the Governor, shall be authorized to acquire property, erect buildings, equip the same, and do all things necessary to accomplish such work, for the best interests of the people of this Commonwealth, in curing and preventing tuberculosis.

SEC. 2. Be it further enacted, that, should the Department of Health and the Governor select one or two tracts of land, of not over five hundred acres each, within the boundaries of the State forestry reservations, that said land be set aside for such purpose.

For the purposes specified in this act, the sum of six hundred thousand dollars, or so much thereof as may be necessary, is hereby specifically appropriated, for the two fiscal years beginning June one, one thousand nine hundred and seven.

Approved—The 14th day of May, A. D. 1907. EDWIN S. STUART.

Act No. 64.

SECTION 1. Be it enacted, etc., That from and after the passage of this act, there shall be a perpetual close season for game of all kinds and for wild birds found upon such tracts of land, within the Forestry Reservations of the Commonwealth,

as may be set apart by the Department of Forestry to the use of the Board of Game Commissioners as preserves, under the provisions of the act of May eleventh, nineteen hundred and five, entitled "An act authorizing the Board of Game Commissioners of the Commonwealth of Pennsylvania to establish and maintain, within the Forestry Reservations of this Commonwealth, preserves for the protection and propagation of deer," et cetera: Provided, Said lands shall be surrounded by a well-defined fire line, or cleared strip of land, and by at least one wire, with notices posted in conspicuous places calling attention to the fact that the land within the limits of said wire belongs to the Commonwealth of Pennsylvania, and has been set apart to the use of the Board of Game Commissioners as a preserve, or a haven of refuge, into which game of all kinds and wild birds can retreat and be safe at all times: Provided, That none of these preserves shall exceed a circumference of nine miles, or shall be located within twenty-five miles of each other.

SEC. 2. That it shall be unlawful to hunt for or catch or kill or wound or drive, or attempt to catch or kill or wound or drive, any animal or any wild bird within the limits of such preserve, established within the Commonwealth, or for any person to carry firearms within the limits of such preserve, or to take a dog of any kind upon such preserve, during what is known as the open season for game in this Commonwealth.

SEC. 3. Each and every person violating any provision of this act shall be liable to a penalty of twenty-five dollars for going upon said land at a time, for a purpose, or in a manner prohibited by this act, or suffer an imprisonment in the common jail of the county for a period of one day for each dollar of penalty imposed.

Each and every person violating any of the provisions of this act, by the killing or wounding of game within the limits of such preserve, shall be liable to a penalty of one hundred dollars for each deer killed or wounded, fifty dollars for each bear killed or wounded, and twenty-five dollars for each ruffed-grouse, wild-turkey or quail killed or wounded; or suffer imprisonment in the common jail of the county, for a period of one day for each dollar of penalty imposed: Provided, That nothing in this act shall be so construed to prevent any citizen of this Commonwealth from going upon said lands, without firearms, at any time during what is known as the close season for game in this Commonwealth; or to prevent any member of the Department of Forestry, or any member of the Board of Game Commissioners, or any employe of either of these before-named bodies, from going upon said lands in any manner, at any time, with firearms or otherwise, for the purpose of fighting fire, or for any purpose in compliance with the requirements of their official duty.

SEC. 4. Each and every magistrate, alderman, and justice of the peace of this Commonwealth shall have the power of summary conviction in all matters pertaining to the enforcement of any of the provisions of this act; and all actions for violation of any of said provisions, excepting where the defendant is taken in the act or in a pursuit immediately following said act, shall be commenced by affidavit made within one year of the time of the commission of such offense. Each and every magistrate, alderman, or justice of the peace, on complaint made before him, by the affidavit of any person, of a violation of any of the provisions of this act by any person, is hereby authorized and required to issue his warrant, under his hand and seal, directed to any constable, police officer, game protector, deputy game protector, or any other peace officer of the State whose duty it is to protect the game or wild birds of the State, and to cause such person to be brought before him, the said magistrate, alderman, or justice of the peace, who shall hear the evidence and determine the guilt or innocence of the person charged. If the accused be convicted of such offense, he shall be sentenced to pay the penalty prescribed by the section violated, together with the costs of suit. All penalties collected in cases where the prosecutor is a game protector shall be immediately surrendered by the court receiving the same to such prosecutor, who in turn shall, as soon as may be, either deliver or forward such amount to the secretary of the Game Commission, who shall deposit the same in the State Treasury, for the use of the Commonwealth. Where any other than a game protector is the prosecutor, one-half of any penalty thus collected shall belong to such prosecutor, and shall be paid to him by the court receiving same, and the remaining one-half of such penalty shall be forwarded by such court to the county treasurer of the county in which the offense was committed, together with a statement of the cause for which said money was collected. It shall be the duty of each county treasurer to keep a record of the cause for which said money was collected, and to forward the same, at least once a month, to the State Treasurer, for the use of the Commonwealth. Any defendant refusing to pay the penalty imposed, together with the costs of prosecution, shall be committed to the common jail of the county, for a period of one day for each dollar of penalty imposed, unless he shall enter into good

and sufficient recognizance, with one or more sureties, to answer such complaint, on a charge of misdemeanor, before the court of quarter sessions of the peace in and for the county in which the offense was committed; which said court, on the conviction of the defendant of such offense, and upon his failure to pay the penalty imposed, together with the costs of prosecution, shall commit such defendant to the common jail of the county for a period of one day for each dollar of penalty imposed: Provided, That any person charged with a violation of any provision of this act may, at his discretion, sign an acknowledgment of the offense committed, and pay to the duly authorized and sworn game protector or deputy game protector the penalty in full, as fixed by the section violated, with costs to that date; and the printed receipt which he shall receive therefor, and which in all instances shall bear the imprint of the seal of the Board of Game Commissioners and the signature of its secretary, shall be evidence of a full satisfaction of the offense committed.

SEC. 5. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

Approved—The 15th day of April, A. D. 1907.

EDWIN S. STUART.

House Bill No. 361.

An Act to provide for the planting and care of shade trees on highways of townships of the first class, boroughs, and cities of the Commonwealth of Pennsylvania, and providing for the cost thereof.

SECTION 1. Be it enacted, etc., that in townships of the first class, boroughs, and cities of the Commonwealth of Pennsylvania, there may be appointed, in the manner hereinafter provided, a commission of three freeholders, to be known and designated as the Shade Tree Commission of the said township, borough, or city, who shall serve without compensation, and who shall have exclusive and absolute custody and control of and power to plant, set out, remove, maintain, protect, and care for shade trees on any of the public highways of the said townships, boroughs, and cities, the cost thereof to be provided for in the manner hereinafter stated; Provided, that in townships, boroughs, or cities in which a commission for the care of public parks shall have been created, said commission shall, upon the acceptance of this act, as provided in section two, be charged with the duties of the commission as above provided, and shall for that purpose be possessed of all the powers herein mentioned and granted.

SEC. 2. The commissioners of any township of the first class, or the councils of any borough or city in the State of Pennsylvania may, by majority vote, in the case of the commissioners, or by joint resolution in the case of the councils, accept the provisions of this act, and when such majority vote or joint resolution shall have been duly passed and approved and such Shade Tree Commissioners appointed, or in their stead the duties and powers herein provided have been devolved upon an existing park commission, then from that time and in that event this act and all its provisions shall be in full force and application in such township of the first class, borough, or city so accepting, and such commissioners shall be appointed for terms of three, four, and five years, respectively, and on the expiration of any term the new appointment shall be for five years, and any vacancies shall be filled for the unexpired term only, and in townships of the first class the said appointment shall be made by the commissioners thereof, and in boroughs by the chief burgess, and in cities by the mayor thereof; Provided, that in cities where a commission exists for the care of public parks the term and appointment of such commission shall not be changed by this act, but shall be and remain as provided by the act of Assembly and by the ordinance of councils creating such commission for the care and maintenance of public parks. And such Shade Tree Commission shall twice in every year report in full its transactions and expenditures for the municipal fiscal year then last ended to the authority under and by which it was appointed; Provided, that an existing park commission acting under this enactment may embody its report in its regular report to the councils, as by law or ordinance provided.

SEC. 3. That when such Shade Tree Commissioners or park commissioners so acting shall propose the setting out or planting or removing of any shade trees or the material changing of the same in any highway, they shall give public notice of the time and place appointed for the meeting at which such contemplated work is to be considered, specifying in detail the highways or portion thereof upon which trees are proposed to be planted, removed, or changed in one or more —not exceeding two in all—of the newspapers published in said township, borough, or city once each week for at least two weeks prior to the date of said meeting.

SEC. 4. The cost of planting, transplanting, or removing any trees in any highway, and of suitable guards, curbing, or grating for the protection thereof when necessary, and of the proper replacing of any pavement or sidewalk necessarily disturbed in the doing of such work, shall be borne by the owner of the real estate in front of which such trees are planted, set out, or removed, and the cost thereof as to each tract of real estate shall be certified by the commissioners to the township commissioners or to the presidents of the councils in boroughs and cities, and also to the person having charge of the collection of taxes for the said township, borough, or city, and upon the filing of said certificates the amount of the cost of such improvement, of which notice shall also be given to each property owner involved, accompanied with a copy of the aforesaid certificate, together with a notice of the time and place for payment, shall be and become a lien upon said real estate in front of which said trees have been planted, set out, or removed, said lien to be collectible, if not paid in accordance with notice as herein provided, in the same manner as other liens for taxes are now collectible against the property involved.

SEC. 5. The cost and expense of caring for said trees after having been planted or set out, and the expense of publishing the notices provided for in section three, shall be borne and paid for by a general tax to be levied annually in the manner that taxes for township, borough, and city purposes are now levied in such townships of the first class, boroughs, or cities, such tax not to exceed the sum of one-tenth of one mill on the dollar on the assessed valuation of the property in such townships of the first class, boroughs, or cities, and the needed amount shall each year in due time be certified by the Shade Tree Commissioners to the proper authorities charged with the assessment of taxes in said townships, boroughs, or cities, to be assessed and paid as other taxes are assessed and paid, and to be drawn against as required by said Commissioners in the same manner as moneys appropriated for township, borough, or city purposes are drawn against in said townships, boroughs, or cities; Provided, That the commissioners of any township of the first class, and the councils of any borough or city accepting the provisions of this act, may provide for the expense of the maintenance of trees on highways in accordance with the provisions of this section by actual appropriation equal to the amount certified to be required by the said Commission in lieu of the specific assessment above authorized.

SEC. 6. The Commission under which the provisions of this act shall be carried out in any township of the first class, borough, or city, shall have power to employ and pay such superintendents, engineers, foresters, tree-wardens, or other assistants as the proper performance of the duties devolving upon it shall require, and to make, publish, and enforce regulations for the care of and to prevent injury to the trees on the highways of any township, borough, or city accepting the provisions of this act, and to assess suitable fines and penalties for violation of this act, provided such regulations shall have been published at least twice in one or more—not exceeding two—newspapers of the township, borough, or city involved, after having been submitted to and being approved by the commissioners of the township of the first class, or the councils of the borough or city affected, and such fines and penalties so assessed for violations of this act shall become liens upon the real property of the offender, and be collectible by the constituted authorities as liens for taxes upon real property are now collected.

SEC. 7. All the moneys due and collected from fines or penalties or assessments in consequence of the acts of said Shade Tree Commission in enforcing this act shall be paid to the treasurers of the townships, boroughs, and cities accepting its provisions, and shall be placed to the credit of said Commission, subject to be drawn upon by the said Commission for the purposes of this act.

SEC. 8. All acts and parts of acts inconsistent with this act are hereby repealed.

SEC. 9. This act shall take effect immediately, but its provisions shall not be and become binding upon any township, borough, or city until it has been duly accepted as provided in section two.

Approved.

EDWIN S. STUART.

New Publications.

The Longleaf Pine in Virgin Forest, by G. Frederick Schwartz, 12mo, 135 pages, illustrated, bound in cloth, $1.25. John Wiley & Sons, New York.

This is a silvical study made by Mr. Schwartz, of the longleaf or yellow pine (*Pinus palustris M.*), the investigations being chiefly confined to the Gulf region. This species occupies a belt of land rarely more than 125 miles in width, extending from the boundary of Virginia and North Carolina southwestward into Florida, and thence west to within a short distance of the Mississippi River. Detached bodies are also found in the Red River region of Lousiana, and between the Sabine and Trinity Rivers in southeastern Texas. Here it is the dominant tree, forming extensive and continuous forests by itself. It is of com-

mercial importance, and well adapted to systematic forest management.

Mr. Schwartz treats of the virgin forests, describing their character, the soil and the number of trees per acre, and the rotation or evolution in the forest is taken up. Forest fires which are, unfortunately, now quite common in the South, are treated, showing the dire effects on the trees, both old and young. The soil cover, rate of growth in virgin forests, forest management, and the æsthetics of forestry are all considered. Twenty-three plates, a map, two diagrams and six tables aid in making an interesting contribution, which is primarily addressed to foresters, forest students, owners and managers of Southern pine timberlands, as well as others who are friends of the forests.

The Legislature of Vermont, at its last session, passed an act establishing a State nursery for growing forest tree seedlings at the Agricultural Experiment Station at Burlington. These seedlings are to be furnished at cost for planting in the State. The work will be done under the supervision of the New York Forest, Fish and Game Commission.

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CONTENTS.

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The attention of Nurserymen and others is called to the advantages of FOREST LEAVES *as an advertising medium. Rates will be furnished on application.*

EDITORIAL.

THE bulletins of the Forest Service have called attention to extravagance in the use of wood, the ravages by forest fire, the necessity of protecting growing trees and of planting for the future. For more than twenty years FOREST LEAVES has directed attention to these important features, and will continue its efforts to encourage appreciation of the value of forests, and the care of trees. For we believe that interest in an individual growth invites attention to the development of groves and forests.

It has been our pleasure to note from time to time, the advance in public sentiment favoring forest protection, to chronicle liberal reservations by State or National governments and the enactment of protective legislation, to record Arbor Day observances and instances of tree planting. But as if to emphasize these favorable evidences we from time to time have directed attention to occasions where needless violence has been done to growing trees; to forested areas cut over before maturity, or denuded when but a small portion of the crops could be utilized; to wooded tracts damaged by fires, started by design or carelessness.

We have noted instances where a handsome row of trees was sacrificed for a prospective suburban street, which after a lapse of years remains unimproved; where stately elms were destroyed to provide a straight sidewalk, diversion of which would have been no hardship. Such cases and others continue.

During July, Philadelphia was invaded by members of a national order, and a large parade was a feature of the convention. For the comfort of onlookers and the profit of individuals, stands were erected, and as some shade trees which the city had planted interferred with these stands, the trees which are young and therefor

readily injured suffered. The stands were constructed so as to clear the slender trunks, but the foliage interfered with the view from seats for which money had been paid. The result is a vivid illustration of the "don't care" which has done so much to damage tree growth and denude areas which should be forest covered.

These are merely individual small trees, but they were planted with the purpose of beautifying the street and the expectation of future symmetrical growth. At present one cannot prophesy which may live, but it is doubtful if any which formed obstructions to the view of those who purchased seats will ever be beautiful or shapely trees. If they were worth planting they are worthy of protection.

A sidewalk tree has a hard struggle for existence and needs care. Many are planted where there is sparse room for root growth or nourishing soil. Asphalted streets and sidewalks offer poor media for moisture to pass to reach the roots, the trunks need protection against the teeth of horses or the jack-knives of whittlers. Brutal treatment of branches and leaves may therefor be expected to heal slowly if at all.

While these are merely young trees which may be replaced, at a loss of time in securing shaded sidewalks, the carelessness of their treatment emphasizes the necessity of maintaining lively public interest in all which pertains to tree life. J. B.

Forest Planting by the Pennsylvania Railroad.

FOREST LEAVES for February, 1905, printed a paper on the "Work of the Pennsylvania Railroad in Planting Timber for Cross-Ties," by J. T. Richards, Chief Engineer, Maintenance of Way, which was read at the American Forest Congress in January of that year. As considerable progress has been made since that time, a brief account of the work may be of interest.

Following the plan which was inaugurated in the spring of 1902, the planting of black locust on unutilized land acquired in connection with straightening and widening the main line and in the construction of low grade lines was continued up to 1907. During this time 1,679,320 locust trees were set out. Most of the plantations grew rapidly and look well, except in the wet situations. The oldest plantation, which is near Vineyard, about 50 miles east of Altoona, is five years old, and the trees are now 2 to 5 inches in diameter and 15 feet high. They were spaced 10 by 10 feet apart, and the tops are now just coming together to form a complete crown cover.

The locust plantations, as a whole, although looking well from a distance, upon close inspection show several serious defects. The most notable is the damage done by the common "locust borer" (*Cyllene robiniæ*), and it is found that none of the plantations are exempt, while in many cases as high as 75 per cent. to 95 per cent. of the trees are infested. Indications of the borers' presence are found in broken twigs, deformed trunks, and piles of fresh sawdust which the borers have excavated. In the worst cases the trees have broken down or are dying.

Another drawback to locust in pure stands is that the trees are inclined to fork near the ground and develop low-spreading crowns. Moreover, owing to their light-demanding nature and thin foliage, they do not form a sufficiently dense crown cover to keep down grass and weeds.

In view of the above objections to black locust, it seemed advisable to use other species in the work carried on this spring (1907), and accordingly red oak, pin oak, Scotch pine, tamarack, and chestnut were tried on situations adapted to these species. Red oak promises to be a very valuable tree for general planting, since it grows more rapidly than white oak, is adapted to most of the upland situations in central Pennsylvania, and, through the ability of the wood to take creosote, can be made durable for cross-ties if treated. Scotch pine is being used in mixture with oak and European larch, and is also well suited for planting in pure stands on sandy soils. Like the red oak, it can easily be treated with preservatives. The European larch, because of its rapid growth and straight, clean stem, is an excellent post timber, and should develop into dimensions suitable for ties. Pin oak and tamarack are being used in wet situations where better species will not thrive.

In order to produce plant material for future work, a forest nursery has been started at Hollidaysburg, near Altoona, where all of the above-mentioned trees are being propagated. Hardy catalpa is also to be tried on fertile, well-drained bottom lands, and Norway spruce is being grown for live snow fences. Arbor vitæ is another species introduced into the nursery with the idea of using it as a screen and soil-retainer around reservoirs.

The following table shows the trees planted to date on lands owned by the Pennsylvania Railroad Company:

1902,	Locust,	13,610
1903,	"	43,364
1904,	"	223,656
1905,	"	597,165
1906,	"	801,625
1907,	Locust,	175,516
	Red oak,	252,154
	Pin oak,	4,570
	European larch,	6,970
	Scotch pine,	3,500
	Tamarack,	3,000
	Chestnut,	2,316
	Total,	2,127,446

The value of this work lies, first of all, in the beginning made toward providing for a future tie supply, but, of course, the two and a quarter million trees planted will be only a start toward providing for the annual consumption of 3,000,000 ties on the lines east of Pittsburg and Erie. The work, however, has, in addition, a broad economic significance in indicating how waste lands may be made productive, while it is hoped that its educational value will not be overlooked, and that private landowners throughout the State will plant their waste land to trees.

E. A. STERLING,
Forester Penna. R. R. Co.

Causes of Deforestation.

SOME of the causes that have and that are destroying the forests, and in many cases, good agricultural lands in the United States may be described as follows:

It is not because the people of the United States do not love their forest, nor that they want to realize great wealth or get more cultivated fields, that our forests are so wantonly cut down. There are other causes that tend to destroy our forests. First in order is the unjust taxation of timbered land, as it exists in nearly all the states of the Union. Second, the tariff placed on foreign timber. Third, the selling of land by the government, both national and state, fit only for raising of timber, as agricultural land.

As to the first cause, no law of taxation has ever worked as ruinous to our forests' interests as the law that taxes the value of timber on the stump the same as any other value of private property.

Many examples might be cited from nearly all states in the union in which men have been forced to cut their forests in order to escape the high and ruinous taxation. But let us take one case of the thousands of these in particular for an example. A man near Grand Rapids, Michigan, has eighty acres of mixed hardwood timber, the pride of the township and county in which he lives. This man has also about sixty acres of agricultural land from which he cannot make a profit large enough to pay the heavy taxes on his timbered land imposed or levied by an honest assessor, and at the same time keep his family and himself from starving. All this because his eighty acres of hardwood timber is valued on the stump at from $25,000 to $30,000.

Now his crop is not ripe enough to cut and at the same time he wishes for many reasons to preserve the forest, for some time, as an ornament to the country and for future profit. Yet under the present system of taxation he is forced to cut the timber either in part or all before it is ripe, just in the prime of its growth in order to escape the high rate of taxation of his whole forest area. He is practically forced to sell either his crop or his farm.

On his various agricultural crops he is not taxed while they stand in the field, but on the value of the land. Why should he be taxed on his forest crops while they stand on the soil? A tax on his crop when it is harvested would be a just tax, and a tax on the land that grows the forest crop would be a just tax, but a tax on unharvested forest crops is setting a premium on the destruction of our forests, and the sooner our state legislatures will see this and remedy it the sooner will our states and the government of the United States preserve some of her beautiful forest lands, for the economic use of those that come after us and who will call us blessed for our forethought.

The second cause, the law of protective tariff on timber, is harmful, working toward the destruction of our forests, and it would become Congress to get busy getting together forces enough to repeal or change such an unjust tariff law. There can be no cry of "protection of infant industries," for the lumber industry has grown to be a giant, and has in many states left nothing but stripped treeless wastes in its wake. It is self-evident that every dollar paid by the foreign lumber dealers in the way of a tariff comes out of the consumer's pocket and restricts at the same time importation and also tends to greater consumption of our own forests. Do we need a tariff on an article which is already becoming scarce in our country?

The third cause, the selling by the states and the giving away by the United States of abandoned forest-lands, and other waste lands, fit only for forest production to settlers as agricultural land, is not only throwing a bad repute on agricultural industries, but it costs the states every year more in advertising and marketing said lands than is realized from the same and in the end they are returned again to the state as delinquent tax lands or abandoned lands. But not in as good condition, for whatever second growth of timber, or value there was on the land has been destroyed or harvested, leaving the land in much poorer condition than when sold or given as a homestead.

Would it not be a better policy for our state legislatures and national government to enact laws for the holding of all such lands, to give them protection and proper management under competent foresters and use them as nucleus for a state and national governmental forest reserve, which might in time raise the much needed materials to keep our wood-working industries running. Then each state might have a forest reserve after the pattern of our already existing national reserves, and in place of having desert land we would again possess the once beautiful forest regions, that would protect our cities in the valleys from flood water, and which would ameliorate our climates. We would then not read so much about rivers breaking and overflowing their banks, destroying life and property, or frosts killing our crops.

It is high time that our people wake up to the fact that our country is fast losing what was once her pride and great natural resource, and that the destruction of the forests have brought with it the floods, drought and destruction of much valuable agricultural land.

If these three causes detrimental to our forests' growth could be removed and above suggestions followed we would soon stand but little beyond the forest policies of European countries, and seventy-five or one hundred years from now our states and country would again have an income from their forests, which at the present increase in lumber prices, would make them rich, and which would make it unnecessary for them to import timber from abroad to keep their manufactories going.

C. H. GOETZ.

Taxing the Wild Lands of Maine.

MR. D. H. DARLING, of Gardiner, Maine, is identified with large lumber interests on the Kennebec River, and an earnest advocate of conserving the forest resources of that State. He is desirous of seeing a radical reform in the laws on the taxation of timber, and suggests a tax on logs only. It is probable that in solving this problem Maine will have to frame laws similar to those proposed for Pennsylvania, making a nominal tax on the land and then tax the timber when cut. His argument in favor of taxing the logs only is as follows:

This State is not so rich in commercial enterprises that it can afford to lose any, let alone the chief enterprise of all—its lumber. But it is in greater danger of losing it than the general public realizes, and no one is as fully aware of this as the lumbermen themselves.

It is true that present methods of cutting are far more careful and less wasteful than formerly, and that, in co-operation with the State Forestry Department, an effort is being made to extinguish fires while small enough to control. But however much lumbermen may desire it, and all enlightened ones do, no attempt is being made to provide for a future supply of timber, nor can be under present conditions. On the contrary, every piece of timberland under operation to-day is being cut at a rate three to five times faster than it grows, a condition which, unless changed, will produce a timber famine within the lifetime of men now in active business.

The sole reason for this is that the present system of wild land taxation is entirely and radically wrong. Under it a man *must* cut his timber, whether it is ripe or not, otherwise his taxes will eat it up. How long could a farmer stand it if he had to cut his hay when half grown, and dig his potatoes when half ripe? But that is precisely the condition of Maine timberland to-day, and a timber town is nothing but a timber farm, and should be so considered, the fact that the spruce crop requires 150 to 200 years to ripen being a difference in degree only.

Our timber farms are now in the condition that Germany came to 100 years ago—demand increasing and the end of the supply in sight. The thrifty Germans saw the condition they would be in with their timber gone, and changed both the tax laws and methods of cutting. For 20 years the annual yield per acre remained stationary, but to-day it has reached the sum of $2.40 net per acre for every year, and is increasing.

For the State of Maine this condition would mean instead of a net yield of $3,000,000.00 yearly with the end in sight, a yearly yield of $21,600,000.00 in perpetuity. Certainly no Yankee will admit his intelligence to be below that of the average German, and what the German, has done, the Yankee can do and do as well.

Under the present system taxes are levied on land valuations, but the money to pay the tax must come from the crop. The timber farm, while growing a crop, but producing no income, must pay from the proceeds of preceding crops, while the one whose crop is ripe and being harvested, pays from the present crop. This is just the point, land should not be taxed at all, but the timber after it is cut into logs. This would relieve the necessity for cutting half-grown trees, allowing them to grow to maturity first, so insuring the future supply.

The crop of logs is a definite value, easily obtained from scale bills on the different operations, while the value of wild land is something on

which no two timberland explorers ever agree. And here is a fact not generally known or appreciated. Wild land—the timber farm—is not the property of its so-called "owner," as is his house lot or his potato farm. On the latter he may place a sign warning trespassers off, and the law says they must then stay off. But his timber is open to any one from anywhere at all times and seasons, and, in this sense, belongs to the public and not to its owner at all. What, then, does he own? For all useful and practical purposes, simply the timber growing there, and should he sell "his land," all of present value he conveys is timber.

Now how is it taxed? First the State levies on the land. Next the county levies, and again on the land. He cuts the timber down into logs, which then, according to present laws, become personal property, and on these the town levies. Unless he sells his logs, either as logs, lumber, or pulp within a year, they are again taxed by his town, so having paid double taxation without paying a cent of return. And this happens yearly with nearly every lumberman who owns logs. He has paid a tax on his land with timber standing, the same year a tax on his logs down, the next year a tax on his land empty, and a second tax on the same logs if he has them. When he has finally cut all timber fit to cut, that land must stand, unproductive of income for at least 25 years, still paying taxes, and always open to the public.

And because that land now produces no income, have the taxes been reduced? Here is an example—From a certain town every saw log (ripe log) will have been cut by the end of next year, leaving nothing standing but half-grown pulp logs. If it is not burned—a not unusual fate—ripe timber may again be cut in 25 years and not before. Have the taxes been reduced? *They have been doubled*, and, at compound interest, will amount in 25 years to over $46,000.00, over half the value of the stumpage cut. At the end of 25 years, $46,000.00 will stand charged against that town if he holds it.

But will he hold it? No! He will withdraw his capital by cutting every dollar's worth of timber standing. The State will buy, for taxes, land that will not pay one cent, that will not profitably employ one man one day for 150 years, for not until then will another crop of timber grow, and the land is fit for nothing else.

The lumber industry is not a philanthropy, but a business—a matter of dollars and cents, in which are interested, not alone the timber farmer, but his employees; the people at large; the State itself. In its timberland and attendant industries is invested over $200,000,000.00 to-day.

Do the people of this State want this money withdrawn from the State? But withdrawn it will be as surely as the present system of taxation continues. It is being withdrawn now in anticipation of increases in land taxation already beginning.

A very little increase in taxes under present methods will bring about such a panic in this industry as neither this nor any other State has seen. Every one will try to cut all of his timber at once, over-supplying the market to such a degree that values for all lumber products will come crashing down. This will go on till every stick of timber that will bring a dollar is gone, and with it an industry that has stood in the forefront in this State for 300 years.

Change the law then before it is too late; tax logs, and logs only. Levy but one tax, a State tax, and apportion it among the State, the County and the town, and levy that tax but once. No property should pay double taxation. The whole matter is too serious to remain the football of politics, but must be settled once, and settled right, and then let alone.

Protective Measures for Forests in California.

THE McCloud River Lumber Company owns 300,000 acres of timber land in Siskiyou county, California, the headquarters of the company being at McCloud. The tract of land is on a level plateau at the base of Mount Shasta, at an elevation of about 3,000 feet above the sea. The situation is such as to preclude an excessive annual rainfall, and is subjected to a long period of dry weather in the warmer season. Between the last of September and the middle of May the rainfall is 40 inches. Practically no rain falls during the summer months. The tract has been logged for the past seven years, about 43,000 acres having been cut over. There are two distinct classes of forests on the tract. On the drier lands the forest is pure yellow pine, with but a slight admixture of white fir, red fir and sugar pine.

The danger from fire on the tract is great, especially on the cutover land on which remains much debris, which becomes as dry as tinder in the rainless season. In cases of great conflagration not only are the forests threatened with destruction but camps, railroads and mills are in danger. In 1903 the company expended $3,000 in fighting fire and $2,500 in 1904. Naturally the company is anxious to adopt some measure to minimize the danger of fire, and it has sought

the aid of the Forest Service for help in such endeavor.

About 15,000 acres in township 39 and 40 north, range 2 west, have been set aside as an experimental area. Most of this body of land has been cut over in the process of logging. The area was carefully cruised and the stand of timber after logging was thereby ascertained. Growth figures were then taken to show the size and amount of timber to be expected from these trees forty years from time of first estimate.

In the plan devised for fire protection on the tract of the McCloud River Lumber Company the cost of the work for one year was set down as follows:

Fire lines, twenty miles a township at $15 a mile	$300.00
One patrolman at $75 a month, four months	300.00
Three tool stations, with tools, at $15 each	45.00
Cost a township	$645.00
Cost an acre	.03

In this estimate no account is taken of telephone lines. The general execution of the plan was in the hands of an agent of the Forest Service.

The fire lines at McCloud were constructed in the fall of 1904 and in the spring of 1905. The fire line along the railroad track was made 400 feet wide, the danger from sparks on that line being great. Where the slash and chaparral were not abundant lines 200 feet wide were deemed sufficient. All the brush in the fire lines was burned. On this tract piling the debris is not, as a rule, necessary, since the slash on the logged lands is usually bunched, due to the use of logging wheels, and to give space for them the slash has to be removed from around felled trees, the result being that the slash is thrown together convenient for burning. Fifteen miles of fire line were burned over in 1905 at an average cost of $15 a mile. Thus protection was afforded for 15,000 acres of cutover land at a cost of 1½ cents an acre.

A patrol route was laid out in the beginning of 1905, which was twenty-five miles long and practically encircled the experimental area. It passed through those parts of the tract where fire danger was the greatest. A mounted patrolman covered the route daily for four months, from June to September inclusive. It was found that in this jaunt he could oversee 70,000 acres. He was given authority to organize crews for fire fighting and had direct control of fire protection. The cost of this patrol system was $75 a month, including the keep of the horse, a cost of but ½ cent an acre.—*The American Lumberman.*

1906 a Record Year in Timber Output.

THE production of lumber, lath, and shingles in the United States in 1906 was the largest ever recorded. A preliminary census bulletin recently issued gives 37,490,067,000 feet as the actual cut of the 21,077 mills which made reports. This is seven billion feet more than the cut reported in 1905.

These figures at first seem to point to the conclusion—that the country had in the last year cut more than 23 per cent. more lumber than in 1905, in the face of the fast waning supply. The difference is, however, chiefly due to the fact that 21,077 concerns have reported their cuts as against 11,666 a year ago. The gain is the result of responses from the smaller mills.

If the returns were complete they would probably show a cut of forty billion feet for lumber alone. The cut of lumber forms perhaps 40 per cent. of the total timber consumption for all purposes. The figures are alarming enough, taken in connection with our available supply of wood. The total amount of merchantable timber in the United States is believed to be less than 2,000 billion feet. If the demand could be kept stationary, and no timber were burned up by forest fires, we should have twenty years from now only what our forests would have grown in the interval.

The Forest Service states that three-fourths of the population of the country is east of the Mississippi, but more than half of the timber supply is west of it. The West has in its forests material to last it for nearly fifty years if its per capita consumption is no greater than that of the country at large and if it can hold itself down to the same annual total. This, however, takes no account of the demands which a developing country makes. But the East has not enough saw timber of its own to last fifteen years. In point of fact the East is already drawing so heavily upon the Northwest for lumber that the railroads have trouble to handle the traffic. The position which Douglas fir holds illustrates the West's rapid progress toward becoming the principal source of supply of saw timber, and the falling off in the production of Eastern States which formerly held first place. Douglas fir now ranks second only to yellow pine in total cut, and yields about one-half as much lumber. Never before has it outranked white pine, which for many years stood first, and later second. Just as white pine had to give way to southern yellow pine, this in turn will be superseded by Douglas fir, which is also known as red fir and Oregon pine. It is found nowhere east of the Rocky Mountains, and by far the greatest quantity of it is in Oregon and Washington.

The passing of the white pine of the Lake States is emphasized by the statistics gathered by the census, which in 1870, 1880, and 1890 showed Michigan the leading State in total production of lumber. In the census of 1900 Wisconsin had passed to first place, with Michigan second and Minnesota third. This relative position was not changed until 1904, when Washington appeared at the top of the column and Louisiana was third, with Wisconsin second and Minnesota and Michigan fourth and fifth. Louisiana now takes second place, while Wisconsin goes down from second to third and Minnesota from fourth to seventh. Mississippi and Arkansas have moved up to fifth and sixth places, while Michigan goes to fourth.

New York, in 1850, led all the States in the production of lumber. Pennsylvania rose to first place ten years later, and New York dropped to second.

The holding of first rank in production by a State does not locate the country's chief source of supply. Washington now stands first among the States, yet the South is supplying more lumber than the West. But the magnificent yellow-pine forests of the South are being rapidly cut and marketed, just as was done with the white-pine forests of Michigan and Minnesota during the thirty years following 1870. But the Pacific Coast will soon be the chief source of supply.

The policy of the Government in creating National Forests in the West, taken in connection with the favorable climatic and topographical conditions for the growth of trees, insures a future supply which will be greatly to the West's advantage. The East had originally the bulk of the country's forests. It has largely wasted them. The West has now a considerable provision for the future. The presence of the National Forests will insure for all time a permanent supply of material for wood-using industries, although the actual holdings of the Federal Government in themselves are by no means sufficient to furnish all the timber which will be needed. They will also have an influence in encouraging private holders of timberlands to take care of them in a way that will keep them in a productive state. The question what to do for timber that can not be had in needed quantities is likely to become acute in the East.

The Agricultural College of the State of Washington has established a forestry school.

Pennsylvania's 1906 Lumber Product.

THE Director of the Census, in co-operation with the Forest Service, has issued a preliminary report on the production of lumber, lath, and shingles in Pennsylvania for the calendar year ending December 31st, 1906. These figures are given below, those for 1905 being added for comparison.

Lumber, Lath, and Shingles—Pennsylvania.

(The figures cover the cut of 1,482 mills in 1906 and 714 mills in 1905.)

Kind of Wood.	Lumber. Thousand ft. B. M.		Lath. Thousands.		Shingles. Thousands.	
	1906	1905	1906	1905	1906	1905
Hemlock	966,480	920,854	153,232	184,309	30,187	69,434
White oak	177,247	92,998	1,295	.....	367	.....
White pine	96,564	87,097	26,458	25,704	3,849	11,993
Maple	75,081	48,883	265	.....	80	.....
Chestnut	73,096	41,018	6,482	1,225	12,793	7,812
Red oak	65,863	42,054	8,962	.....	7,091	.....
Beech	53,892	53,494	455	2,000	.....	.....
Yellow pine	34,063	15,929	1,455	951	262	284
Birch	25,583	23,852	137	.....	250	.....
Basswood	17,932	12,520	717	.....	40	.....
Ash	9,484	6,691	2	.....	.....	.....
Hickory	9,389	5,146	.....	.....	.....	.....
Elm	5,635	2,323	.....	.....	530	.....
Yellow poplar	5,304	.....	81	.....	.....	.....
Spruce	2,428	834	953	185	411	.....
All other	2,840	45,471	.....	4,729	.....	2,618
Total	1,620,881	1,397,164	200,494	219,143	55,860	92,141

From the table, it will be seen that the production of lumber in Pennsylvania increased from 1,397,164,000 feet in 1905 to 1,620,881,000 feet, a gain of 16 per cent., but there is a falling-off in the manufacture of lath and shingles. The latter fact owing to the increase in production of timber, and the larger number of mills reporting is difficult to account for, as it would seem as if there should have been a proportionate increase in shingles and laths. Possibly in the revised report this may be accounted for.

The fifteenth National Irrigation Congress will be held in Sacramento, Cal., September 2 to 7, inclusive. The four great objects of the Congress are "to save the forests, store the floods, reclaim the deserts, and make homes on land." All who are interested in these objects are invited to attend the Congress and participate in its deliberations.

Simultaneously with the Irrigation Congress, the Interstate Exposition of Irrigated Land Products and Forest Products will be held at Sacramento.

There will be special excursions, to enable delegates to see various portions of California.

Pacific Coast Red Cedar (Thuya Gigantea).

THIS valuable Pacific Coast tree is known by at least a dozen different names, and nearly all are wrong. It is not a cedar at all, but an arborvitæ. However, as it is commercially known as a cedar, we will ignore the error and speak of it by its best known name. It is found in western Washington, western Oregon, and in northwestern California. It nowhere forms pure forests, but will be found growing singly or in small groves. It prefers, for its best development, moist bottom lands or near the banks of streams, although it climbs the mountains to a height of 5,000 or 6,000 feet. It extends eastward into Idaho and Montana, where, in places, it is greatly dwarfed in size, sometimes to but little better than a shrub, showing that it requires a moist atmosphere. It does not attain to much importance more than 50 miles from the coast.

It grows to a large size in favorable situations, frequently to a height of 200 feet, with a diameter of 10 and even 11 feet. It is a vigorous grower and a fairly prolific seeder, and, were it not for forest fires, could be depended upon to reproduce itself; but as its bark is thin—seldom over three-fourths of an inch—even a slight fire may kill it. The bark is a bright cinnamon red, and its general appearance can be seen in the illustration. The dead bark scales off in long, thin, fibrous strips, and the Indians made ropes of it, and, at times, wove it into rough cloth.

Its wood is very light, quite close-grained, soft, brittle, easily split, and very durable, especially in contact with the soil. The color is dull brown, somewhat tinged with red. Its sap-wood is thin and nearly white. It has a peculiar odor which is difficult to describe, but which, when once observed, cannot be mistaken.

Its wood is used on the Pacific Coast for interior finish of buildings, doors, sashes, cabinetwork, fences and shingles. It may well be called the great shingle tree of our country. Vast quantities of shingles are manufactured from it in Oregon and Washington and shipped to the eastern States. Of the shingles cut in the United States in 1905, this Pacific Coast cedar produced 62.5 per cent., or 9,590,245,000. Of cypress, next in importance, there was 9.9 per cent., and of eastern cedar 8.6 per cent. White and Norway pine produced only 2.5 per cent. This establishes its importance.

If fire can be kept out of the forests the tree will grow naturally and its successful reproduction be assured, otherwise propagation will come about only from artificial methods. It is not at all probable that it can be grown east of the crest of the Rocky Mountains, and unless its propagation shall soon be undertaken in the states where it naturally thrives it will, in the not distant future, become, like our white pine of the east, practically exhausted, and when exhausted—and the eastern cedar and cypress will go with it—what are people of moderate means to do for material to cover their houses? S. B. ELLIOTT.

The Form of Trees.

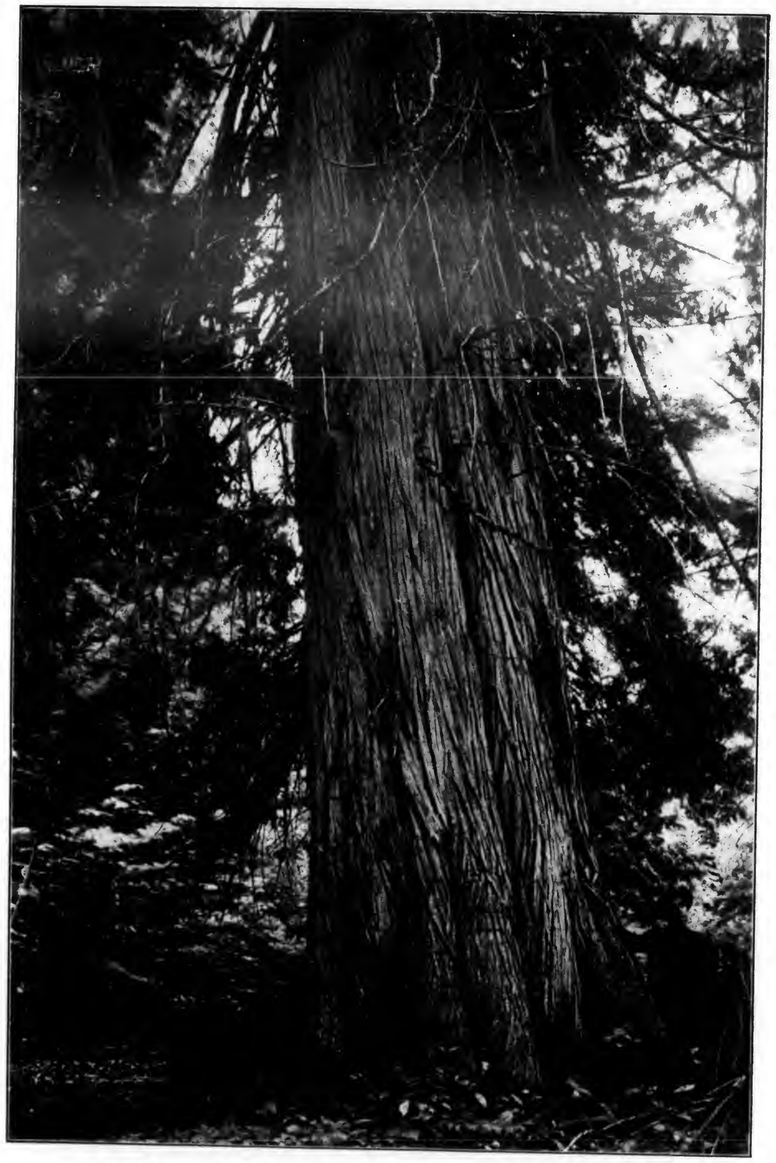
ANYONE estimating timber, or having any connection with the woods end of lumbering, knows that one species of tree will scale and cut more lumber than another of exactly the same diameter and height. This is due to the shape of the tree. The one will be full-bodied and keep its diameter well up into the short, bushy top, while the other is more slender with more rapidly-tapering logs and long, narrow top. In the east the old white pine was an example of the full-bodied tree, the hemlock of the tapering tree. In the west yellow pine grown in the Black Hills, Arizona, or the lower Rockies, is much fuller-bodied than the same species on the west slope of the Sierras in California and Oregon. Douglas fir in the Rockies is fuller-bodied than the same species around Puget Sound. The cause of this difference is that the form of the tree is by nature different in various species of the same locality, or environment causes different forms of the same species under widely varying conditions and localities. Thus, white pine and hemlock vary in the east under the same conditions, and western yellow pine of the Black Hills varies radically from western yellow pine of the upper Sierras in California. The cause of the latter difference is the slower growth and open forest of the Black Hills against the very rapid growth and dense forest of California.

In estimating, a lumberman mentally makes allowance for this difference in form. It can, however, be expressed accurately by comparing the volume of the tree with the volume of a cylinder of equal diameter and height. Thus, if a tree 24 inches in diameter, breast high, and 100 feet in height had a volume of 157 cubic feet, and a cylinder of the same dimensions had a volume of 314 cubic feet, the relation would be $\frac{157}{314}$, or $\frac{1}{2}$, or decimally .50. This mathematical relation is called a form factor. If the volume of another tree of the same dimensions were 188 cubic feet, its form factor would be $\frac{188}{314}$, or .60, which would show a more full-bodied tree and would scale $\frac{60}{50}$, or 120 per cent. of the first tree's

THE PACIFIC COAST RED CEDAR. (THUYA GIGANTEA.)

FOREST LEAVES, VOL. XI., NO. 4.

SPRAY OF PACIFIC COAST RED CEDAR, WITH CONES.



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scale, were the same number of logs cut from each.

From a large number of accurately measured trees the Forest Service has established the average form factor for lodgepole pine in Montana to be .53, with a range of from .58 for 6-inch trees to .42 for 22-inch trees. Douglas fir in Idaho and Wyoming varies from .58 for 10-inch trees to .40 for a 40-inch tree, with an average of .49 for merchantable trees. Western yellow pine in the Black Hills has an average form factor of .53, which does not vary very much. In the Sierras of California it is .42, with a range of from .45 to .39 as extreme averages—a very small variation. In other words, western yellow pine in the Black Hills would be expected to give a scale of $\frac{53}{42}$ of the scale of a tree of the same dimension in the sugar pine-yellow pine belt of California. This would be more than ¼ more in the former region, and is further greatly increased by the closer cutting in the Black Hills, where better local markets are found for the lower grades of lumber.

Forestry in Norway.

U. S. Vice-Consul Michael Alger, of Christiania, furnishes a report on the forest and forestry products of Norway, in which he says:

Although 21 per cent., or 26,324 square miles, of the total area of Norway is still considered to be covered with forests, having an estimated value of about $122,000,000, the products of these woods remain, what they have been for years, the principal item on the country's export list. Real forests, where lumber of useful sizes are found, are now confined mainly to the eastern and central part of the country, while on the coast land, from the southern part to the Russian frontier on the Arctic Ocean, there is hardly anything left of the abundance of large trees which formerly covered those districts.

The real forest trees of the country are Scotch fir (*Pinus silvestris*), spruce (*Picea excelsa*), and birch (*Betula verrucosa* and *odorata*). The two first named species grow side by side, the fir predominating on dry ground and going somewhat higher up the mountains than the spruce can grow. With the exception of the spruce, which rarely grows north of the polar circle, these trees prevail over all the country, sometimes in an unmixed continuous forest covering large stretches, but more commonly mixed with each other or with sporadic representatives of other species of trees. North of the polar circle the birch is predominant on the coast as well as in the interior and forms the great bulk of the forests. The conifers grow as high as 2,600 feet, while the birch zone reaches from 3,000 to 3,500 feet above the sea. Three-fourths of the forest area is covered with conifers and one-fourth with foliage trees.

The annual lumber production is about 344,000,000 cubic feet for the whole country, or 203 cubic feet per acre of forest. Of this quantity about one-fifth is exported. With a population of 2,000,000 there is an annual average consumption per capita of 137 cubic feet and a forest area of 8.42 acres. About 20,000 persons earn their livelihood by working in the Norwegian forests.

The time required by the conifers to reach timber size varies greatly in Norway, where climate and other conditions differ so much on account of the great distances and the ruggedness of the country. In southern Norway the pine when from 75 to 100 years old is, as a rule, sufficiently large to yield timber of from 23 to 25 feet in length and 9 or 10 inches in diameter at the top. The spruce can, under favorable conditions of growth, yield timber of the same size somewhat earlier, and may be ripe for cutting down at an age of 70 or 80 years. But for the whole country the period of growth for trees matured for felling may be placed somewhat higher, for the pine at about 150 years, and for the spruce at 120 to 150 years. The new growth amounts on an average to 20.7 cubic feet per acre; but at the same time the cutting down of forests is estimated at 21.7 cubic feet to each acre of forest; thus the forests are made to yield more than their annual new growth.

In Norway the forestry administration is now part of the department of agriculture, having a director, 4 inspectors, 25 managers, 2 assistants, 10 planters, and 385 overseers and rangers as the working staff.

An appraisement of the forests and the preparation of regular plans for their exploitation have been commenced. Commercial nurseries have been established in several places, as well as establishments for collecting and sale of forest tree seed. Elementary instruction in the treatment and cultivation of forests is given at three forestry schools, and advanced instruction at the agricultural college. During the last thirty or forty years planting and scientific cultivation of forests have been undertaken both by the State (in one treeless district the State has planted a territory of more than 4 square miles) and by private persons with the assistance of the State. Planted forest is supposed to be self-seeding when 30 years old.

Of Norway's forest area the State owns 3,335 square miles, which bring an annual income of about $268,000. The annual expenses connected with the public forests, "Statsal menninger," as they are called, amount to about $128,000. The yearly profit derived by the State from this source is thus about $140,000. About $45,500 are actual running expenses, while about $20,000 is used for planting of new trees and for seed, and the rest for purchases and improvements of forests, and for aid to private people in forest cultivation.

In 1898 a forestry society, "Det Norske Skogselskab," embracing the whole country, was established, and of which a forestry engineer paid by the State has the professional management. The aim of the society is the preservation and cultivation of Norway's forests. The membership fee is 54 cents annually, or $8.10 for life-membership. The members, at present about 20,000, receive the publications issued by the society free of charge. The State appropriates about $30,000 annually for the use of the society.

Forest planting has attracted much attention in recent years. There were 6,800,000 trees planted and 748 pounds of seed sown in 1905, of which 1,487,400 trees were planted and 176 pounds of seed sown by school children and other young people. Forest planting is gradually being introduced as a subject in the public schools. Especially on the west coast the school children have taken much interest in the matter. In a single parish 100,000 trees have been planted by them during the last three or four years.

About one-third of the total exports from Norway in 1905 consisted of lumber and wooden goods. The value of the different classes of these products were: Lumber, $9,355,500; manufactures of lumber, $656,000; wood pulp (about 450,000 tons), $7,402,300; and paper (about 72,000 tons), $3,324,700; total, $20,738,500.

Much interest is being manifested in the State Forest Academy at Mont Alto, Pa., and this summer 21 young men, between the ages of 18 and 25, took the entrance examination in the various required branches, most of these passed creditably, and the 9 highest will be admitted to the Academy September 1st.

The first graduates of the Academy, 6 in number, have been doing good work surveying boundaries on the States reserves, establishing nurseries in Huntingdon and Tioga Counties, etc. One now has charge of the reserve in Huntingdon County, another of the nursery at Mont Alto, a third of the improvement work on South Mountain Reservation, two others being employed on this reservation and the other in the Pike County reserve.

Lookout Stations for Forest Fires.

A NUMBER of years ago, Mr. Albert Lewis, at his estate at Bear Creek, Pa., in order to minimize the loss from forest fires, established a lookout on the roof of a pleasure house located on the end of a high mountain spur, from which a magnificent view of the surrounding country could be secured. During the danger seasons a man was constantly on duty to watch for fires, reporting the appearance of fire by means of a megaphone to the settlement below, when the fire fighting brigade at once hastened to the spot.

The results obtained were most satisfactory, and a similiar experiment on a larger scale was tried in the State of Maine. Forest Commissioner Edgar E. Ring, of Maine, in his report for 1906, states that nothing of more importance in the extinction of forest fires had been taken in that State than the establishment in 1905 of several "lookout stations." Three observatories were constructed in that year, located at Squaw Mountain, Attean Mountain, and Mt. Bigelow. Each station was connected by telephone with the house of the chief fire warden of the district, who is immediately communicated with in case a smoke or other indication of fire is noted by the observer in the station.

The cost of building the observatories and constructing the telephone lines was borne by the land owners, while the State paid the men in charge of the various stations, as per arrangement previously made. Mr. Ring says: "The plan has more than met the expectations of its promoters, and it is estimated that for the first year alone the direct result amounted to the saving of thousands of dollars worth of timber land."

The station at Squaw Mountain is a log cabin structure with flat roof, located at the southern end of Moosehead Lake, at an elevation of over 4,000 feet above sea level. The station commands a clean sweep of the entire Moosehead Lake region east and west, and to the southwest can control the whole forest in the East Branch section. The watchman makes observations from the roof every hour of the day, and from June 10th, 1905, to September 12, 1905, discovered between 30 and 40 fires.

The Attean Mountain station is on the south shore of Moose River, about 20 miles west of Jackson. The operator has an outlook over 200,000 acres of green timber country. Twelve fires were detected and reported from this point.

The Mount Bigelow station controls a view of 200,000 acres of timber and farming land, and reported 11 fires in 1905.

The average cost of constructing and equipping these stations is about $750. They are supplied with instruments for charting the sections they are supposed to cover, together with topographical charts of their stations, and have the regulation range finder to locate the forest fire exactly. The operator noticing the rise of a little stream of white smoke in any direction consults his chart, and telephones to the fire warden of the district in which the fire is noted. Investigation is made by the warden, and, if necessary, crews can be hastened to the scene to fight the fire. A little blaze thus detected and smothered often prevents the burning of large areas.

In 1906 three more stations were constructed. One of these is at Skinnertown, on a high elevation commanding a view of 250,000 acres on the headwaters of the Dead and Moose Rivers. Another is at Spencer Mountain, on the east shore of Moosehead Lake, where 200,000 acres of timber land on the Penobscot and Kennebec can be watched. The remaining station was erected at Whitecap Mountain, overlooking 300,000 acres on the Kennebec and Penobscot watersheds.

In 1905 there were 20,316 acres of land in Maine devasted by forest fires, the estimated damage being $63,623, while in 1906 but 7,528 acres were burned, the loss being figured at $20,919. The expenditures for posting forest fire notices, patrolling in dry seasons, fighting forest fires, and other expenses, in connection with the fire warden's services, was $10,201.25 in 1905 and $10,000 in 1906. The appropriation made for this purpose by the State has been for the past four years $10,000 per annum, and while this has been found ample in reasonably wet seasons, it is inadequate in dry years.

Dr. Bernard E. Fernow contributes to the August number of *Country Life in America*, an article upon the damage done to our forests by fire. He follows a statistical review of the average burned over, and the estimated value of timber destroyed, with statements indicating the expense which is warranted in fighting these fires, and gives a graphic description of the methods pursued and labor required in combatting a forest conflagration. In closing he attributes much of the injury done in the Adirondack Mountains to the forest laws of the State of New York, which prohibits the cutting of any tree, live or dead.

Reforestation in France.

THE New York *Tribune*, in an editorial, calls the attention of the government to the necessity of securing forest reserves in the east, giving as a warning the experience of France. It says:—

"The forested mountains of France were in the way of complete denudation before 1860. Their mighty sponges of roots, deciduous deposits, and undergrowth which regulated the flow of the French rivers at their springs were exposed, dried, and, taking fire, were destroyed. Heavy downpours washed away the disintegrated mountain soils, which filled the river beds and checked navigation. Productive land became barren. There was a dearth of lumber. The cities with their large manufacturing interests were punished with torrential floods and droughts and the punishment increased recurrently.

"The French government at last seriously bestirred itself. It appropriated $15,000,000 to purchase 400,000 acres of the deforested area; it has incurred for over forty years an annual expenditure of $600,000 for reforestation, and it must yet acquire an additional tract at a cost of $20,000,000. The state-owned forest of France will remain for many years non-productive.

"Our government will profit, though tardily, by the experience of France. The great Eastern forest brows of the White Mountains and of the Southern Appalachian chain are a public sacrifice to the ephemeral needs of their private owners; in the latter division 30 per cent. of first-growth trees have been cut, and 70 per cent. in New Hampshire. Already gales of fire sweep the open spaces of the cut-over districts. Floods pour uncontrollably down the barren declivities into the manufacturing towns, bearing with them bridges, dams, and mills, destroying public roads and fertile bottom lands, and filling navigable streams with silt. The flood damage in the Southern Appalachian region amounted in a single year to $18,000,000; $7,000,000 is its average annual loss. In New England the famous water-power streams are each dry season running lower, and in the flood season becoming dangerously unmanageable.

"The bill setting aside the two National Eastern reserves would introduce practical forestry protection in the New England watershed—800,000 acres—from which flow its five principal rivers, namely, the Connecticut, the Merrimac, the Androscoggin, the Saco, and the Piscataqua, with their important tributaries and enormous water powers; and in the Appalachian Mountains,

4,000,000 acres, situated at the headwaters of the James, the Roanoke, the Yadkin, the Catawba, the two Broads, the Saluda, and the Chatooga; the Coosa and Chattahoochee, and the Kanawha and the Tennessee—this watershed receiving the heaviest rainfall east of the Sierras.

"The bill asks a beggarly appropriation of $3,000,000. The forests it would protect are still productive. They will pay the expense of maintenance, and in a few years yield a profit."

Forestry at the Michigan Agricultural College.

THE four years forestry course of the Michigan Agricultural College was established by the State Board in 1902, and has been popular from its beginning.

The opportunities for the study of forestry are good, for there are several plantations of forest trees that have been established under forest conditions at various times during the past 30 years. These plantations speak for themselves, and demonstrate beyond question what these trees will do under like conditions; 175 acres of the College farm are devoted exclusively to the use of this department. There are three woodlots, in which different methods of treatment are demonstrated. In these pieces of timber the student has actual practice in determining the growth of trees, making valuation surveys, thinning of timber and other features of forestry work, such as the recognition of species, habits, habitats, and so forth. There are five acres devoted to a forest nursery, where thousands of coniferous and deciduous seedlings are grown every year. The student learns how to collect and store forest tree seeds and makes and store cuttings of trees that are best propagated in that manner. The student has practice with the transit so that he can locate boundaries, determine grades and perform the work of an ordinary surveyor. Topographic drawing is a valuable feature of the work.

Every student candidate for a degree chooses a subject for special investigation on which a thesis is prepared and placed on file in the department.

The instruction is given by lectures, laboratory and field work, bulletins, reports, current literature, and text books.

An interesting feature of the work is a trip that is taken by the combined junior and senior classes each alternate year. The trip covers nearly 500 miles, and visits are made to forestry plantations, furniture and other wood-working factories, alcohol plants, iron-smelting works where charcoal is used, lumber and logging camps, pulp and paper mills, and other places of interest to foresters.

Cause of and Prevention of Forest Fires.

I WAS a little surprised to know by a statement in the Arbor Day proclamation of the Governor that the State holds over three-fourths of a million acres of land for the purpose of encouraging the growth of timber and conserving a forest area. The question of protecting the forests on these lands from the almost inevitable fires, and my slight experience has been in Northern Pennsylvania and in the Cumberland Mountains of Eastern Tennessee.

How and why do forest fires come?

Carelessness.—I remember when I was a young man, while out on a survey in Potter County, myself and party sat down for the noon lunch. A little fire was made to sit and eat by, and then left without seeing to it that the last spark was put out. The wind fanned the remnant of our smouldering fire into flame, and before crossing the next ridge, there was a roaring, fierce fire sweeping through the woods behind us. We three or four men, nor fifty men, could not have stopped that fire after it was well started, but during the first few minutes by scraping away leaves in front of the fire, it could have whipped or stamped out. I judge that little forgetfulness led to destruction of timber that would be worth several thousand dollars to-day.

When the ground is dry, as it was that day, the fire will be led along by leaves, moss and old decaying wood on the ground, and will also catch in standing trees and then be blown considerable distances. No man, or ten men, can overcome the evil result of not putting out the little fire before leaving the spot.

Mr. Philips was burning some piles of brush in a new clearing, or a field. When he was at hand, he could stamp, or whip out with brush, the little fires that would start from flying sparks, perhaps at the outside fence, but when he went to dinner conditions changed. The little blazes became larger and in a short time the fire was raging—carried along, by dry stuff on the land, and by blowing from burning dry trees. That little recklessness destroyed about every live tree on three or four hundred acres of that spur of the Cumberland Mountains. Of course, Mr. Philips could not fight it—he was behind the fire. The farmers living ahead, as the fire was coming, did fight to save fences and buildings. This was done by back firing. A man would burn the leaves and dry stuff from a strip around his fields, raking leaves from the fences. Himself and wife and children, with two or three men whose farms were out of line of the approaching smoke, who had run over to help, would get quite a strip around his fences burned bare before the fire reached them, and then could watch flying sparks that might cross that bare strip, and put them out, if they caught in fence or roof. This would be done by a little water carried along in a bucket, if they could find any water, or by whipping with a brush, or by scraping a little earth on with hoe and shovel.

But this back firing against a big fire is a hot, wild business, calling for courage and endurance. The fight may last all the afternoon and perhaps nearly all night. An inexperienced man would be apt to give up.

Maliciousness.—A fire was set by a man who wanted to destroy timber and also the fences of fields adjoining the forest. To prevent the fire spreading in one direction, men went toward the wind, to a bridle path through the woods, and set fires at the side of the path toward the forest fire. Then they watched to see that their fire should not cross the path. By burning along a little ways at a time, they could keep the fire from crossing. Their back fire soon met the main fire, and the burning stopped for want of material. This kind of back firing caused the bridle path to become the limit of the burning in that direction, and saved much timber. In the other direction, fronting the moving fire, there was nothing to do but to let the fire climb the mountain till it reached the fields.

Sometimes a fire can be stopped, or limited, when it is climbing a mountain or hill that has a sharp ridge. By getting ahead and burning the leaves from a strip along the top of the ridge, the fire may be stopped, and at least this burned strip furnish fighting ground. A few men may whip out the little fires, if any do catch across the burned strip, or possibly they may have a pail of water, a little of which will stop a small fire, or may use a hoe or shovel to put earth on the first startings of a blaze. A man in this way will head off fire a longer distance along the top than a person would think who has not seen it tried.

By Hunters or Stock Rangers.—Mr. F. E. Olmstead of the U. S. Forestry Commission makes a remark which I will copy: "The custom of burning the forest to improve the grazing (and he might have said also the hunting) is not now carried on to such an extent as formerly, and most of the fires at the present time are the result of carelessness or indifference. The slopes naturally suffer much more than the coves, because on the former the forest is more open and the ground litter dryer. In the coves, owing to the dense character of the forest growth, a fire seldom gains much headway, and the damage is not extensive. . . . . On the slopes, the ordinary light ground fire consumes the leaf litter and humus layer which forms the forest floor. The soil is then left unprotected and is directly exposed to the action of sun, rain and wind. As a consequence, the ground is easily washed out and gullied by the hard summer rains. In addition to this, the destruction of the ground cover deprives the soil of much of its fertility. Wherever fire occurs, all seedling growth is killed back, and although many of the species have the power of sprouting from the roots after being killed back, this avails but little if the next fire treats them in the same manner. There are of course many localities on the slopes which have been exempt from fire for a number of years, and here an excellent young growth has developed. As a rule, it may be stated that the ordinary ground fires seldom destroy reproduction which has reached a height of four feet, although in a severe burn, saplings and poles are frequently killed. . . . . The damage done by a ground fire to mature trees is not extensive, although in the case of some trees a not inconsiderable amount of valuable timber has been destroyed. Wherever a pile of litter has accumulated around the base of a mature tree (this is common on slopes at the upper side of the tree) the fire will burn for some time and gradually eats it way into the butt, often hollowing out the trunk to a height of four or five feet. After the fire comes disease and rot.

. . . The forest growth on the slopes would undoubtedly be much denser at the present time if it had not been subjected to fire for many years in the past; the growth is now too open to produce timber of the best quality, as the trees tend to form many low branches, making knotty stems. Seedling of all species are of course killed back every time fire runs over the ground."

While these remarks by Mr. Olmstead are in a report about land in the Cumberland Mountains of Tennessee, they apply with equal force to Pennsylvania lands under the control of the Forestry Department. There is much land about the headwaters, or on the watersheds of the Susquehanna and Ohio Rivers, for instance in Clearfield, Elk, Cameron, Centre, Clinton and McKean Counties, to which these statements would well apply.

L. BIRD.

The Legislature of Wisconsin has appropriated $10,000 for the purchase of lands at tax sales. Whenever any county north of Town 33 becomes possessed of land from non-payment of taxes, it must first be offered for sale to the Public Land Commissioners, and when purchased added to the State Forest Reserves.

Forestalling Forest Fires.

STATE Fire Warden J. R. Welty, of Washington, has mailed a circular letter urging early burning of brush piles and slashings to lessen the danger of forest fires this summer. He says:

"We are going to use every means possible to prevent the occurrence of timber fires during the dry season this year, and we take this method of asking you to aid us in this work by burning over any logged-off lands, choppings, slashings, windfalls or any other combustible stuff which you may have, early in the season and before there is danger of the fire running into green standing timber.

All material of this kind which lies in the open and is exposed to the sun and the air dries quickly and is in condition to burn long before there is any danger of the fire running into or injuring green standing timber. You will find it in condition to burn some time during the month of May, or at least by June 15. If allowed to remain until the dry season is on it will be a constant source of danger, and only a spark will be required to set a fire going.

You can burn without a permit any time before June 1. If you desire to burn after that date you can procure a permit to burn from the deputy fire warden of your county.

The way to prevent fire is to remove the material which may later cause a fire. It is the cheapest and best insurance against timber fires and the consequent loss of timber or other property.

This letter is authorized by the state board of forest fire commissioners, and we are sending copies to about 1,800 persons and companies. You are earnestly requested to act in compliance therewith."

The axe wielded by a laborer can in a few minutes fell a tree which has required a century to develope.

New Publications.

The Use of the National Forests. Forest Service, Department of Agriculture, Washington, D. C. 12mo., illustrated.

This publication, just printed by the Department of Agriculture, is a brief, clear manual for public information as to the forest policy of the National Government, and was prepared by Mr. Frederick E. Olmsted.

It is too true, as the preface says, that "many people do not know what National Forests are. Others may have heard much about them, but have no idea of their true purpose and use." It is the object of this publication to explain just what the National Forests mean, what they are for, and how to use them.

In the first place, it is explained how the Forests are created and how their boundaries are drawn. Next, their direct use and value are shown from the point of view of the homeseeker, the prospector and miner, the users of timber, of the range, of water, and other users of Forest resources. Third, it is shown how the Forests are intended for use, for the production of usable products, and for the establishment and maintenance of homes; how on all of them the timber is protected from fire, the water flow is kept steady, the forage on the range is increased and guarded from abuse; and how, in addition, they serve as great public playgrounds and as breeding places and refuges for game. Finally, the management of the National Forests is described.

In a word, the special interest of this manual lies in its showing that the Forest policy of the Government, both in principle and in practice, is for the benefit of the ordinary man, for the benefit of every citizen equally. There is still a tendency to think of the National Forests as "preserves" closed to use, and to leave the public lands exposed to unregulated individual exploitation. Where these misapprehensions still prevail "The Use of the National Forests" will go far to correct them.

Forest Leaves

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CONTENTS.

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The Pennsylvania Forestry Association,

FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, Two dollars.

Life membership, Twenty-five dollars.

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 1012 Walnut Street, Phila.

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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIAL.

THOSE who participated in the initiatory meetings from which the organization of the Pennsylvania Forestry Association resulted, will recognize in portions of the address delivered by President Roosevelt on October 4th, in Memphis, Tenn., before the Deep Water Ways Convention, an echo of the sentiment expressed in Philadelphia twenty-one years ago. Those who later connected themselves with the Association, will read in the following excerpts from the President's Memphis address the keynote which FOREST LEAVES has endeavored to sound for two decades, and they will rejoice in having so powerful an ally as the Chief Magistrate of the nation. That the President is in hearty sympathy with all efforts to preserve the forests, has been made evident by former appeals in his addresses, and in messages, as well as by his official acts, and we naturally expected that he would seize the opportunity offered to direct attention to this important problem.

His reference to forestry, which was incidental to a discussion of the necessity of husbanding our resources, coal and other minerals, water and the forests, was as follows:

"We are consuming our forests three times faster than they are being reproduced. Some of the richest timber lands of this continent have already been destroyed, and not replaced, and other vast areas are on the verge of destruction. Yet forests, unlike mines, can be so handled as to yield the best results of use, without exhaustion, just like grain fields.

"It is clear beyond peradventure that our natural resources have been and are still being abused, that continued abuse will destroy them, and that we have at last reached the forks of the road. We are face to face with the great fact that the whole future of the nation is directly at

stake in the momentous decision which is forced upon us.

"It is the plain duty of those of us who for the moment are responsible, to make inventory of the natural resources which have been handed down to us, to forecast as well as we may the needs of the future, and so to handle the great sources of our prosperity as not to destroy in advance all hope for the prosperity of our descendants."

While FOREST LEAVES presents the above excerpts because of the special reference to forest protection, it does not minimize the importance of husbanding other resources, but believes that the mineral products, the water supplies, like the forests, should be intelligently used to obtain the greatest value for ourselves and for posterity. The selfish sentiment which sees only immediate results cannot be allowed to control the resources of which nature has been so lavish, and from which it is our duty to build and maintain a great and continuously prosperous nation. J. B.

Autumn Arbor Day Announcement.

A boy strolled through a dusty road,
"What can I do?" said he,
"What little errand for the world?
"I know—I'll plant a tree."

The nursling was taken by mother earth,
Who fed it with all things good:
Sparkling water from mountain springs,
And many a subtle food.

Drawn from her own wide-reaching veins,
From the treasuries of the sky;
Far spread its branches in affluent grace,
So the steady years went by.

The boy who planted the little tree,
By a kindly purpose led,
One desolate, dreadful winter day
In the brother-war fell dead.

But the gentle thought at the great elm's root
Burst forth with the spring's warm breath,
And softly the fluttering foliage sang:
"Love cannot suffer death."

The elm's vast shadow far and cool
Fell o'er the dusty way,
Blessing the toilers at their rest,
The children at their play.

And the panting horses felt the air
Grow sudden full of balm;
Great oxen with their weary loads
Caught there a sudden calm.

So little acts of kindliness
Spread every branch and root,
And never guesses he who plants
The wonders of the fruit.

I often think of blessed eyes
The old home scenes can see,
That Heaven's joy is heightened by
The planting of the tree.

—*Anonymous.*

With the autumn days comes a second season for the planting of trees. In view of the extensive destruction of our forests, the serious effect upon the distribution of rainfall, and the timber famine against which the United States Department of Agriculture is warning our people, no opportunity for the planting of a tree should be allowed to pass un-improved. Every school should observe Arbor Day at least once, if not twice, each year. Hence it has become customary in Pennsylvania to observe Arbor day in the fall as in the spring of the year. Under the Joint Resolution approved March 17, 1885, the Governor appoints one or more Arbor Days in the month of April and the schools have added another in the month of October. In accordance with this laudable custom

FRIDAY, OCTOBER 18,

has been selected as Autumn Arbor Day for the year 1907. Pupils, teachers, superintendents and other school officials are requested to observe the day by the planting of trees and by exercises designed to impress upon young minds the value of trees, the importance of tree-planting, and the best ways to foster the growth of trees and to protect them from noxious insects and other enemies. This request should appeal especially to rural schools which are not in session during either of the Arbor Days in the spring of the year.

NATHAN C. SCHAEFFER,
Superintendent of Public Instruction.

The readers of FOREST LEAVES will notice the announcement above by Dr. Nathan C. Schaeffer, of Fall Arbor Day on Friday, October 18th. The Governor appoints two alternate Arbor Days in the Spring, but at this season of the year all of the schools are not in session, and therefore a Fall Arbor Day is also named by the Superintendent of Public Instruction. This is a special feature in Pennsylvania, and its purpose is to give the public schools, especially those outside of the larger cities, opportunity to make some recognition of the forest interest of the Commonwealth.

This excellent idea has been cordially approved by the Pennsylvania Forestry Association, and has produced some satisfactory results. We hope the coming Arbor Day will be generally recognized by all the schools of the State. The editors of FOREST LEAVES will be gratified to receive from any of its readers, from principals, teachers or scholars in the schools of this Commonwealth, information concerning local celebrations.

The Best Timber Trees.

TIMBER owners and manufacturers will be interested in the results of the detailed studies of commercial timber trees which the Forest Service of the U. S. Department of Agriculture is making. These studies are not confined exclusively to the well-known trees of recognized value, but, owing to the rapid decrease in the supply of our valuable woods, include those cheaper woods whose properties are imperfectly known. Such studies of the tupelo gum and western hemlock have done much to overcome the common prejudice against these species and have added materially to their commercial importance.

Commercial tree studies begin with the tree in the forest and follow it all the way to the finished product in the market. The intermediate steps are many and complex, but a little explanation of them may not be amiss, since they typify the field methods of a forest investigation.

The selection of a suitable place is the first step. In this the aim is to obtain average conditions as far as possible. When the range of the species to be studied is small, one locality may be sufficient, but generally it is necessary to take at least two localities, the data from which, if similar, can be thrown together or, if markedly unlike, kept separate for different regions within the range of the species. For example, the poplar, or tulip-tree, has a very wide range, but a study of its growth and form would show very different results in the North and in the South.

In getting at the rate of growth of a species, the annual rings on the stumps are counted and the distance between each tenth ring is accurately measured. In other words, beginning at the outside of the stump, the rings are counted inward along the average radius, which is obtained by actual measurement and indicated by a pencil line. The layers of ten rings are marked off along this line and then the distance to each mark from the centre of the pith is measured and tallied. Additional data as to the relative width of sapwood and heartwood, the width of the bark, the height of the stump, and so forth, are obtained at the same time. These figures are taken for a great many stumps, in order to secure a fair average.

The results show the growth of the average tree inside the bark at the average stump height. In order to reduce this to diameter growth outside the bark at breastheight (4½ feet above the ground), the taper of the average tree must be known. This is found by measuring the diameter of a great many trees at 1, 2, 3, 4, and 5 feet above the ground and averaging the results. The bark width is already known, so that all that is necessary is to add to it the figure obtained for growth inside the bark and subtract the loss through taper between stumpheight and breast-height.

As a rule, a number of seedlings are measured to find out how long they have taken to reach stumpheight. By adding this period to the age of the average tree on the stump the measurement of the height growth of the average tree is complete. This would not be the case except for a peculiarity in tree growth. A given point on the trunk never moves upward with the growth of the tree. Only the tip grows, and a nail driven into the trunk at a given height will hold the same height always.

The taper measurements also serve as a guide for fixing the proper height of stump in felling, so as to avoid waste but still get above the stump-swelling peculiar to some species.

Frequently, felled trees are measured, noting the diameter breasthigh, the length or distance without branches, the "clear" and actual merchantable lengths, and the total height of the tree. Where this is done in conjunction with the stump analyses, a table of age and height is readily made from the table of age and breasthigh diameter already explained.

In order to apply the tables described, the stand on average acres of different types of land is determined by means of sample plots, usually of an acre each, on which the diameter of every tree is carefully measured and tallied. The future yield on an average acre is then figured out from the diameter growth tables and tabulated by decades.

Cutting over an area often markedly increases the growth of the remaining trees, so that a separate yield table is frequently made for second growth after lumbering. This forms an excellent basis for an estimate of the future stand on logged areas.

Besides the more purely technical matters of the life history of the tree; the best methods of management and reproduction; the distribution of the species; the soundness; the damage by fire, wind, insects, and fungi; and the general form and development of the species, a study of the methods of lumbering is undertaken, especially as regards waste and damage to young growth.

Finally, a market study is made throughout the range of the species. Figures are obtained by measurement at some mill of the actual cut and grade in board feet of the logs from trees previously marked in the woods. From these measurements the actual value of trees of all diameters is found. The present uses of the timbers are

looked up, and the practicability of extending its use or substituting it for other species is considered. In connection with this, timber tests of the wood are made at one of the Government timber testing laboratories.

To sum up, every detail and aspect of the problem receives careful attention in these commercial tree studies, since it is their special object to set forth all facts that will assist forest owners in managing and improving their timberlands.

Growing Red Cedar for Pencil Wood.

RED cedar is a tree of comparatively moderate requirements as to soil and moisture, and while it grows better under favorable conditions it is a hardy tree and is found naturally, and can be planted, on the bluffs and among the sand hills of the semiarid plains. Like most trees of simple requirements, red cedar grows slowly, and as is usual with slow-growing cone-bearing trees its wood is fine-grained and valuable. Indeed, no other American-grown wood has the distinction of being regularly sold by the pound, and very few are so well nigh indispensable for any purpose as is red cedar for pencil wood.

Red cedar originally grew in quantities sufficient for lumbering throughout the eastern portion of the United States south of the Ohio River, but very much of it has now been cut and marketed. It is no wonder, then, that pencil manufacturers are deeply concerned as to their future supply of pencil wood, as they observe the rapid removal of the red cedar forests. Enough cedar to fill daily ten rooms of the dimensions 10 by 10 by 20 feet each is required for the 315,000,000 pencils manufactured each year in the United States. Although the pencil trade, by paying higher prices, secures the best product of the larger trees, it is by no means the only market. A red cedar post is exceptionally durable and so much in demand that many timber owners sell their red cedar at post size, rather than hold it twenty years longer when, at an age of sixty years, an ordinary stand of 100 trees per acre would yield eight times as much for pencil wood. In other words, it does not pay to invest money in growing 200 cedars to the acre if the trees are cut at the age of 40 years for posts, while it does pay a sum equal to 37 cents for every year of the investment period if the same trees are allowed to reach 60 years and then sold for pencil wood. The annual profit from 300 trees per acre cut at 60 years for pencil wood would be 51 cents, and that from 400 trees per acre would be 61 cents.

As a tree for planting, red cedar has generally been regarded as suitable only for situations where more rapid-growing trees would not endure the conditions of soil or climate. In many parts of the southeastern United States, however, where young red cedar can either be pulled up in the clumps where it has come up naturally or shipped in at a cost not greater than $2 per thousand, red cedar can be planted in the sod at a cost of $4.84 per acre, spacing the trees 6 feet apart, making a total of 1,210 trees per acre. By removing half of the trees at the age of 25 years, to stimulate growth (thus securing second-class posts to pay for the labor) and three fourths of the remainder at 40 years (when posts at 6 cents each, stumpage, will yield $40.80 per acre), the stand is reduced to 150 trees per acre, standing 17 feet apart. Assuming an interest rate of 5 per cent., land at $6 per acre, planting at $4.84, annual taxes 3 cents, and management 4 cents per acre, the following returns per acre may be expected at the end of 60 years:

Gross returns, including thinnings	$310
Total expense	$221
Net profit	$89
Interest on investment	5.5 per cent.

A publication, *Production of Red Cedar for Pencil Wood*, issued by the Forester of the United States Department of Agriculture, contains a report based on a study of the growth and marketing of red cedar, with tables of growth and of comparative profit by cutting at different ages.

Timberland Taxes—Land *vs.* Income Tax.

I HAVE not made, nor shall I make, a plea to relieve the Timber Industry of Taxation. It must bear and benefit from its share of the the burdens. What I propose is to shift the tax from uncertain Land Values to certain Log Values.

This country has had tremendous natural timber resources and has been prodigal of them. They were wealth close at hand in such volume that no one gave a thought to the future—the supply seemed inexhaustible. What man, 100 years ago, would not have laughed had he been told this country could have ever become a treeless waste? But vast areas in the middle West are so to-day—areas once covered with dense forests—and because of it, Pennsylvania is to plant two billion trees! Think of it! It is a crop for the fourth generation to reap, for all the present will benefit is to save loss from floods, and for that they must wait 15 years.

In the timber industry, Maine has been a producing State of high capacity longer than any other State in the Union, but the year the cut exceeded the growth it passed its zenith and began to decline. Just when that was no one knows, for there is no exact data to show; it was within 10 years, that is sure. Our best guide is the timberland under operation, and every piece of which to-day is being cut at a rate 3 to 5 times faster than it grows.

It is true that the *legal* right to our timber is vested in the present generation, but, being a natural resource, it is equally true that in it our children have a moral equity. But it is not alone the future generation that is in danger of losing its birthright; the danger is imminent—it is here. No man, or group of men, in their right mind would think of destroying an industry of such vital importance to the State, but would, on the other hand, use any reasonable means to maintain and increase its usefulness.

The first measure, in perpetuating our timber supply, is to provide a system of taxation scientifically adapted to its needs, a system under which half-grown trees may be allowed to ripen to maturity, and not, as now, be taxed out of existence. Some States have already done this, and those that have not will soon, if not now, face the tremendous cost of planting trees, when the natural supply is gone. Maine land has not, in most cases, reached this stage, and must not be allowed to, for the cost is beyond the capacity of the State to meet. We must save our timber while we have it.

One tax method, used, I think, in New York is to reduce the taxes on cut-over land to a very low point for a term of years, making it correspondingly heavy in years of harvest. But all methods now in use are open to the strong objection that they do not work automatically. Too much is left to judgment. By taxing logs alone, judgment is eliminated. The number of logs and their measure is on record at camps, on the drive and at mills. All of these records are available, and, being a staple, the value is shown.

Maine has made one attempt at adjusting taxes to cut-over land—*i. e.*, by remitting them entirely where at least 2000 trees per acre had been planted. But it was of no practical value, for the need for planting had not come, no one took advantage of it, and its sole use was to serve as a precedent for the principle here advocated. Well timbered Spruce land, from which nothing is cut but mature trees, may be cut once in 25 years with about the same yield. In the meantime the danger of loss from fire is so great that no insurance company will take it, and there is not a dollars worth of insurance on any timberland to-day. But, if in addition to fire risk, the timber farmer must pay a constantly increasing tax, to hold the land and let the crop ripen becomes a financial impossibility.

The instance, cited in my last article, of a cut-over town on which land tax has been doubled, is not an imaginary case, but one where our Company will have finished cutting next Winter. We have no use for half-grown logs, and have cut as few as possible, leaving a good stand of young trees, many of which will be fit to cut in 25 years. But with the present tax amounting to $46,000 in 25 years the owner cannot afford to let this small timber grow, for the tax is ruinous.

This town has an area of 27,000 acres, and is assessed on a valuation of $7.00 per acre, which, were it all producing land, and un-cut, would not seem excessive. But ⅔ is swamp land which grows nothing, so that the burden is all on the other ⅓ placing its valuation at $21.00 per acre. I take this Town as an example, because, first, I know accurately its condition, and, second, it is one of the first the Assessors have explored and shows the tendency for all under the land tax system.

The average valuation and tax rate do not show the way we are drifting—it is in the specific cases of recent raises—cases increasing yearly. An increase in land tax will increase the State revenue for a time, but, when the land is stripped and abandoned from what will the revenue come? Can it be sold for farms? Most of the Wild Land is rightly named, for it is a mountainous and rocky region unfit for farming anything but trees. Most of it is remote from either rail or water transportation. And is the demand for farms so keen that even the accessible land will be taken up? Within 10 miles of the Town of Richmond there are for sale to-day, at prices which would not put up the buildings, 100 farms, 15 of which are abandoned, and all within easy reach of rail and water transportation. Who, then, will locate 50 to 100 miles away from a railroad?

The hardest problem of taxation is to find the true value of the property taxed, and the value of a timber farm, risking a fire yearly, is the hardest of all. But of the value of logs there can be no question, and if all taxable property were as easy to get at, taxation would be simple. The tax proposed is purely an income tax, admittedly the ideal method, for by it the burdens are in exact proportion to the benefits.

I shall not attempt to argue that the land is valueless, for that would be futile, but that its value is most accurately shown in the logs cut from it, and for that reason, if no other, logs and not land should be taxed. The present land tax now yields, in round numbers $150,000 yearly; 8,000,000 feet of logs were cut during the Winter of 1906–'07 which, were they valued at $10.00 per 1000 feet, and taxed at a 2-cent rate, would

yield $160,000. Germany, by improved methods, already raises 12½ times as much timber per acre as we, raises it yearly, and is increasing it. Our 9,000,000 acres of timberland under these conditions would yield 10,000,000,000 feet of logs yearly which, valued at $10.00 per 1000 feet, and taxed at 2 cents would bring to the State $2,000,000 per year, nearly the whole present State expenses. Which is worth more to the State of Maine, a large increase in land taxes for a few years and then nothing, or a log tax with this amount as its goal? The greatest potential wealth in timber East of the Rocky Mountains lies in the hands of the people of this state to keep or throw away. Which will they do? D. H. DARLING.

RICHMOND, MAINE.

Suggestions for Forest Planting in the Northeastern and Lake States.

RECOGNIZING the great need and demand throughout the New England States, New York, New Jersey, all of Pennsylvania except the western portion, Michigan, Wisconsin, and the eastern portion of Minnesota for reliable information concerning the planting of the most desirable tree species, the Forest Service has gathered together the necessary information and issued it in circular No. 100.

While the necessity for tree planting has not been felt in this part of the United States so keenly as it has been, for instance, in the treeless West, yet sufficient planting has been done in the past to prove that the growing of wood crops is entirely practicable.

Large areas of land in this region are fit for forest growth only, and from an economic standpoint it is important that these lands be put into a state of productiveness. Extensive investment in forest planting has thus far been unduly discouraged by present methods of taxation and, in parts of the region, by difficulty in securing adequate fire protection. The true value of forest land and its rightful place among the permanent resources are, however, becoming appreciated, and an enlightened public sentiment is rapidly making this form of investment safe and desirable.

Throughout this region there are large lumbered areas on which successive fires have destroyed all young trees of valuable species. Inferior trees, such as aspen, fire cherry, scrub oak, and red maple, as well as shrubs, have sprung up. This land is worthless in its present condition, but where adequate fire protection can be provided forest planting will bring it again to productiveness.

There is a large amount of land, particularly in New England and Michigan, which was first cleared for farming but has since deteriorated in value either through loss of fertility or through neglect or abandonment. Throughout Massachusetts, Connecticut, and New Hampshire many of of these abandoned farms and old pastures are now covered with white pine, But this crop is rapidly being removed, and little natural reproduction will follow because seed trees are lacking. These lands offer exceptionally fine opportunities for forest planting, owing to their nearness to market and to their freedom from brush cover.

The barren sand plains of Connecticut, Rhode Island, New Hampshire, Massachusetts, New Jersey, and Michigan, which can not be tilled and are a source of expense to their owners, will in many instances support a good growth of white pine, or at least one of the more hardy species of pine.

The protection of city watersheds demands urgent attention. The annual spring floods, which bring destruction to thousands of homes in the lower-lying fertile valleys and are generally followed by epidemics of serious diseases, would in a great measure be prevented were the slopes covered by forest. Forests regulate the flow of streams, prevent erosion and turbidity, and make waste areas beautiful and productive, besides insuring a source of pure water supply. Wherever natural reproduction can not be depended upon to cover the denuded and burned-over lands of most of these watersheds, tree-planting operations must be undertaken. While the immediate object of this reforesting will be protective, timber crops will eventually be produced which will yield good profits on all such investments.

Nearly every farm has at least a few acres which are of little value for growing agricultural crops. This land should be set aside for a woodlot and devoted to the production of fuel, fence posts, and timber for farm uses.

The species best suited for plantations of these various sorts, as well as planting directions and advice as to protective measures, are given in the circular.

The most important point is taxation. Unless some form of relief from this is worked out successfully, and protection secured from forest fires private forestry is not likely to prove renumerative at the present time.

Ireland in order to help forward the cause of forestry has established an Arbor Day.

The National Forests and the Lumber Supply.

A POINT in the industrial progress of the United States has now been reached where development of the country is made, not in the face of the forest, but with its essential aid. The old process of exhausting the supply of timber in a region and then seeking new fields is practically over. Already the lumber industry is turning back on its tracks. A quality of timber is eagerly sought in the Lake States which a few years ago was ignored as utterly worthless, and in the South the whole pine region is being gone over in a close search for the old field pine, a tree once despised, but now bought up at prices much higher than those formerly paid for the magnificent timber of the virgin forests.

A publication just issued by the Department of Agriculture, entitled *National Forests and the Lumber Supply*, defines the important part which the National Forests are destined to play in the economic development of the country. Abuses have grown up under the laws which provide for the disposition of public land, notably the segregation of large holdings of timberland for speculative purposes. Timber from the National Forests is now purchased by the thousand board feet, and payment is made upon the actual scale of the logs when cut. Two dollars and a half per thousand feet is comparatively low as present charges go, but since the cut ranges from 5,000 to 20,000 feet per acre, the Government receives from five to twenty times as much for the timber as it did under the timber and stone act.

Public opinion now demands, not that the Government should dispose of its remaining timberlands as rapidly as possible and leave it to private enterprise to exploit the forest hastily, but that what remains of the National Forests should be more conservatively used. The Government has been forced into the lumber business solely in order that a supply of forest products may be guaranteed to future generations.

Probably 65 per cent. of the total stand of merchantable timber within the Forests is located on the Pacific Coast, where for a long time the enormous supply of privately owned timber will satisfy most of the demand. This more accessible private timber surrounded the Forests as the meat of an apple surrounds the core. It has been entirely eaten away in many places, while in others it is locked up by speculators. The thing to remember, then, is that this immense body of public timber is there as a great reserve against the time when private timberlands will be depleted, and for use as a weapon against monopoly.

The first effect of National Forests upon prices, particularly where there is still a great deal of available timber, is to raise the price of outside stumpage toward its actual value by withdrawing the excess supply of low-priced timber from the market. But later, as the supply of timber dwindles and values are forced upward by speculative holdings, the effect of the Forests will be to check the advance of prices.

In the virgin forest, growth is just about balanced by decay. In the western forests, however, natural deterioration is greatly augmented by forest fires. The fires usually do most harm by damaging merchantable timber, but, great as this injury is, vastly more actual loss in forest wealth results from the yearly burning over of the grass and undergrowth of the forest. Ground fires do not consume the large trees, but they destroy seedlings outright and injure growing trees so that they quickly decay. Finally, the forest floor, composed of a mold of needles, twigs and mosses, is burned away.

Far beyond the present influence of the National Forests upon the lumber supply will be their importance in the future. The United States is now facing a shortage in the stock of available timber. The yield from the National Forests will aid greatly to bridge over the period in which mature timber will be lacking, a period which will last from the time the old trees are gone until the young trees are large enough to take their places.

The definite result, therefore, of the sale of timber from the Forests will be to sustain the lumber business, to maintain a steady range of timber values and so discourage speculation, and, far more important still, steadily to further the uninterrupted development of the great industries dependent upon wood.

The Nebagamon Lumber Company at Lake Nebagamon, Wis., has given 4,000 acres on the Brule River, in Douglas County, to the State as a forest reserve. The Legislature of the State in 1905, passed a bill to the effect that it was the policy of the State to form a forest reserve along the Brule River, and prohibited the building or maintaining of any dams upon the stream. The State Board of Forestry hopes to purchase other lands along the Brule River to add to this reserve. The forest reserves in the State, according to *Forestry and Irrigation*, now amount to approximately 167,000 acres, which it is expected to increase in the near future.

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Pinus palustris, Mill. Longleaf Pine.

THE Longleaf or Southern Pine is one of the most important forest trees of the Southern States. It occupies a belt of land seldom more than 125 miles wide, extending along the coast of the Atlantic and Gulf States from Virginia to Florida, thence westward to Louisiana and Texas. It occurs principally on late Tertiary sands and gravels. Over parts of this area the loblolly, Cuban and short-leaf pines are found, but the Longleaf Pine is the dominant tree, and generally forms continuous forests by itself.

It is an impressive tree, growing to a height of 100 to 120 feet and from 2 to 3 feet as the maximum diameter, breast-high. The bole of the tree is usually straight and cylindrical.

Prof. Sargent describes the tree as covered with a thin, dark scaly bark forming an open elongated and usually irregular shaped head, one-third to one-half the heighth of the tree, thick orange-brown branchlets, and acute winter buds covered by elongated, silvery-white lustrous scales divided into long filaments forming a cobweb-like network over the bud. The leaves form dense tufts at the ends of the branches, and are slender, flexible, pendulous, of a dark green color from 8 to 18 inches in length. The ends of the branches are quite commonly seen in our Pennsylvania cities just before Christmas and are used for decorative purposes.

The tree flowers early in the Spring before the appearance of the leaves, and are staminate, in short dense clusters of a dark-rose purple color. The cones are from 6 to 10 inches long of a dull-brown color. The seeds are triangular, about half an inch long, with a thin, pale shell, with wings widest near the middle. The bark is of a light orange-brown color from $\frac{1}{16}$ to $\frac{1}{2}$ inch thick separating on the surface to larger papery scales. The wood is heavy, hard, strong, tough, cross-grained, durable, light-red to orange in color with nearly white sapwood. It is used for masts, spars, railway ties, interior finish of buildings, fencing, etc. The tree is rich in resinous secretions, which are used in the production of naval stores, being the chief source of our turpentine, tar, rosin and their derivatives. The wood weighs 43.62 pounds per cubic foot.

For the accompanying illustrations, taken at Pinebluff, N. C., we are indebted to Dr. McAllister. The view of the trunk of the Longleaf pine shows the old method of "boxing" to procure turpentine, etc.

It is stated that England imports ten times the quantity of timber it produces.

Lumbermen's Views on Reforestation.

IT is a mistaken idea that lumbermen are simply looking towards deforesting the land, and buy it only for the timber.

While there is one now and then who looks only to the present money-getting, yet the majority look ahead far enough to secure a continuous supply of timber; and if the States and our National Government would give some encouragement in the way of relief from taxation of deforested land, 10 per cent. of the lumbermen and lumber companies would reforest their land, and be glad to do so.

Who can blame the lumbermen and lumber companies of to-day for not reforesting their cut-over land? The lumberman is a business man, who looks towards a legitimate return for capital invested. It does not take long to figure out that, under the present system of taxation of land, the reforested land could not be held until the crops were half ripe, as the taxes would eat up the land, capital, and all invested in them.

At the present, I know of several States, such as Maine, in which a small increase of land tax is causing such a quick deforestation as to influence the market price of all lumber. This will continue until all timber is cut. Then the price of timber will naturally jump up to prohibitive prices.

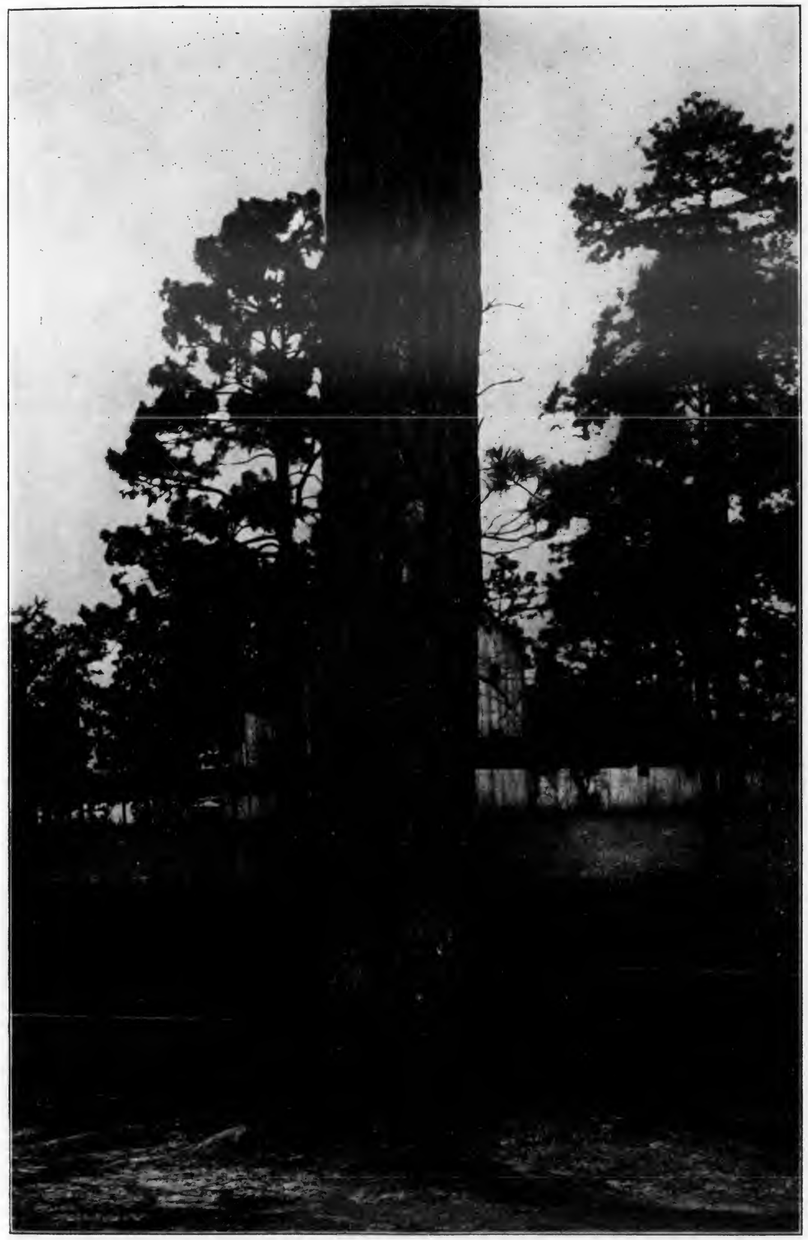
The land, if not fit for agriculture, will return to the States for taxes, and the States will have to nearly double the taxes on land remaining, having killed the goose that laid the golden eggs.

Take the State of Michigan to-day. Where have the millions of dollars gone that have been made from lumber from the once beautiful white and red pine forests? I dare say not one-half of it has remained in the State, and the companies and the men that once operated the mills have gone to new fields. To-day, many who still lumber the hardwoods remaining, speak of going to Washington and British Columbia, where virgin forests still stand. If they go, their wealth goes with them. What would have induced the others to stay? what would cause those here to remain? A different law as to taxing forest land and forest products. If we could only learn from European states, things would be different.

I always contended for a tax on logs, or cut timber only, it being the product of the soil accumulated for generations, and in this respect different from all other products of the soil. All land producing forests, or planted to forests, should never come into the schedule of agricultural land.

LONG-LEAF PINE. (PINUS PALUSTRIS, MILL.)
PINEBLUFF, N. C.

FOREST LEAVES, VOL. XI., NO. 5.



TRUNK OF LONG-LEAF PINE. (PINUS PALUSTRIS, MILL.)
PINEBLUFF, N. C.

The tax on logs or forest products should be a State tax, and used as such. The forests of a State or States should be looked upon as a blessing to the whole community, and their destruction as a curse to all. Why, then, have a tax as at present, that drives men to cut the forest as quick as possible in order to escape the ruinous taxation?

What use to talk to a lumberman or lumber company about reforestation, about starting nurseries or employing a competent forester to look after his land? What use have they for a working plan for selection cutting? Do you wonder that to-day they make a clean cut and then go to new fields? It is just because they are driven to it.

Time and time again I have heard it said that the present laws of taxation have destroyed the forests so quickly, and that the only hope of reforestation is in the Government, which is exempt from taxation. These are the views of a lumberman on the question of reforestation and taxation of forest land.

C. H. GOETZ.

White Oak in the Southern Appalachians.

THE Southern Appalachian region, including the Allegheny ranges and the plateaus which slope westward to the Mississippi and Ohio rivers, is now the chief source of supply of white oak, as well as the region of its greatest commercial importance. West Virginia, with an estimated stumpage of nearly 5,000,000,000 board feet has more than one-third of the standing white oak in this region. The State of Kentucky still has over 2,500,000,000 feet, and Tennessee a little over 2,000,000,000 feet. Virginia and North Carolina follow next in order with over 1,000,000,000 each.

White oak is one of the most widely distributed and commercially important trees of the United States, and its total annual product of over 2,000,000,000 feet of lumber is more than double that of any other hardwood. The wood is compact and close grained, hard, tough, strong, heavy, and durable in contact with the soil. By a peculiar mode of sawing by which the boards are cut nearly parallel to the pith rays, the silver grain is shown, furnishing the handsomely figured panels, ceiling, and molding of "quarter-sawed" oak.

White oak is the favorite timber for railroad cross-ties, and of the 90,000,000 ties purchased each year nearly one-half are of oak, the greater part of which are white oak. It is also an ideal material for tight cooperage manufacture. Other uses are for car stock, boards, planking, beams, dimension stuff of all sizes, ship building, tool handles, wagon spokes, and furniture and basket veneer.

Red oak and black oak exceed white oak in rapid growth and early maturity, but the latter has a marked advantage in its greater ability to withstand shading, in its longevity, and in its inherent resistance to decay, insects, and fungi.

The Forest Service has just issued a publication (Circular 105) which describes the growth and supply of white oak and its uses.

Forestry Applied to the Farm.

THROUGH a revival of interest in forestry among farmers, by inducing them to devote a part of their land to tree planting, the State Board of Forestry of Indiana in time expects to find a solution of the rapidly-disappearing-timber problem. The large number of manufacturing concerns in Indiana have prospered because of the formerly abundant timber supply, but they are now facing an embarrassing situation in their inability to get a supply adequate to meet their needs. Railroads are having difficulty in finding lumber for their own use; lumber for building material is scarce and high and the fuel scarcity from a timber standpoint has become acute.

The forestry board advocates that each farmer set aside a part of his farm for timber growing, to be planted according to the timber needs in various localities. At present the farmer who has disposed of all the timber on his farm is compelled to buy at high prices for his own building and fence needs. Thus, the board argues, he is the loser. Secretary Wm. Freeman, of the State Board of Forestry, says:

The idea is frequently advanced that when all timber is gone there will be substitutes that will answer the different purposes. Also many say there will be plenty of timber as long as they live and after that they do not care. It will be found impossible to substitute in the majority of uses. There is a quality about wood that is indispensable, and because it cannot be manufactured, but must grow, the future supply can only be hoped for through forestry. Putting to the most wise use the present supply and growing new forests is the only and absolute way to have timber in the future.

It is frequently asked what proportion of the farm should be devoted to forestry. In the best agricultural districts a fair fractional estimate would be from one-twelfth to one-sixteenth of the land, and where not well suited to farming the area devoted to forestry should be larger. As broken land is far better and more profitable when devoted to forest and fruit growing, an estimate

of from one-half to one-sixth would not be too large.

The wood lot in Indiana can be planted in no better kinds of trees than those natural to the woodlands throughout the State. No more valuable trees could be introduced, viewed from every standpoint, than the white, burr and red oaks, American ash, black walnut, shellbark hickory, yellow poplar, wild cherry, American elm, sycamore, maple and linden. For fencing-posts, cross-ties, telegraph and telephone poles, the American chestnut, black locust, catalpa speciosa, osage orange, mulberry, Kentucky coffee tree and red cedar are the best. The woodlot should contain a mixture of these two classes of trees, as the problem, especially with the farmer, is lumber for fencing, building and wood for fuel. The farm forest should be free from worthless species, and trees of experiment should be given no room and time. Let the experimental stations develop all such doubtful points as growing trees, the character and quality of which in this section are unknown and doubtful.

Alabama to Preserve its Forests.

THE *American Lumberman* states that developments in Alabama indicate that the State administration is about to take up actively the matter of forest preservation. The protection and encouragement are to be given chiefly by exemptions of unused timber lands from taxation.

The subject was brought to public notice by a large delegation representing the Alabama Lumbermen's Association and other prominent lumbermen, which called on Gov. B. B. Comer. These men presented to the Governor pertinent reasons why Alabama should make a move to protect its timber interests. The Governor was greatly interested, and after an exchange of ideas, and after he had asked many questions on the subject, he announced that he would include in his call for an extra session of the Legislature, about November 1, a measure urging the legislators to enact laws to encourage the preservation and conservation of the timber of the State.

The proposed measure will provide that all land from which the timber has been cut and which the owner desires to set aside as a reserve shall be given a special rate of taxation. A list of these lands is to be filed with the State tax commissioner. Provision will also be made to encourage the planting and growing of timber. It is pointed out that this action on the part of the State will not only be a long step toward guarding against a timber famine, but it will mean much for the waterways, and will go a long way toward reducing the danger of overflows and freshets in the lowlands.

The proposed action on the part of Alabama in encouraging forest reserves is in harmony with the purposes of Congress to make provisions for the Appalachian reserve. This reserve will extend to the northern part of Alabama, but the plan indorsed by the Governor will supplement the national government work and will extend the forest reserve idea to every part of the State. The proposed law will affect the large and the small owner alike. The farmer with ten or twenty acres of land which he wishes to reserve for timber purposes is given the same privilege as the land owner who has 10,000 acres which he wishes to reserve.

Alabama has hundreds of thousands of acres of cut-over timber lands, and with the proposed encouragement on the part of the State these may again be reforested.

New Wisconsin Forestry Law.

AT the last meeting of the Legislature of Wisconsin a law was passed and approved by the Governor exempting from taxation for 30 years tracts of not more than 40 acres when these are set aside for forest culture and planted with not less than 1,200 forest trees per acre. It is the opinion of the legislators that many people will take advantage of the act to plant part of their farms in trees.

This is a start in the right direction, but if large areas are to be reforested by private owners for a future timber supply, legislation for the partial or entire exemption of the same from taxation for a certain period of years, under proper restrictions, will be necessary.

The text of the act is as follows:

SECTION 1. There are added to the statutes eleven new sections, to read: In consideration of the public benefit to be derived from the planting and cultivation of timber or forest trees, the owner of any tract of land in this State who shall set apart any specific portion thereof, not exceeding forty acres, for forest culture and plant the same with timber or forest trees, not less than 1,200 to the acre, shall be exempted from taxation for the period of thirty years from the time of such planting to timber or forest trees. Such exemption shall only be allowed on condition that said planted trees are kept alive and in a healthy condition. A statement or return of such plantings shall be made to the assessors when making the annual assessment, which returns shall be verified by the assessors and made the basis of such tax exemption. After said trees have been planted ten years, the owner may, without waiving the tax exemption, thin out the same so that not less than six hundred trees shall be left upon each acre.

A description and plat of all lands so planted shall be made in duplicate by the person applying for an exemption under the provisions of this act. One copy of said description and plat shall be filed with the town clerk of the town in which said land is located and the other copy of said description and plat shall be filed in the office of the State forester at Madison, on or before the 1st day of May of the year in which such exemption shall first be claimed.

The State forester is hereby authorized upon a written complaint being filed in his office that an exemption has been allowed on any plantation which has not been established or maintained in conformity with the provisions of this act, to determine whether the facts as set forth in the complaint are just and true, and if he shall find such complaint to be true he shall cancel such exemptions by filing a statement to that effect with the town clerk of the town in which such plantation is located and thereupon such plantation or so much thereof as is not so established and maintained, shall cease to be exempt from taxation until the same shall be replanted, and otherwise brought within the conditions of this act.

Said exemption, as provided in this act, shall not apply to any lands within two miles of the limits of any incorporated city or village except upon written approval of the State forester, filed with the town clerk of the town in which such land is located.

The planting of a tract in forest trees in compliance with the provisions of this act and the filing of the description and plat of the tract so planted as provided, shall be taken and deemed to be an acceptance by the person planting the same of the exemption privilege herein granted and of the conditions herein imposed upon such privilege; and, in consideration of the public benefit to be derived from the planting, cultivation and growth of such trees, the exemption of such land from taxation as herein provided shall be continued and is hereby assured, and the right to such exemption shall be inviolable and irrevocable as a contract obligation of the State, so long as the owner of the land so planted shall fully comply with and perform the conditions aforesaid, not exceeding said period of thirty years.

Any person intending to plant a tract of land in forest trees so as to secure the exemption privilege provided in this act, may have the value thereof determined in advance of such planting by the board of review of the town in which such tract is located. To procure such determination such person shall file in the office of the clerk of such town an application in writing containing a declaration of such intention, a correct description of the lands included in such tract and a request that the valuation thereof be determined by such board under the provisions of this act. Said board at their first meeting after the filing of such application shall proceed to determine such value. For that purpose they shall have authority to summon witnesses and take testimony under oath. They may require such lands to be viewed by one or more members of such board, and may adjourn the matter for such time as may be necessary in order to secure needful testimony or information respecting the value of such tract. If such board shall determine the average value of such tract to be not over $10 per acre, such determination shall be final for all purposes of this act as to so much of such tract as shall be planted with forest trees in accordance with the requirements of this act within two years after such determination. But if the board shall determine such value to be more than $10 per acre, the owner of such tract shall not be precluded from making a new application in any subsequent year.

The person filing such application shall be entitled to have the value of such tract determined without delay and before the said board shall be convened for other purposes by including in his application a request that such determination be so made and by depositing with the town clerk a sum sufficient to defray the compensation of the members of said board for one day's attendance. The clerk shall thereupon fix a time at the earliest practicable date for a special meeting of such board to act upon such application, and shall give notice thereof to each member of said board, to be served by or at the expense of the applicant, in time to enable each member to be present. Such meeting shall be at the place fixed by law for the regular meetings of said board. The members of the board shall attend at the time and place designated in such notice, and the board shall thereupon proceed to determine the value of such tract in the manner hereinbefore provided.

The town clerk shall make a record of the proceedings and determination of the board of review upon each application under the foregoing provisions and shall enter the same in the book containing the record of other proceedings of said board. The record of each determination shall include a description of the lands to which such determination relates. Such record shall be prima facie evidence of the facts therein stated, but failure to make the same shall not affect the validity of the action of the board.

When a tract of land shall have been planted in trees under the provisions of this act without previous determination of the value thereof as hereinbefore provided, the allowance by the assessor and board of review, or by the board of review, of the exemption thereof under the provisions of this act shall be deemed to include a determination by such board that the value of such land at the time of planting did not exceed ten dollars per acre; and such determination shall have the same effect as if made before such planting. If such exemption shall be disallowed, the action of the board of review disallowing the same may be reviewed by the State forester. To secure such review the claimant of such exemption shall file with the State forester an application in writing containing a description of the lands, a statement of the facts on which such exemption is claimed and of the disallowance thereof by such board, and a request for the review of such action by the State forester. Such application shall be accompanied by an undertaking on the part of the applicant with one or more sureties, approved by the chairman or clerk of the town, for the payment of the expense of said forester upon such review in case the exemption claimed shall be disallowed by him. The State forester shall thereupon give notice of a time and place within the town at which he will hear the matter and any testimony that may be offered in relation thereto. A copy of such notice shall be mailed to the chairman and clerk of the town and to such applicant at least ten days before the time fixed in such notice. Said forester may adjourn such hearing from time to time if necessary, by filing notice thereof with the town clerk. He may review and inspect the premises and may summon and examine witnesses under oath. His determination shall be made in writing and filed with the town clerk as soon as practicable. Such determination upon written approval of the State tax commission shall be final, but if adverse to the claimant, it shall not preclude him from applying for like exemption in any subsequent year upon compliance with the requirements of this act.

After the exemption provided in this act has once been allowed it shall continue for the period specified in this act unless cancelled by the State forester as provided.

Any corporation, co-partnership or other association of persons, as well as individuals, shall be entitled to the exemption rights and privileges herein provided, upon compliance with the conditions and requirements of this act.

A measure of importance in the Province of Ontario, Canada, has been the establishment of a fire-ranging system.

Forestry at the Pennsylvania State College.

PROF. HUGH P. BAKER, late of the Iowa State College, has been appointed as the head of the Forestry Department of the Pennsylvania State College, and our readers will join in wishing him the fullest measure of success in his new field.

The State College now offers a four years' course in forestry. The first two years are practically the same as in the general agricultural course, except that elementary forestry is taught, together with additional mineralogy and geology, while the practical work in surveying is increased. At the end of the Junior year two weeks will be spent in camping in the woods, where practical work in forest measurement and management will be given. In this and the Senior years special attention is given to forestry. In the Senior year silviculture, physiography, dendrology, mensuration, and protection are taken up. There is also practical forestry, with instructions in geology, physics, geological surveying and mapping, highway engineering, general bacteriology, fish and game preservation, and zoology. In the Senior year forest management, utilization, wood technology, history and administration, forest law and finance, diseases of trees, political science, landscape gardening, forest entomology, and horticulture are all taught.

A two-story frame building has been assigned for the work of the Forestry Department, and is admirably suited for its needs. There is a large museum room on the second floor, with offices, class room, and instrument room on the first floor. A basement is divided so as to be well suited for the storage of seeds by various methods; 115 well selected books on forestry will form the nucleus for a strong working library, and a museum will be built up.

With an unusually large number of different forest trees on the college campus, and with forested hills within two miles, there are good opportunities for becoming acquainted with trees and practical work in forestry. Special stress will be laid on practical field work, and the required amount of this will be increased within the near future. It is planned to have the men spend at least one summer in a logging camp and sawmill.

A class of five men who began the work under Dr. Fernow are now taking up the Junior year course, and eighteen men have classified in the Freshman year. An assistant will be procured for the Forestry Department during the coming year.

Private Fire Patrol Service.

A SPECIAL report from Lewiston, Idaho, states that representatives of nine timber owning concerns in that city have reached an agreement whereby protection against fire will be given to 250,000 acres of timber land which they own. The work of supervision was to begin about the middle of June, and for this area the cost for a year, it is thought, will be approximately $10,000 or about 4 cents an acre. This is a private undertaking, and so far as reports show no assistance is to be given by the State or counties in which the timber is located.

It is a matter of regret to every timber land owner that no provision is made by the States for the protection of their property. Selfish interests on the part of timber owners cause them to deprecate the lack of enterprise in this direction. While their interests naturally are selfish ones, it should be remembered that everyone is concerned in the preservation of existing timber and also in every step that is being taken to perpetuate its life. It is a matter of personal and selfish concern to every property owner in a city to have established efficient forces for fighting fire. The fire departments are not established merely to safeguard the property of the individual from destruction, but as a public safety precaution. The people of every large city and most of the smaller ones have by direct means agreed to tax themselves to maintain organized forces in order that they may be able to cope with conflagrations great or small. While some progress has been made in this direction by State and county it is to be regretted that none of them have what correctly could be termed an adequate system of guarding against forest fires. In Europe some of the governments have established facilities for guarding against fires and for stamping out those which originate, or facilities for confining them to the smallest possible area. It has been demonstrated by the outcome of the efforts of the old world that forest fires can be controlled where systematic efforts are made. The forest rangers in the federal reserves in the west are doing good work. They are not strong enough in number, however, to cope with great fires but they can handle the little ones, and by putting forth the ounce of prevention are able to forestall possible heavy losses.

At this time it would seem that the efforts of the federal government should be supplemented by those of the various States in which they are made, and in turn the timber land owners should co-operate with both, so that by putting into the field a large number of capable rangers damage and loss by forest fires could be reduced to a minimum.

In carrying out a system of forest protection it might be necessary to increase the rate of taxation in order to provide funds for this purpose, but the increase would be light, and in view of the dependence of the timber sections upon the lumber and allied industries no great objection should be raised to this special taxation for a specific purpose. The farmer might quibble at the raise, holding that it would confer no benefit upon him, but a demurrer of this sort would not be in line with his best interests, because both the timber camps and saw mills are heavy consumers of all the products that agriculturists have to offer them.

Every timbered section is endangered to a greater or less extent by the railroads, notorious spreaders of fires along their rights of way. It should be possible by pacific means to secure their co-operation. Probably by increasing the number of track walkers and enlarging their duties they can help stamp out fires set by passing locomotives. In some of the eastern States the experiment was tried at one time of keeping a fire train and a fire crew in commission during the dry summer months, and as soon as a fire was reported at any point the train was sent out to fight it. Results were very satisfactory.

Timber in Idaho is not damaged as readily or as greatly as that in some other parts of the country. Damage by fire to yellow pine either in the west or south has been nominal in so far as matured timber is concerned, but the fires which sweep through the forests during the dry summer and fall months kill the young growth in the south, and sometimes reach such a velocity and generate so much heat in the western States that not only is timber damaged but in some cases destroyed. The danger here is not so great as it is nearer the Coast, where the forests grow up in masses of tangled underbrush. When dry weather comes this growth becomes very inflammable, and a fire starting in it soon gets such headway as practically to defy all efforts to control it. The best safeguard against fires is to take those precautionary steps which prevent their inception, and the timber owners of Lewiston are to be congratulated upon recognizing this salient truth.—*American Lumberman.*

In the year 1895 an Act was passed creating a National Park in the Province of Quebec. Since that time rapid strides have been made in the establishment of reserves, and the total area of the reserves in the Province is now 165,474 square miles. The largest of these is known as the Saguenay and Labrador Reserve of 109,360 square miles. Quebec is to be congratulated on its appreciation of the value of forest reserves.

Forestry on the Girard Estate.

THE Girard Estate in Schuylkill County, Pa., has over 10,000 acres of mountain and farm lands lying outside of the coal measures, which, with the exception of 700 acres of farm land in Catawissa Valley, could be utilized for forestry purposes if they could be protected from forest fires.

In 1879 the first planting of trees was made, and since that time over 250,000 trees were planted, principally white and Scotch pine. These trees were protected by fire lanes and by fire patrols during the dry seasons, but it seemed impossible to prevent forest fires. In the year 1902 a stone wall 4 feet in height, 2½ feet thick at the base, and 1½ feet at the top was commenced, to inclose and protect the watershed of Lost Creek from forest fires, and from pollution by refuse deposit. This was completed in 1905, the total length being 6⅓ miles. This stone wall has been of assistance in preventing the spread of forest fires. In the report of the Board of Directors of City Trusts for 1906, it states that in that year forest fires burned over 1,625 acres of the Girard Estate and 210 acres of the Girard Water Company, destroying the young trees, for the most part, of 1, 2, and 3 years' growth; and in the case of some 60 acres of 7 years' growth. These fires occurred in April, while there was a strike at the collieries, and were started by men making excursions over the mountains.

The forest trees planted on the watershed of Lost Creek, and the spontaneous growth of young trees, were inclosed by a stone wall as mentioned, but even this and the fire patrol did not prevent 210 acres from being burned either by careless or intentional fires. The fire roads within the enclosure, established to prevent the extension of fires, were recut and burned. No trees were planted in 1906.

It would seem, from the precautions taken, that some, at least, of these fires were intentionally started; and if this is the case, the offenders should be severely punished. The Girard Estate has made a large expenditure in the endeavor to retimber its wild lands, and it is hoped that ultimate success will crown its efforts.

The Canadian government has passed "the Dominion Reserves Act." This Act sets apart 21 forest reserves, with a total area of 3,420,200 acres. Six of these reserves are in Manitoba, three in Alberta, four in Saskatchewan, and eight in British Columbia.

New Publications.

Twelfth Annual Report of the Forestry Commission of Minnesota for the year 1906. 8vo. 147 pages, illustrated. St. Paul, Minn.

The Minnesota law creating the office of Forestry Commissioner expressly makes it one of his duties to "disseminate information concerning forestry," and one way of doing this is to include forestry information in his annual report which he is required by law to make and of which 4,000 copies are printed and circulated free. The law makes town supervisors fire wardens, and it appears from their reports that the damage done last year by forest fires was only $15,115, 11,501 acres being burned, and by prairie fires $2,087, 17,261 acres being devasted. It is the duty of wardens to take precautions to prevent fires. If in any part of a town there is a smouldering fire, which for the present moment seems unimportant and it is out of sight and knowledge of a warden, it is his duty to have some resident who does know of the fire bring it to his knowledge and the fire should be promptly extinguished; otherwise should there be a high wind, it might prove very destructive.

The secret of forestry, says the Commissioner, is that it utilizes waste, hilly, rocky or sandy land that is unfit for agriculture. On such land it requires 80 years on an average for pine to reach its fiscal age—that is, when it ceases to earn good interest by its growth. According to the yield tables of Germany we would expect from such land in 80 years at least 18,000 feet of merchantable standing timber per acre. If fires are kept out the most of such land would become forested in some sort naturally, but only a comparatively small part would become well stocked with pine. To get such land well stocked with pine the most of it will have to be planted; therefore, the State should acquire possession of such land and have it treated on scientific forestry principles. The Commissioner states that the average farmer in Minnesota who opens up a farm of 160 acres would require for the construction of his buildings 30,000 feet of lumber, board measure, and that the average cost of such lumber at present is $30.00 per thousand feet. The population of the United States since its first settlement has increased at the rate of 18 per cent. every 10 years, and in 80 years from now it will be 320,000,000, and the Commissioner argues earnestly in favor of the State now beginning forestry work on a scale suited to its own dignity and its great natural resources.

Sketches of forestry in eleven European countries are also given in the report

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The attention of Nurserymen and others is called to the advantages of FOREST LEAVES *as an advertising medium. Rates will be furnished on application.*

The Pennsylvania Forestry Association,
FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, Two dollars.
Life membership, Twenty-five dollars.

Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 1012 Walnut Street, Phila.

President, John Birkinbine.
Vice-Presidents, Wm. S. Harvey, James C. Haydon, Albert Lewis, Richard Wood.
General Secretary, Dr. Joseph T. Rothrock.
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County Organization, Samuel Marshall, Chairman; Eugene Ellicott, James C. Haydon, Dr. J. Newton Hunsberger, and Richard Wood.

OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIAL.

READERS of FOREST LEAVES will notice that the keynote of the Twenty-second Annual Meeting of the Pennsylvania Forestry Association was the practical utilization of our forest reserves. This subject is worthy of careful consideration, and although no action looking towards modification of the forest laws of Pennsylvation can be had for a year, and it may not at that time be wise to agitate the subject, it is well that this should receive consideration and thought.

We believe that a great majority of the members of the association will consider the forest reserves in the broad aspect of future usefulness, and base profits from the timber accretion, rather than from the view point of immediate gain. Legislative committees may listen and give consideration to the claims put forward in behalf of enlarged forest reservation, but to secure any revision of the laws governing these reservations without jeopardizing the basic principle which encouraged their creation, the public sentiment must be educated which will support the advocates of the revision. It is, therefore, well to consider such matters at a time which admits of of mature deliberation.

In the narrative of the meeting considerable space is given to the appeal made by Vice-President, Mr. Harvey, in behalf of the Appalachian and White Mountain forest reservations, for which Congress is asked to make provision.

We appreciate the conditions which prevails in the western portion of our country, and recognize that the future of the States west of the Mississippi River is being cared for by the reserves created. We also appreciate that any advance in one section of the country means progress for the whole Nation, and Pennsylvania should not be jealous that forest reservation has been so liberally distributed throughout the western section, or

that the Keystone State will apparently profit but little, if any, from the Appalachian or White Mountain reserves proposed. We can well afford to favor forest reservation in any section of the country where their usefulness can be demonstrated.

Narrative of the Annual Meeting of the Pennsylvania Forestry Association.

THE Twenty-second Annual Meeting of the Pennsylvania Forestry Association was held at 1012 Walnut St., Philadelphia, Pa., on Monday, December 9th, 1907 at 3.30 p.m., President John Birkinbine in the chair.

After calling the meeting to order the President's annual address, which will be found in another column, was presented.

This was followed by the Reports of the General Secretary, Treasurer, and of the Council, all of which appears on other pages of this issue.

Prof. Hugh P. Baker, head of the Forestry Department of the Pennsylvania State College, referred to his connection with the Reclamation Service, and emphasized the necessity of water conservation. He stated that 13 per cent. of Iowa is in woodland, and owners of timbered tracts can set aside reservations on which taxes are rebated. He also referred to the four year under-graduate course in forestry in the Pennsylvania State College, the class now numbering twenty men.

Mr. Wm. S. Harvey, Vice-President of the Pennsylvania Forestry Association, and of the American Forestry Association, also the President of the Philadelphia Commercial Museum, commended the reports presented and desired that copies be sent to members of the State Forestry Reservation Commission, the Water Supply Commission and the Department of Health.

He also urged the securing of the proposed Appalachian and White Mountain Reservations, advocating an appropriation by Congress of $25,000,000 to secure forest reserves of 5,000,000 acres in the first, and 600,000 acres in the last mentioned reservation. He quoted Speaker Cannon as saying that if the people can demonstrate to Congress that these reserves are wanted they will be secured. Mr. Harvey suggested that if the reserves could not be secured in any other way 4,000,000 or 5,000,000 acres of the 147,000,000 acres of forest reserves in the west, where there is a population of but 5,000,000, might be sold and the proceeds reinvested in forest reserves in the east, where there is a population of 80,000,000 and where the United States has not one acre of reserves.

He referred to President Roosevelt's statement that forest reservation is the most important economic question we have to consider.

Mr. Harvey stated that there is invested in the east and south more than $450,000,000, which is largely dependent on the water-power of these regions and which will be crippled if the mountain and hill cover is not protected.

He called attention to the American Forestry Association having carried on for the last six months an educational campaign, sending to 1500 newspapers throughout the United States editorial matter relating to forestry and the utilization of the material resources of the country.

The forestry work has broadened out into advocating the utilization of all the natural resources, as Mr. Pinchot stated in a recent address that the forestry associations, river and harbor improvement congresses, inland waterways, reclamation and irrigation and the settlement of lands for agriculture should all unite their divided efforts into a great central body, for all were working for the same end and fundamentally all were dependent upon the preservation of the forests.

Continuing, he said that the scope of usefulness of the Pennsylvania Forestry Association has broadened, as clearly indicated in the report made by our officers to-day, and the work and influence of this Association is far reaching beyond our State.

Mr. Wm. L. DuBois, President of Philadelphia Trust Company, said, that if we could only drop out a few battleships and invest the money in forest reserves it would be better for the nation.

Messrs. Kirk and Marshall were appointed tellers of the election, and after counting the ballot announced that the following officers were unanimously elected.

President, John Birkinbine.
Vice-Presidents, Wm. S. Harvey, James C. Haydon, Albert Lewis, Richard Wood.
General Secretary, Dr. Joseph T. Rothrock.
Recording Secretary, F. L. Bitler.
Treasurer, Charles E. Pancoast.

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Westmoreland County, Hon. Lucien W. Doty.
Wyoming County, James W. Piatt.
York County, Dr. I. C. Gable.

There being no other business before the meeting it was adjourned *sine die*.

Address of the President of the Pennsylvania Forestry Association.

IN greeting you as members of the Pennsylvania Forestry Association at its twenty-second annual meeting, your President is gratified to repeat the sentiment which he has been able to express for a number of years, viz.: That decided progress in the forestry movement in Pennsylvania and in the Nation can be reported.

It is considered unnecessary to recite individual evidences of this progress, some of which are set forth in the reports of the Council and of the General Secretary. Instead, your attention is invited to the responsibility which extensive areas of forest reserves have created, and to the necessity of sustaining their administration upon a sound, practical, business basis.

The Forest Reservations, which have been established by various States and by the Nation, have been favorably accepted by the public, and sentiment encouraging the maintenance of these, and the desire for augmented protected forest areas have been widespread. This appreciation is not merely sentimental, although the delights and comforts which wooded areas offer are of sufficient importance to warrant enthusiasm for forest protection, but, to have public favor continue and to encourage the growth of the sentiment, which approves the extension of forest reserves, tangible material results must demonstrate their value.

The claim will be made that the money of the people is invested in the protected forest areas, and, while it is expected that in many instances interest on the investment will be more than met by the natural accretion of wood volume, this may demand years to demonstrate. The forestry laws

of the State of Pennsylvania permit of harvesting matured lumber under proper restrictions and making the forests renumerative, yet for some time the maintenance of forest reserves may be a continuing tax, the payment of which may become tiresome, unless some appreciable revenue results.

The State or Nation can well afford to preserve forests for their beauty or for the enjoyment and pleasure of the citizens, and the gratification and recuperation resulting from a short sojourn in the woods, or from hunting game or fishing, will go far towards instilling or maintaining interest in well-protected forest areas.

The use of portions of the State's forest reserves as sanitaria will also bring the support of many who suffer, or who care for invalids.

The above, however, may be considered as especially applicable to limited areas, and it may be desirable to demonstrate that the more liberal territory, which the State or Nation maintains, is a good investment by reason of possibilities which exist. The administration of our forest reserves is, therefore, an important problem, one which commands and is receiving careful consideration in many details. Large areas will require the employment of a liberal number of men to guard and protect them, to look after the seeding, planting, and re-planting, to restore denuded areas, and these employees must be specially fitted and trained for the work assigned to them and not merely partisan appointees.

In the desire to protect the forests some legislation in other States has gone so far as to materially limit the possibilities of making these good investments by practically prohibiting any cutting whatever. The laws of the State of Pennsylvania, however, provide for the cutting of matured timber under the authority of the Forestry Reservation Commission, and the maintenance of a Sanitarium and of a Forest Academy are further evidence of a liberal policy of administration. The success of forestry in Pennsylvania is primarily due to the Department being recognized as an integral feature of the State Administration and therefore responsible directly to the Governor, and also to the fact that the practical side of forestry has not been overlooked. The administration of our forest reserves has been upon a clean business basis which merits approbation.

But there are some features of State regulation which may require amendment and which are worthy of consideration by the friends of forestry, so that at some future session of the Legislature these conditions may be improved. Thus, much of the mineral on forest lands owned by the State of Pennsylvania is liable to be undeveloped because the deposits must be leased or disposed of to the highest bidder. Such a method would meet with approval, provided the State would develop the properties to such an extent that each bidder would be able to determine the value of the mineral to him, but bidders will not be liable to expend money in development for the benefit of competitors. This does not apply to open quarries so much as to underground or covered deposits, and some quarries now bring a good return to the State. However, as the mineral does not deteriorate, it may become a source of future revenue when this is needed more than at the present time.

The conservation of water, which encourages perennial springs, draining from the forest floor, is of untold value, for this floor keeps much of the rainfall from doing damage in the erosion of cultivated lands or by the flooding of streams, except under unusual conditions. These advantages, if fostered by progressive administration, will offset interest on large amounts of money invested in foreign lands.

When the Forestry Laws, especially those creating the reserves, were under consideration, one of the arguments used in their favor was the beneficent influence the reserves would exert on the water supply of the State. To merely hold these lands as forest reserves does not meet the requirements for the conservation of water. Much of the rain, which falls upon and which is temporarily held in the forest floor, could be made of economic value by the erection of storage reservoirs, and there are admirable sites for these in the forest reservations. Whereas the streams below and without the reservations may offer less desirable locations at insufficient elevation to obtain the desired head or pressure.

If storage reservoirs were constructed and maintained by the State, this would probably solve the problem, but it is questionable if the people of the Commonwealth are ready to favor such paternalism. It would seem, therefore, that the true interest of forestry would be served if, under proper restriction and subject to the direction of the Department of Forestry, private corporations could be allowed to construct storage reservoirs. However, according to existing laws, as interpreted by the Attorney General, this can not be permitted, and it may be advisable for us to give careful consideration to a suggestion to permit storage reservoirs to be located on State lands, and also to the advisability of modifying the present laws, so as to encourage the development of mineral lands on State property. The law is now understood to give no option to the Commissioner of Forestry to grant the right of way for a road, railway, telegraph or power transmission lines, or to permit the laying of conduits on State forest lands. These, in many instances, could be advantageously located so as to create fire lanes and reduce the risk of damage from forest conflagrations, and permit of communication between desired termini. Some modification of the laws seems possible, which would work no permanent injury to the forest reserves, but which would bring revenue from them while improving the opportunities for development of industrial interests.

The forest reserves of Pennsylvania require careful administration, so that each year they will represent greater value than in the preceding year. To guard and protect 750,000 acres in various sections of the State, and to replant portions or carry forward improvement cuttings in others, is a task of magnitude. To prevent or limit loss from forest fires calls for ability, energy, and resourcefulness. Add to these the supervision of the Forest Academy, the propagation of young trees for re-foresting denuded areas, and the duties of the Forestry Reservation Commission appear sufficiently onerous. But the adoption of a policy which, under proper restriction, would permit the construction of reservoirs, the placing of conduits, the building of roads, power transmission lines, etc., would not materially add to these duties, but would bring revenue from these reserves, assist in their protection and maintenance, and win the support of the public.

The practical value of forest reserves must be demonstrated by making them useful to the Commonwealth, and by encouraging material development in any direction which does not jeopardize their maintenance.

Report of the General Secretary.

THE report of the General Secretary will be short, for the very good reason that the report of the President and the Secretary of the Council have covered carefully and wisely almost every phase of the forestry problem in this State.

There are, however, two or three points to which I desire to call your attention.

1. The water flow which is embraced within the State Forest Reservations. The most important use to which this can be put is for the immediate support of human life. It is no disparagement to the other interests to say that beside this one they all become absolutely insignificant, important as they are to our remoter wants. As soon as a stream becomes large enough to produce power, it is likely to be set to work, and, in addition, it is likely to be made the vehicle for removing the refuse and filth of the manufactories on its banks. No more wicked or unsanatory statement could be made than that which but a few years ago was proclaimed in our legislative halls that "the streams are the natural sewers of the State." No commercial emergency can be imagined which morally justifies the pollution of the sources of water supply upon which our citizens depend for their very life, and no legislation against such a vicious practice can be too stringent; it simply should not be tolerated.

As one of the avowed purposes for which the State Forest Reservations were created was the conservation of water, it is the duty of those who are personally, or officially, interested in State Forestry to see that the water supply contained in these reservations is put to the best use so long as it flows through the State lands.

It might be supposed that a proposition so fundamentally true as this would need no argument in its favor. An illustration, however, may make the necessity for calling attention to this point more clear. Within a few years a railroad corporation from another State actually crossed a river in this State with its pipes to seize upon a mountain stream for water for its locomotives, justifying its act by the subterfuge that it was a necessity and done by virtue of eminent domain which the law confered upon it. It was neither; but it was the exercise of an arbitrary authority by which commercialism may absolutely imperil the property and the life of our citizens. This case may serve to point out the danger to which I allude. It is not an isolated case. It was simply the entering wedge and was promptly followed by others, involving the same principle. It is not too much to say that already many of the most valuable water rights in the State have already passed into the hands of those who will use them for personal, rather than for general, good. It may be safely said that the time is not far distant when water and air will be placed in the class of nature's gifts to which all men have equal rights.

I am aware that this is a dangerous subject, one in which the speaker is likely to be misunderstood. I assume the risk, however, but desire now to add the further word that the forces which protect and advance our national prosperity and which demand cheap power must be cared for. Stop the wheels on our railroads and in our manufactories and the glory of the Nation would depart. Pennsylvania is in position to make equable distribution of its wealth of water. It has a commission specially dedicated to this work, and the make-up of this commission is such that we may expect due consideration of every interest.

It may, however, not be amiss to suggest that there should exist some definite point at which a pure water supply for the family and the individual should be guaranteed.

It does not follow that because it is made legally possible to dam our greatest river at McCall's Ferry that it should be equally legal and just to dam every fountain head which contributes to the flow of the Susquehanna. There should be a point above which purity of the water should be maintained against all commercial interests.

The proposition to furnish water from artesian wells for domestic purposes is dangerous—especially in limestone regions. Artesian water is not necessarily pure. I am of the opinion that all mountain streams originating in and flowing through the State Forest Reservations should, so long as they are on the State lands, be held directly and exclusively for water supply to towns and cities and that it should be made impossible for any strictly corporate interest to obtain control of them.

Water power and water supply are becoming interests which may transcend State boundaries and become of national importance. For example, Kansas and Nebraska on the east of the Rocky Mountains and Utah on the west were all settled before Colorado, and their productive capacity depends largely upon streams which have their heads within that State. It would be manifestly unfair to leave these three important communities to the mercy of the fourth State. Federal control may need to be invoked. Other like examples might be readily given.

Indeed, the time may come when the tributaries of the Ohio will, for the general good, be placed under similar supervision. This does not in the least lessen Pennsylvania's right, or duty, to exercise exclusive control of the Forest Reservations in production and perpetuation of timber supply.

The second point which I wish to allude to is the right of the individual in the State Forest Reservations. No forestry system can be maintained if the citizens at large are not interested in it, and, it may as well be added, no general public interest in the State forest lands will exist unless our people are induced to visit and enjoy as well as profit by them. It is not enough that we raise timber in our woods, important as this is. There is a large proportion of every population which fails utterly to realize that it has any interest in growing timber. We must awaken their interest in some other way. This can best be done by cultivating in the people the sense of ownership, which will come by throwing the reservations open to the public and inviting a full enjoyment of the State lands.

It would therefore appear to be wise to set apart portions of the reservations on which, at any season, any citizen could camp after having received the proper "permit" to do so. On the back of the "permit" should be printed the rules to be observed. The permit should be open to inspection by any State warden or forest officer. If there had been violation of the rules the permit should be withdrawn and forwarded to the Department of Forestry, and the name of the party, or parties, placed upon a black list, and no permit be again issued to the offenders. It would require but a brief period to cultivate a proper respect for both the land and the laws.

The third point which I wish to emphasize is that the one thing which distinguishes our forestry system from that of other States, and indeed from that of the general government, is, that it is a distinct department of the State government and not a mere division, or bureau, of another department. It is to this that the remarkable development of our forestry interests is due.

At present, Pennsylvania has not less than three million dollars invested in forestry interests. As the years pass this sum will be enormously increased. To care for the forests and to wisely plan for the future requires a special professional training. As well might we expect a physician to be a safe adviser in matters of law as to expect one unacquainted with the science of forestry to be the best person to shape and enforce a sound forest policy. Our State is now successfully training men for this branch of public service.

In conclusion, I may add that the camp for the treatment of tuberculosis which was opened, and successfully conducted for five years, by the Department of Forestry has been wisely transferred to the Department of Public Health, and a liberal appropriation made for its increase and maintenance. The experiment of placing consumptives on the public lands where, properly isolated, they might derive from out-door life such benefit as was possible, has awakened a lively interest in other States and elicited general commendation. The example probably will be followed elsewhere. The friends of forestry will bespeak for the Mont Alto camp, under its new management, a continuance of the friendly interest which the work has hitherto received.

The following paragraphs suggest lines on which future legislation seems to be desirable, and upon which, also, the assistance of the Pennsylvania Forestry Association is requested.

1. Forestry Commission should have the power to grant rights of way to individuals and corporations, and to lease lands for the development of stream-power.

2. It should have the power to furnish seedling trees at cost to citizens desiring to plant forests, or lesser areas, upon suitable guarantee that these seedlings would be properly cared for.

3. It should be given power to direct and assist individuals and corporations in their tree-planting operations.

4. It should be given power to lease suitable lots to individuals for the erection of health cottages, under proper restrictions.

5. The campaign for the amended tax laws on timber lands should be vigorously prosecuted anew.

Respectfully submitted.

J. T. ROTHROCK,
General Secretary.

Treasurer's Report.

THE fiscal year of the Pennsylvania Forestry Association ends December 1, 1907, and the statement of finances on that date was as follows:

Treasurer's Statement to December 1, 1907.

	Dr.
To balance on hand December 1, 1906,	$ 627 24
Cash, annual dues to November 30, 1907,	2165 15
Cash, donations and subscriptions,	241 00
Cash, sale of FOREST LEAVES and advertisements,	187 30
Cash, interest on Life Membership bonds and deposits,	185 92
Cash, Life Membership fees,	150 00
Cash, sale of badges,	8 41
Total,	$3565 02
	Cr.
By cash, sundries, postage, office rent, etc.,	$ 508 79
Publication of FOREST LEAVES,	966 11
Assistant Secretary's salary,	600 00
Official Badges,	7 50
Meetings,	152 32
Life Membership fund,	150 00
Membership Committee, expenses of,	124 19
Awards for tree planting,	100 00
Balance on hand December 1, 1907,	956 11
Total,	$3565 02
Forest Leaves Fund.	
Invested,	$1859 42
Cash on hand,	52 00
	$1911 42
Life Membership Fund.	
Invested,	$2835 00
Cash on hand,	200 00
	$3035 00
General Fund.	
Invested,	$1788 15

CHARLES E. PANCOAST,
Treasurer.

Audited and found correct.

WILLIAM S. KIRK.
ALBERT B. WEIMER

Report of Council of the Pennsylvania Forestry Association.

DURING the first five months of 1907, when the Legislature of Pennsylvania was in session, efforts were made to secure changes in the laws taxing timberlands, so that owners would be encouraged to hold those already timbered and reforest cut-over and sprout lands. It was deemed better to present the proposed law for the reduction of taxes as two separate bills.

The first act provided that all lands not suitable for agriculture, on which the timber was being grown either by natural reproduction, seed sown, trees planted out or all combined, should constitute a separate and distinct class of lands, to be known as Auxiliary Forest Reserves. Any owner desiring, to have his land placed in this class was to notify the Commissioner of Forestry giving a description of the land, the condition of the trees, etc. The Commissioner of Forestry will then cause the land to be examined by a skilled forester, and if he concludes that the land should be placed in the class mentioned to notify the Commissioners of the County in which the land was located. The land was to then remain in the class of Auxiliary Forest Reserves until the trees shall become sufficiently large or suitable for merchantable timber, provided the owner agreed in writing with the County Commissioners to care for and treat the trees according to the directions of the Commissioner of Forestry. If the owner failed to do this then the land was to be removed from this class. When the trees become suitable for merchantable timber and it was desirable to cut them, three months' notice was to be given the Commissioner of Forestry, who shall designate what trees were to be cut and the method of removal. If other trees are then planted or the young growth protected then the land will still remain as Auxiliary Forest Reserves.

The second act provided that the Auxiliary Forest Reserves should not be assessed for the purposes of taxation at an amount in excess of one dollar per acre. The County Commissioners to furnish the assessors with a list of the names of owners and descriptions of the tracts which were classified as auxiliary forest reserves. When lands were removed from this class, then the owner was to pay the County 50 cents per 1,000 feet of coniferous timber and 25 cents for hardwood and broadleaf timber.

This second act received four votes less than the necessary two-thirds vote in the House and was defeated. As the first act would therefore be of no avail (although it had passed the House)

it was not pushed. If the important timber industry of this State is to be maintained some such laws must be soon enacted.

Other forestry legislation which was passed included :

The old law in regard to fire wardens having been questioned in the courts, Act No. 86 was passed. It provides that all constables of boroughs or townships and their deputies, and the employes of the Department of Forestry shall be *ex-officio* fire wardens whose duty it is when fire is discovered in or approaching forests or wild lands, to immediately take steps for its extinguishment, and have authority to employ other persons to assist in such extinguishment. The fire wardens to receive 25 cents per hour when so employed and other persons 20 cents per hour. Two-thirds of this amount is to be paid by the State and the remainder by the county in which the land is situated. Penalties are provided for the non-performance of their duties by *ex-officio* fire wardens.

The Camp Sanatorium at Mont Alto for the care of persons suffering from incipient consumption was transferred from the Department of Forestry to the Department of Health, which under Act, No. 157 has an appropriation of $600,000 for the acquisition of property, erection of buildings, etc., for one or more sanatoria for the cure and prevention of tuberculosis. The right is also given to select one or two tracts of land of not over 500 acres each in the State forestry reservations for this purpose. It is understood that approximately one-half of the above appropriation will be used in enlarging and improving the sanatorium at Mont Alto, and a second one established in the western part of the State.

Appropriations of $80,000 for taxes for two years on the State forest reserves ; of $15,000 for the maintenance of the Forest Academy, $15,000 for the new dormitory for the Academy, as well as that necessary for the continuance of the Department of Forestry, were made.

Another bill provided for the appointment of Shade Tree Commissions in cities, boroughs and townships of the first-class. The Commission to have the exclusive custody and care of all shade trees on any of the public highways. The Commissioners are to serve without compensation, but provision is made for the necessary expenses by taxation.

Game preserves were also established in the forest reserves, where the denizens of the forest were secure from all molestation.

The forest reserves of Pennsylvania have been increased by the purchase of desirable lands with good titles, so that at the present time the State of Pennsylvania owns 751,650 acres of forest reserves, and 75,000 acres are in the course of acquisition. Offers for the sale of lands are made almost every day, but the prices asked are much higher than in the past.

The Department of Forestry has continued its good work, establishing two new nurseries, one at Asaph in Tioga County and the other at Greenwood Furnace, in Huntingdon County. The one first established at Mont Alto has been enlarged to seven acres, with hundreds of thousands of seedling trees. Experimental plantations have been made on several of the reserves. The Forest Academy is now furnishing young men, carefully and thoroughly educated, who will be placed in charge of the various reserves, and in the course of a few years the beneficent results will be seen.

It was suggested that the charter of the Pennsylvania Forestry Association be amended so that it could hold lands for park purposes in various sections of the State. This was referred to the Law Committee, and after careful consideration it was deemed inadvisable at the present time to make any change.

The national forest reserves were increased by Presidential proclamation by the addition of some 17,000,000 acres, the total now being 146,286,403 acres in the United States and 12,987,626 acres in Alaska, or 159,274,029 acres in all, not including those in our insular possessions, or nearly 250,000 square miles.

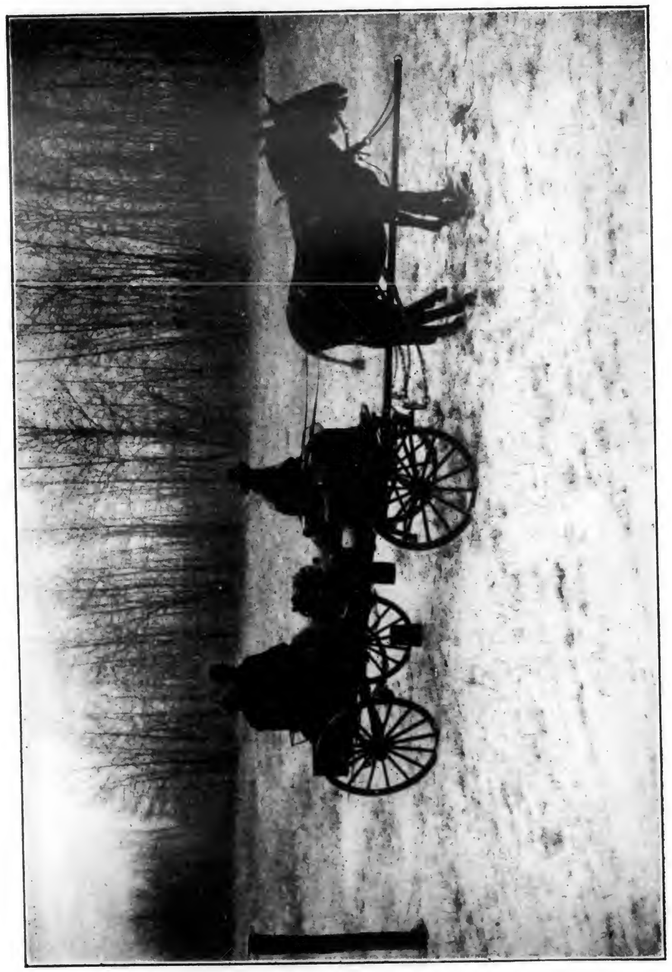
The bills creating the Appalachian and White Mountain national forest reserves were not passed at the last session of Congress, but will be again presented during the present session. It is hoped that our members will use their influence in securing their passage, thus aiding in the preservation of the hardwoods of the east.

Most of the States have Arbor Days and some of them have established forest reserves, notably New York, with 1,400,000 acres. While numerous forestry associations have been formed.

The educational institutions are either establishing forestry courses, or at least giving some attention to these, while various womens' clubs and the press have continued to give the movement warm support.

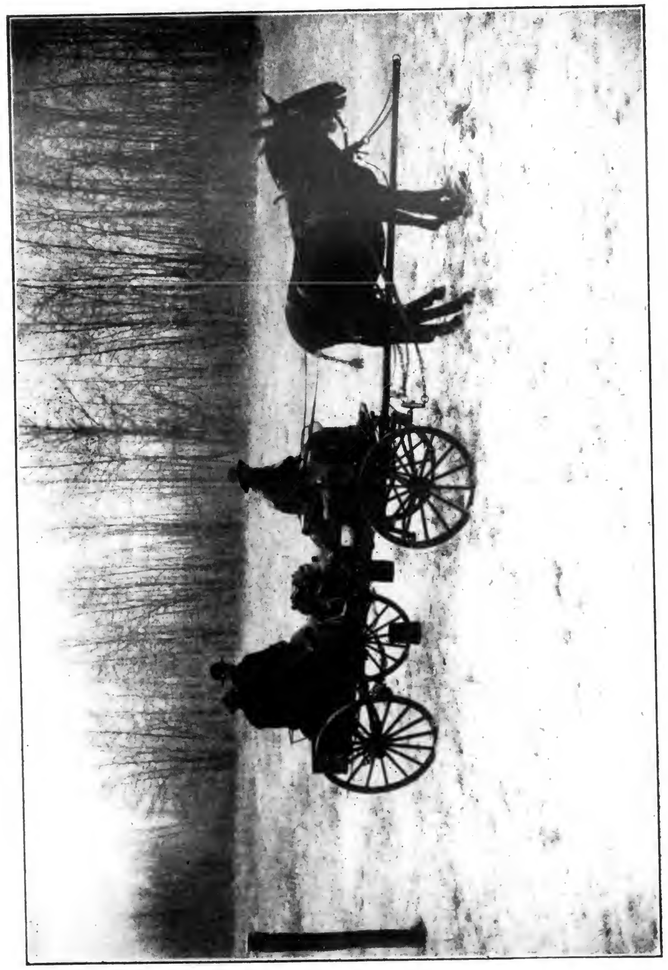
One of the most important advances in late years is the active co-operation of the lumbermen in the forestry movement.

On June 10th the Pennsylvania Forestry Association held an enjoyable and instructive meeting at Alverthorpe, the residence of Dr. Henry M. Fisher. Brief addresses, an inspection of the magnificent trees on the property, and the interchange of ideas among members served to awaken renewed interest in forestry.



THE PENNSYLVANIA FIRE WAGON.

A YOUNG BLACK WALNUT TREE.
In the Experimental Plantation on the Hopkins Reservation.
CLINTON COUNTY, PENNSYLVANIA.



THE PENNSYLVANIA FIRE WAGON.

A YOUNG BLACK WALNUT TREE.
IN THE EXPERIMENTAL PLANTATION ON THE HOPKINS RESERVATION.
CLINTON COUNTY, PENNSYLVANIA.

During the past year the Association has made a net gain in membership of 11, the number of new members being 85, while 74 died, resigned or were dropped, leaving the present membership of 1551. The losses through death were especially heavy, 27 having passed away. Among these were three members of Council, Messrs. N. T. Arnold, Dr. William Herbst and Charles Hewett. Their wise counsel and active help will be missed.

The most pressing needs of forestry at the present time in Pennsylvania would seem to be in securing proper laws in regard to the taxation of timberland (both that which is forested, or in process of reforesting), and protection from forest fires. One means of securing this is to largely augment our membership, thus enlarging its influence, and it is hoped that all on the roll will aid in this effort.

The leaven which was placed twenty-two years ago by the Pennsylvania Forestry Association is now giving magnificent results, in the interest of forestry, not only in Pennsylvania, but throughout the whole country.

F. L. Bitler,
Recording Secretary.

The Pennsylvania Fire Wagon.

IN the June, 1904 issue, of Forest Leaves a description was given of the method of conveying water to fight forest fires by means of kegs placed on pack-saddles on horses.

This system has given excellent results, but the Department of Forestry of Pennsylvania has made anothor additional innovation in a fire wagon. The 1905–06 report of the Department states that this wagon was built expressly for the purpose of conveying as near to the forest fire as it can go everything the particular nature of the service requires. Every utensil is kept constantly on the wagon, in perfect order, all that is necessary being to hitch the horses to the wagon and go.

On the wagon are four men, one as wagon-master, one a driver, and two men to use the force pump. There are also four ten-gallon kegs filled with water for the pumps, a five-gallon keg of fresh water for drinking purposes, six axes for brushing out a back firing line, six rakes for clearing away the leaves, shovels and mattocks for trenching or throwing earth on fire, canvas buckets for carrying water, chains for dragging burning logs to safe points, pack-saddles to carry water when the end of the wagon road is reached. Food for one day is kept in the wagon, and also an emergency case of medicines.

The wagon-master is held absolutely responsible for every article on this wagon. He alone has the possession of the key to the house where the wagon is kept. He and the driver remain with the wagon to guard it, to issue utensils and food and remove the wagon and riding horses to a point of safety if the fire advances to a dangerous proximity.

It is probable that in the future a portable chemical engine may be added to the wagon equipment, and possibly adapted also to a pack-saddle, but this has not yet been done. The illustration, for which we are indebted to the Department of Forestry, gives a good understanding of this Pennsylvania Fire Wagon, forming part of a carefully thought-out system for fighting forest fires.

An Experimental Walnut Plantation.

IN order to demonstrate the fact that it is commercially practicable to grow the black walnut tree in Pennsylvania an experimental plantation was begun by the Forestry Department in the Fall of the year 1904, and is described in the report of 1905–06, as follows:

A suitable tract of ground containing from four to five acres was selected on the headwaters of the East Branch of Big Run in the heart of the Hopkins Reservation in Clinton County. The location is the best that could be found at that time. It is in a deep, wide swale, surrounded on all sides by mountain ridges, and has a southern exposure. The washings from the mountain sides have been accumulating here for unknown centuries, forming a deep, rich soil. The plantation was started under the direction of John Liggetto, Esq., of Beech Creek. Men from the neighborhood were employed and work was begun in October, 1904. The land was overgrown with a dense growth of brush. Many stumps of forest trees previously removed for lumber purposes and a number of burned stubs of trees killed by forest fires were on the ground. The stubs were cut, the stumps blasted out, and the whole area thoroughly grubbed and worked over. Roots, stones and other obstructions were carried away or buried, leaving the ground cleared, mellow, and ready for planting.

The tract was then marked out at right angles in rows eight feet apart and the walnuts planted at this distance. The nuts were covered rather deeply for the purpose of protecting them from squirrels and what washings might take place from the winter rains. A stake was placed by the side of each planted nut. In this manner 2,353 plantings were made and left until the following Spring.

Frequently two or three nuts were placed in a planting, so that if one should fail to grow, others might. For protective purposes a three-strand fence of barbed wire was run around the tract to keep out cattle.

In the Spring of 1905, after the nuts began to sprout, the plantation was seeded down to buckwheat for the purpose of destroying the growth of bracken and other weeds which would likely choke the ground. The result of this seeding was deterrant to promiscuous weed growth, and the young walnuts showed up all over the plantation in good style. A number of nuts did not sprout the first year, but remained in the ground, showing no signs of growth until the Spring of 1906. This being the second season for the plantation, the ground was again seeded down, now with rye, and when the crop was removed in July the plantation was nearly free from foreign growth. In the meantime the late sprouting nuts made a good start, and those which grew the first year had in some instances reached a height of two feet.

At the time the plantation was started another small area nearby was cleared and planted as a nursery. Here the ground was marked out in rows six feet apart, and the walnuts planted at distances of one foot. Young trees have appeared plentifully all over the nursery and will be used to fill in on the plantation where the planted nuts failed to grow.

An inventory of the growing stock made in September, 1906, showed that on the plantation proper were growing 1,767 young trees, not counting 193 extra trees, that is, those derived from the extra nuts placed in the ground at the time of the first planting; so that now, instead of there being but one tree at a given point, there are sometimes two or three. These extra trees will also be employed in filling in gaps where nuts failed to grow. In the nursery ready to be planted are 350 trees. The number of points at at which the nuts failed to germinate was 586, or a little less than 25 per cent. of the whole number of plantings made, showing that nearly 76 per cent. of the planting was successful, with trees now well rooted and in thrifty condition. The extra trees in the nursery and the duplicates on the plantation lack only 43 trees of the number sufficient to fill up all gaps. A ranger who patrols nearby land in the reservation guards and developes the walnut plantation.

In 1907, after removing the rye, the black walnut plantation was found to have a good setting of grass and the trees made considerable growth. The gaps were filled with plantings from the nursery and with duplicates, and the plantation protected from trespassing of every sort. The ranger cut the grass and removed the sod from around the base of the young trees. The trees are not permitted to fork, and all weak side branches removed, this gives a straight clean stem until the crown closes in. Those trees which grew the first season survived the winter killing. Within a few years the crowns of the trees will completely shade the ground, thus enabling the plantation to take on the true forest aspect. In order to develop straight, tall, and limbless trunks pruning will be regularly employed and forking of the trees eliminated as much as possible.

We are indebted to the Department of Forestry for the illustration showing the excellent growth made by one of these young trees.

Report of the Pennsylvania Department of Forestry 1905-06.

WE are in receipt of a copy of this most interesting report. It shows that at the close of the year 1906 the State actually owned 701,297 acres of forest reserves located in 23 counties. In addition, there was under contract for purchase an area of about 100,000 acres.

A description is given of the general forest administration, which at present is principally confined to the South Mountain reservation, but a nursery has been established at Greenwood Furnace, and the seven graduates of the Forest Academy have been delegated to look after surveying, nursery, and improvement work.

The question of a new system of taxation for forested lands is discussed, together with the results obtained from efforts in this direction made in other States.

The forest nurseries at Mont Alto and Greenwood Furnace are described, together with information as to the planting of seedling trees, of which the Department had planted 164,650 at the close of the year 1906.

The excellent results obtained at the experimental walnut plantation on the Hopkins Reservation, and of Mr. D. D. Drake's plantation near the Delaware Water Gap, where there have been planted 70,000 young, black walnut trees, and 200,000 white pine, 60,000 German or Scotch pine, 120,000 Norway spruce, and 60,000 European larch, were imported for this purpose. The important subject of farmers' wood lots is also discussed.

The progress of the surveys of the forest reserves, of prosecutions for illegal timber cutting, rules for the government of the reserves, the method of granting permits for camping parties, etc., are all set forth.

There are also a number of interesting and instructive papers. Mr. George H. Wirt, State Forester, describes the work on the Mont Alto section of the South Mountain Reserve during the years 1905 and 1906. Mr. Lewis Staley, Forester, makes a report on "Improvement Cutting on the South Mountain Reserve." There is also mention made of the Federal Refractories and South Renovo leases. Dr. J. T. Rothrock, Secretary of the Forestry Reservation Commission, contributes four papers, on "State Tuberculosis Camps on State Forest Reserves," "Forest Roads, Fire Laws and Trails," "Fire Fighting in the Forest" and "The Collier's Cabin."

Dr. A. M. Rothrock, Camp Physician, describes "The South Mouutain Camp Sanatorium." Hon. S. B. Elliott gives an article on "How Should Our Future Forest Lands be Taxed." The amount of timber cut and losses from forest fires in 1904, and 1905 are given, mention is made of the Water Supply Commission, and Mr. Ephriam Gearhart contributes a description of the "Arborescent Flora of Lycoming, Northumberland, Snyder and Union Counties.

A description of the Black Walnut Plantation on the Hopkins Reservation, and of the Pennsylvania Fire Wagon are given in this issue; we hope to present more of the interesting data contained in the report in later numbers, but each member should have one of these instructive reports for the library, and they can obtain them from the Department of Forestry, Harrisburg, Pa.

Better Utilization of Yellow Pine.

"IN fifteen or twenty years, at the present rate of cutting, the supply of the longleaf yellow pine of the South, one of America's most useful forest trees will be nearly exhausted," says the United States Forest Service. If these pine forests are wiped out one of the South's important industries will die—the production of the so-called naval stores.

The lumber of the Southern yellow pine brings $15 to $35 per thousand feet, its turpentine 56 cents per gallon, its rosin from $4.35 to $6.95 per 280 pounds, and its pitch $3.25 per 280 pounds. All of these prices are gradually becoming higher and higher on account of the increased demand and the scarcity of the products. Formerly, turpentine could be purchased for 30 cents a gallon. Now 56 cents must be paid at wholesale, and the consumer of gallon lots will pay at times as high as $1.00.

In the face of these fast increasing prices, people are still found who say that there is yet an inexhaustible supply of yellow pine in the South, and that all talk about a famine is unwarranted. Such statements are not justified by conditions and the yellow pine lumbering industry will soon be in the face of a serious shortage unless decided changes are made in the present methods, and unless valuable products now going to waste are utilized. The longleaf pine is a slow-growing tree and does not make timber with anywhere near the rapidity that it is being cut. The situation calls for making the very best use of the present supply.

There are at present in the woods of the South vast quantities of pine logs and tall stumps left as a result of careless lumbering in the past. This material is rich in turpentine and could be made to yield from ten to fifteen gallons of refined spirits per cord. Besides this, there is great waste at the sawmills in the forms of slabs, edgings, and sawdust, all of which must have a value, but at present is, for the most part, simply burned to get it out of the way. In fact, not more than 50 per cent. of the tree as it stands in the forest comes to the market in the form of valuable materials.

In the year 1906 the reported cut of southern yellow pine was twelve billion board feet. A conservative estimate of the actual amount of turpentine alone, to say nothing of wood fiber and other materials, which could be produced from the wastewood of this one year, would place the amount at not less than 30 million gallons. This is a surprising figure, when it is remembered that it represents an amount almost equal to the present annual production of gum spirits in this country. If this product were extracted from the wood and sold at even the current price of good wood turpentine, the gross saving would be easily $14,400,000.

Men have realized for some time that an enormous waste of valuable substances is going on, and a few have succeeded in extracting the turpentine and placing on the market a material of a fairly good quality. In the majority of cases, however, the article has been of an inferior grade, due generally to the fact that the technical methods used have been faulty. As a result of this, wood turpentine is at present often considered as an adulterated material, or at best as a poor substitute for gum spirits. It is true that in some cases these opinions are well founded, but inferior products have put an unnecessary damper on the whole industry.

The Section of Wood Chemistry of the Forest Service has lately been investigating this subject,

and some valuable results have been obtained. It has been found that for the recovery of turpentine from wastewood, the steam distillation process is far superior to that of distilling the wood destructively. The crude turpentine is in all cases more uniform, and the final refined materials are as a rule of better grade and can demand a higher price. When properly made and refined, experiments have shown that the steam turpentines are in many cases even more uniform in composition than the gum turpentines, and for all practical purposes contain the identical substances. The odor often can not be distinguished from that of the gum spirits, but even if it could, this is a small matter in many cases, as infinitesimal and undetectable amounts of certain impurities left in the refined product as the result of the methods of production can produce this slight difference in odor, and the wood turpentine should not be condemned for practical purposes on this account. This becomes still more evident when it is known that the sweet odor of the gum turpentine is not characteristic of itself, but is due to an impurity produced by the chemical action of air upon it.

These are important discoveries and are well worthy of consideration. If they are true, then refined steam turpentine, properly prepared, should bring at least an equal price in this country with the gum turpentine. Indeed, abroad, this is often the case, and instances are on record where the refined steam turpentine has, by virtue of its more uniform composition, brought five cents a gallon more than the gum spirits, and is in much greater demand. Further investigations along these lines will be pushed vigorously by the Forest Service.

The Forests as a Natural Resource.

MR. GIFFORD PINCHOT, Forester of the United States Department of Agriculture in an article in "*The Outlook*" entitled "The Conservation of Natural Resources," calls attention to the enormous waste of the resources which nature has so bountifully bestowed upon the United States. In regard to the forests he says:

The lowest estimate reached by the Forest Service of the timber now standing in the United States, is 1,400 billion feet, board measure; the highest, 2,000 billion. The present annual consumption is approximately 100 billion feet, while the annual growth is but a third of the consumption, or from 20 to 40 billion feet. If we accept the larger estimate of the standing timber, 2,000 billion feet, and the larger estimate of the annual growth, 40 billion feet, and apply the present rate of consumption, the result shows a probable duration of our supplies of timber of not more than thirty-three years.

Estimates of this kind are almost inevitably misleading. For example, it is certain that the rate of consumption of timber will increase enormously in the future, as it has in the past, so long as supplies remain to draw upon. Exact knowledge of many other factors is needed before closely accurate results can be obtained. The figures cited are, however, sufficiently reliable to make it certain that the United States has already crossed the verge of a timber famine so severe that its blighting effect will be felt in every household in the land. The rise in the price of lumber which marks the opening of the present century is the beginning of a vastly greater and more rapid rise which is to come. We must necessarily begin to suffer from the scarcity of timber long before our supplies are completely exhausted. It is well to remember that there is no foreign source from which we can draw cheap and abundant supplies of timber to meet a demand per capita so large as to be without parallel in the world, and that the suffering which will result from the progressive failure of our timber was but faintly foreshadowed by the recent temporary scarcity of coal.

What will happen when the forests fail? In the first place, the business of lumbering will disappear. It is now the fourth greatest industry in the United States. All forms of building industries will suffer with it, and the occupants of houses, offices, and stores must pay the added cost. Mining will become vastly more expensive; and with the rise in the cost of mining there must follow a corresponding rise in the price of coal, iron, and other minerals. The railways, which have as yet failed entirely to develop a satisfactory substitute for the wooden tie (and must, in the opinion of their best engineers, continue to fail), will be profoundly affected, and the cost of transportation will suffer a corresponding increase. Water power for lighting, manufacturing, and transportation, and the movement of freight and passengers by inland waterways, will be affected still more directly than the steam railways. The cultivation of the soil, with or without irrigation, will be hampered by the increased cost of agricultural tools, fencing, and the wood needed for other purposes about a farm. Irrigated agriculture will suffer most of all, for the destruction of the forests means the loss of the waters as surely as night follows day. With the rise in the cost of producing food, the cost of food itself will rise. Commerce in general will necessarily be affected by the difficulties of the primary industries upon which it depends. In a word, when the forests fail, the daily life of the average citizen will inevitably feel the pinch on every side. And the forests have already begun to fail, as the direct result of the suicidal policy of forest destruction which the people of the United States have allowed themselves to pursue.

It is true that about twenty per cent. of the less valuable timber land in the United States remains in the possession of the people in the National Forests, and that it is being cared for and conserved to supply the needs of the present and to mitigate the suffering of the near future. But it needs no argument to prove that this comparatively small area will be insufficient to meet the demand which is now exhausting an area four times as great, or to prevent the suffering I have described. Measures of greater vigor are imperatively required.

We are in the habit of speaking of the solid earth and the eternal hills as though they, at least, were free from the vicissitudes of time and certain to furnish perpetual support for prosperous human life. This conclusion is as false as the term "inexhaustible" applied to other natural resources. The waste of soil is among the most dangerous of all wastes now in progress in the United States. In 1896 Professor Shaler, than whom no one has spoken with greater authority on this subject, estimated that in the upland regions of the States south of Pennsylvania three thousand square miles of soil had been destroyed as the result of forest denudation, and that the destruction was then proceeding at the rate of one hundred square miles of fertile soil per year. No seeing man can travel through the United States without being struck with the enormous and unnecessary loss of fertility by easily preventable soil wash. The soil so lost, as in the case of many other wastes, becomes itself a source of damage and expense, and must be removed from the channels of our navigable streams at an enormous annual cost. The Mississippi River alone is estimated to transport yearly four hundred million tons of sediment, or about twice the amount of material to be excavated from the Panama Canal. This material is the most fertile portion of our richest fields, transformed from a blessing to a curse by unrestricted erosion.

Arbor Day was observed in Darby, Pennsylvania, by the Woman's Christian Temperance Union. A tree was planted at Colwyn Public School and ten bushes of shrubbery were planted at the Ridge Avenue Public School in Darby.

President Roosevelt on Forestry.

IN his Annual Message to Congress President Roosevelt advocates the importance of forest reserves. He says:

Optimism is a good characteristic, but if carried to an excess it becomes foolishness. We are prone to speak of the resources of this country as inexhaustible; this is not so. The mineral wealth of the country, the coal, iron, oil, gas, and the like, does not reproduce itself, and therefore is certain to be exhausted ultimately; and wastefulness in dealing with it to-day means that our descendants will feel the exhaustion a generation or two before they otherwise would. But there are certain other forms of waste which could be entirely stopped—the waste of soil by washing, for instance, which is among the most dangerous of all wastes now in progress in the United States, is easily preventable, so that this present enormous loss of fertility is entirely unnecessary. The preservation or replacement of the forests is one of the most important means of preventing this loss. We have made a beginning in forest preservation, but it is only a beginning. At present lumbering is the fourth greatest industry in the United States; and yet, so rapid has been the rate of exhaustion of timber in the United States in the past, and so rapidly is the remainder being exhausted, that the country is unquestionably on the verge of a timber famine which will be felt in every household in the land. There has already been a rise in the price of lumber, but there is certain to be a more rapid and heavier rise in the future. The present annual consumption of lumber is certainly three times as great as the annual growth; and if the consumption and growth continue unchanged, practically all our lumber will be exhausted in another generation, while long before the limit to complete exhaustion is reached the growing scarcity will make itself felt in many blighting ways upon our national welfare. About 20 per cent. of our forested territory is now reserved in national forests; but these do not include the most valuable timber lands, and in any event the proportion is to small too expect that the reserves can accomplish more than a mitigation of the trouble which is ahead for the nation. Far more drastic action is needed. Forests can be lumbered so as to give to the public the full use of their mercantile timber without the slightest detriment to the forests, any more than it is a detriment to a farm to furnish a harvest; so that there is no parallel between forests and mines, which can only be completely used by exhaustion. But forests, if used as all our forests have been used in the past and as most of them are still

used, will be either wholly destroyed or so damaged that many decades have to pass before effective use can be made of them again. All these facts are so obvious that it is extraordinary that it should be necessary to repeat them. Every business man in the land, every writer in the newspapers, every man or woman of an ordinary school education, ought to be able to see that immense quantities of timber are used in the country, that the forests which supply this timber are rapidly being exhausted and that if no change takes place exhaustion will come comparatively soon, and that the effects of it will be felt severely in the everyday life of our people. Surely, when these facts are so obvious, there should be no delay in taking preventive measures. Yet we seem as a nation too willing to proceed in this matter with happy-go-lucky indifference even to the immediate future. It is this attitude which permits the self-interest of a very few persons who find it to their immense pecuniary benefit to destroy the the forests by lumbering. They are to be blamed for thus sacrificing the future of the nation as a whole to their own self-interest of the moment; but heavier blame attaches to the people at large for permitting such action, whether in the White Mountains, in the Southern Alleghanies, or in the Rockies and Sierras. A big lumbering company, impatient for immediate returns and not caring to look far enough ahead, will often deliberately destroy all the good timber in a region, hoping afterward to move on to some new country. The shiftless man of small means, who does not care to become an actual home maker, but would like immediate profit, will find it to his advantage to take up timber land simply to turn it over to such a big company, and leave it valueless for future settlers. A big mine owner, anxious only to develop his mine at the moment, will care only to cut all the timber that he wishes without regard to the future—probably not looking ahead to the condition of the country when the forests are exhausted, any more than he does to the condition when the mine is worked out. I do not blame these men nearly as much as I blame the supine public opinion, the indifferent public opinion, which permits their action to go unchecked. Of course, to check the waste of timber means that there must be on the part of the public the acceptance of a temporary restriction in the lavish use of the timber, in order to prevent the total loss of this use in the future. There are plenty of men in public and private life who actually advocate the continuance of the present system of unchecked and wastful extravagance, using as an argument the fact that to check it will, of course, mean interference with the ease and comfort of certain people who now get lumber at less cost than they ought to pay, at the expense of the future generation. Some of these persons actually demand that the present forest reserves be thrown open to destruction, because, forsooth, they think that thereby the price of lumber could be put down again for two or more years. Their attitude is precisely like that of an agitator protesting against the outlay of money by farmers on manure and in taking care of their farms generally. Undoubtedly, if the average farmer were content absolutely to ruin his farm he could for two or three years avoid spending any money on it and yet make a good deal of money out of it. But only a savage would in his private affairs show such reckless disregard of the future; yet it is precisely the reckless disregard of the future which the opponents of the forestry system are now endeavoring to get the people of the United States to show. The only trouble with the movement for the preservation of our forests is that it has not gone nearly far enough and was not begun soon enough. It is a most fortunate thing, however, that we began it when we did. We should acquire in the Appalachian and White Mountain regions all the forest lands that it is possible to acquire for the use of the nation. These lands, because they form a national asset, are as emphatically national as the rivers which they feed, and which flow through so many states before they reach the ocean.

There should be no tariff on any forest product grown in this country, and, in especial, there should be no tariff on wood pulp, due notice of the change being of course given to those engaged in the business so as to enable them to adjust themselves to the new conditions. The repeal of the duty on wood pulp should if possible be accompanied by an agreement with Canada that there shall be no export duty on Canadian pulp wood.

A novel penalty was imposed by Mr. Montagu Sharpe, the Brentford magistrate, on a schoolboy who had damaged a tree belonging to the Ealing Corporation. He ordered the boy to provide another tree and to plant it himself. "If the children of this country were brought up like those in Germany and Switzerland and taught to plant trees in the public highway," Mr. Sharpe remarked, "there would be less of this wanton destruction."—*London (Eng.) Evening Standard.*

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The Pennsylvania Forestry Association,

FOUNDED IN JUNE, 1886,

Labors to disseminate information in regard to the necessity and methods of forest culture and preservation, and to secure the enactment and enforcement of proper forest protective laws, both State and National.

Annual membership fee, Two dollars.
Life membership, Twenty-five dollars.
Neither the membership nor the work of this Association is intended to be limited to the State of Pennsylvania. Persons desiring to become members should send their names to the Chairman of the Membership Committee, 1012 Walnut Street, Phila.
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OFFICE OF THE ASSOCIATION, 1012 WALNUT ST., PHILADELPHIA.

EDITORIAL.

THE progress made in the forestry movement in Pennsylvania has been favorably commented on, and, although it has not received the public recognition from the United States authorities to which it is entitled, the work accomplished by the association is appreciated by those who have keen interest in forest protection. The absence of official attention is, however, no deterrant, for the association was not organized with the expectation of winning applause; in fact, in its earlier history it was received as a coterie of enthusiasts attempting to carry out impracticable ideas. Time has demonstrated that the problem of awakening interest in forest preservation was practicable, the extensive forest reservations in Pennsylvania and other States, and the great area of forest reserves held by the general Government demonstrating the favor in which they are held.

A retrospect convinces us that a factor which has counted for success, has been the freedom of the forestry movement from efforts towards self-advancement by individuals, and appreciation of the business and commercial aspects as of greater moment than the æsthetic and sentimental features of forest protection.

Early in its history the Pennsylvania Forestry Association asserted its purpose to recognize the lumber industry, as a necessary feature of industrial advancement, and opposition has been made to the waste and not to the legitimate utilization of our mature timber.

If we are to continue to write of success and progress each year, it is essential that the policy heretofore followed be adhered to. The replanted and protected forests must be considered for their prospective value as sources of timber supply to other generations, they must be maintained as conservers of the water supply; as aids to the health and comfort of the people, and must

be managed by men skilled in their specialties, whose love for the forest encourage their best efforts.

For the utilization of the forest reserves all means which make them sources of immediate or prospective revenue, without detracting from their intended usefulness, should be applied so as to overcome objections from the element which looks only to the present. The administration of the reserves must not degenerate into efforts towards the political advancement or financial interest of individuals or corporations. A clean business management of our forest reserves for the interest of the State or nation will demand, and should receive, attention and support from all true friends of forestry, and this support should be active, not merely passive. Satisfaction as to what has been accomplished must be accompanied by earnest effort to have the forest reserves maintained and administered as a practical proposition looking to the personal comforts of the people, the reduction of injury from uncontrolled sources of water supply, and for an ultimate financial gain to the Commonwealth.

J. B.

The Forest Policy of Pennsylvania.

OUR State began its forestry work with the well-defined policy of anticipating future needs in directions which do not seem to have attracted the attention of any other State.

For example, it was a wise foresight which founded the School of Forestry at Mont Alto, where young men were to be trained especially for State service. In no other way could we hope to secure skilled assistance without regard to political affiliation than by such a course. It produced a class of men who knew no other motive than loyalty to the Commonwealth.

Opening the State Forest Reservations for use as sanatoria in the crusade against tuberculosis was another example of advanced, far-seeing policy in the forest administration of Pennsylvania. The citizens were the owners of the land, and in equity entitled to any advantage they could derive from it without detriment to the purposes for which the land was set apart. Furthermore, the isolation so secured was helpful to the invalids, and a protection to the community at large. In no other place could the work be done so well and so safely as in the reservations. Besides this, such location opened the possibility of enabling the convalescent to become inured again to labor at a minimum of risk to himself and to the community, while his cure was being fully established.

There remains yet a further step which should be taken as soon as legislative authority for it can be obtained. No one doubts that it is wise thus to provide for the sick. The originality and feasibility of the idea has commended itself to thinkers, not only in our own, but in other States. If it is well thus to provide for the tuberculous patients already diseased, is it not even wiser to anticipate the actual onset of disease and provide outing grounds on the forest reserves for those who may be preserved from invalidism by a timely recourse to an outdoor life? Is it not wiser to prevent than to cure disease? It is certainly cheaper, as well as more humane, and these considerations should entitle the idea to most careful consideration. It would be another step in advance of any yet taken by any other State, not only to tolerate, but to encourage such a use of the woodlands now owned by Pennsylvania, if we were to set apart certain suitable areas on to which those who were a little ailing from indoor life could go for recuperation and restoration to full health. It is impossible to overestimate the gain of such a policy to the State. It might, under certain conditions, be well even to lease ground to such persons for the erection of permanent homes, under suitable restrictions, and it would probably be a wise economy to provide a physician and a superintendent for such a camp.

Thus far we have considered the proposition mainly from the standpoint of the individual. There remains a still more important consideration, if such were possible. That is the education of our people in the importance of the forests to the very life of the State. Those who are kept from the public lands can have but little interest in their preservation. It is not in human nature to have an actual interest in that from which we are shut off. The tendency is rather to awaken a spirit of hostility. It is nothing to the point to say that the privilege of sojourn in State lands would lead to destruction of the property. Prevention of such an abuse of privilege is merely a matter of education. No doubt such an abuse would occur. But it already occurs without the privilege, and there is no doubt that such abuses would be less frequent if it were understood that those who were guilty of them would be denied access to the reservations. If respect for the advantages of our advanced civilization cannot be secured, then that civilization is a failure, and I imagine that but few of us would be willing to admit such a conclusion. If the law-abiding people did not outnumber the lawless element our laws could neither exist nor be enforced, and as they do exist and can be enforced it is certain that we may safely trust our people.

Open up to our citizens, to the fullest possible extent, the public lands of the State. Placard the sites of these outing-grounds with rules to be observed for the good of all, and they will come to be observed. It is not possible to secure a proper interest in our forest holdings by any system of exclusion from them. That would simply perpetuate hostility and put a premium on lawlessness. People cannot appreciate advantages of which they are ignorant!

J. T. ROTHROCK.

An Act to Encourage the Planting of Forest and Fruit Trees in the State of Iowa.

THE General Assembly of the State of Iowa in March, 1906, passed the following law:

That on any tract of land in the State of Iowa the owner or owners may select a permanent forest reservation not less than two acres in continuous area, or a fruit tree reservation not less than one or more than five acres in area, or both, and that upon compliance with the provision of this act, such owner or owners shall be entitled to the benefits hereinafter set forth.

A forest reservation shall contain not less than two hundred growing forest trees on each acre. If the area selected is an original forest containing the required number of growing forest trees, it shall be accepted as a forest reservation under the provision of this act. If the area selected is an original forest containing less than two hundred forest trees to the acre, or if it is an artificial grove, the owner or owners thereof shall have planted, cultivated and otherwise properly cared for the number of forest trees necessary to bring the total number of growing trees to not less than two hundred on each acre, during a period of not less than two years, before it can be accepted as a forest reservation within the meaning of this act. Provided that no ground upon which any farm buildings stand shall be recognized as part of any such reservation.

Not more than one-fifth of the total number of trees in any forest reservation may be removed in any one year, excepting in cases where the trees die naturally.

The ash, black cherry, black walnut, butternut, catalpa, coffee tree, the elm, hackberry, the hickories, honey locust, mulberry, the oaks, sugar maple, European larch and other coniferous trees, and all other forest trees introduced into the State for experimental purposes, shall be considered forest trees within the meaning of this act. In forest reservations which are artificial groves, the willows, box-elder, soft maple, cottonwood and other poplars, shall be included among forest trees for the purposes of this act when they are used as protecting borders not exceeding two rows in width around a forest reservation, or when they are used as nurse-trees for forest trees in such forest reservations, the number of such nurse-trees not to exceed one hundred on each acre; provided that only box-elder and soft maple shall be used as nurse-trees.

The trees of a forest reservation shall be in groves not less than four rods wide.

A fruit-tree reservation shall contain not less than seventy fruit trees on each acre, growing under proper care, and may be claimed for such for a period of eight years after planting.

The cultivated varieties of apples, crabs, plums, cherries, peaches and pears shall be considered fruit-trees within the meaning of this act.

Whenever any tree or trees on a fruit-tree or forest reservation shall be removed or die, the owner or owners of such reservation shall, within one year, plant and care for other fruit or forest trees, in order that the number of such trees may not fall below that required by this act.

Cattle, horses, mules, sheep, goats and hogs shall not be permitted upon a fruit-tree or forest reservation.

Forest reservations fulfilling the conditions of this act shall be assessed on a taxable valuation of one dollar per acre.

Fruit-tree reservations shall be assessed on a taxable valuation of one dollar per acre for a period of eight years from the time of planting.

In all other cases where trees are planted upon any tract of land, without regard to area, or forest, fruit, shade or ornamental purposes, or for windbreaks, the assessor shall not increase the valuation of such property because of such improvements.

If the owner or owners of a fruit or forest reservation violate any provision of this act within the two years preceding the making of an assessment, the assessor shall not list any tract belonging to such owner or owners, as a reservation within the meaning of this act, for the ensuing two years.

It shall be the duty of the assessor to secure the facts relative to fruit and forest reservations by taking the sworn statement, or affirmation, of the owner or owners making application under this act; and to make special report to the county auditor of all reservations made in the county under the provision of this act.

It shall be the duty of the county auditor in every county to keep a record of all forest and fruit reservations within the county; and to make a report of the same to the Secretary of the State Horticultural Society on or before November 15th of each year.

The Secretary of the Iowa State Horticultural Society shall be State Forestry Commissioner, without salary. It shall be his duty to promote the objects of this act, and he shall have power to appoint deputies without salary for each county, of group of counties, who shall assist him, and who shall make an annual report to him of forestry matters and of the operation of this act, within their respective territories, for the use of the State Horticultural Society.

The Proposed Southern Appalachian and White Mountain Forest Reserves.

BY a special Act of Congress, approved March 4, 1907, the Secretary of Agriculture was required to investigate the watersheds of the Southern Appalachian and White Mountains, and report on the advisability of the Government purchasing and setting these apart as national forest reserves.

This report has just been published, and shows the vast commercial importance of these reserves to the industries of the country. It calls attention to the increased value of these forest lands, from 300 to 500 per cent. over the price at which they could have been obtained six years ago, when the Secretary of Agriculture made his first recommendation, that they be secured for national reserves.

The Southern Appalachian region contains a timbered area of over 58,000,000 acres, or, including the mountains of Pennsylvania, New York and New England, the Appalachian area covers 75,000,000 acres primarily adapted to hardwood timber, of which only 12 to 15 per cent. is now covered by virgin timber. The forest has also suffered great damage by fire, millions of young trees being killed and the humus destroyed, so that over the whole area the average growth is probably not more than 10 cubic feet annually. In the Southern Appalachians these lands, under proper protection, will produce 50 cubic feet of wood per acre annually, or, if 40 cubic feet is taken for the whole area of 75,000,000 acres, a possible production of 3,000,000,000 cubic feet, which is about equal to the present consumption of hardwood timber for all purposes. The Secretary inclines to the belief that if the Appalachian forests are taken soon enough, and properly handled, they will eventually produce three-fourths of the hardwood supply of the country without exhausting the forests.

In the Southern Appalachian region the Geological Survey reports that there is available on the streams rising in this district a minimum of 2,740,000 horse-power for the whole year, or, if but six months are considered, a minimum of 4,929,573 horse-power. If one-half of the yearly minimum be taken and based on a rental of $20 per annum, it is worth $27,000,000 per year; or, if allowance of 50 per cent. of the minimum additional power available for six months is included, it would add $11,000,000, bringing the total to $38,000,000.

On the watersheds comprising the White Mountain region the four most important streams of New England have their rise, and upon them are located the great mills of this region. They abound in fine water-power, only a part of which is now utilized. It has been estimated that the capital invested in manufacturing enterprises which utilize the power of these streams amounts to $250,000,000.

Timber and water-power are not the only factors which make these proposed forest reserves commercially important. They aid in equalizing the flow of the streams so as to make them navigable, and bear a vital relation to effectual artificial storage.

The report shows that in the Southern Appalachian region, including the States of Alabama, Georgia, Kentucky, Maryland, North Carolina, South Carolina, Tennessee, Virginia and West Virginia, there was originally 58,583,000 acres of forested area, of which 9,700,000 is unlumbered or lightly culled; and the balance, 83 per cent., has been cut over, being in all stages of reproduction and growth, most of it having been burned over.

In the White Mountains proper, the rugged and elevated portion in the States of New Hampshire and Maine covers about 812,000 acres, but little of the original tree-growth being left.

The report is most interesting, covering the topography, condition of the forest, mining and agricultural possibilities, damage through clearing and fire, advantages for recreation, etc.

The Secretary states that there are probably 75,000,000 acres in this mountain system more important for timber production than for any other purpose, but considers that the more important district in the Southern Appalachian region covers an area of 23,310,000 acres, while the lands of first importance, which include the mountain ridges mainly, but extend considerable distances down the slopes in those localities where the soil is particularly subject to erosion, and on the watersheds of streams of the greatest importance for water-power or navigation, embrace not to exceed 5,000,000 acres. Similarly, of the 2,157,000 acres in the White Mountain region, the principal area, considering all economic conditions, covers 668,000 acres.

In summing up, the Secretary says:

In the control of these lands does not the Federal Government have a larger obligation and a corresponding opportunity? A careful study of their character and of their relation to the administration of the entire region convinces me that it has, for the following reasons:

1. The safeguarding of these lands can not be accomplished by action of the States in passing fire and tax laws. Some special action taken with a view, primarily, of public welfare is necessary.

2. These lands are of value solely for timber production. They lie above the limits of fruit-growing and farming. If not in timber they must come to a condition of absolute waste, the prey of fire and any sort of abuse or mismanagement. Cared for, they will form a valuable addition to the future timber supply, which the Government must take action to secure.

3. These lands form the most important part of the two regions. Having the greatest elevation, they receive the largest amount of rainfall; being steepest, they are most subject to erosion. Therefore, their influence on the streams of the region is far greater, for good or ill, than the influence of any other areas of equal extent.

4. Every acre of these lands is on the watershed of a navigable stream, on which, for the removal of sand and silt, the Government is even now spending money in large amounts. The sand and silt which are now in the rivers have come from the cleared slopes of gentler gradient and lower elevation than those remaining in forest. If the forest is destroyed from these higher lands, the expense of keeping the stream clear will be multiplied many times.

5. The States cannot afford to protect these lands. The timber which they can produce is not valuable enough for the State to protect them for the timber crop. Almost without exception they lie on the watershed of a stream which has its chief commercial importance in another State. Therefore, no State is willing to put them under control for the protective value of their forest

6. By taking control of these lands, the Federal Government would be in a position to exert, by example and co-operation, a far-reaching influence for the safeguarding of the two regions. With relatively small bodies of land on each of twelve or fifteen important watersheds, it could co-operate with other landowners on each watershed in protecting the locality from fire and in the introduction of improved methods of forest management. Advices from timberland owners in many localities justify the opinion that in this way conservative forest management can be effected over millions of acres of private lands. In my judgment it is clear that, by the ownership of 5,000,000 acres in the Southern Appalachians and 600,000 acres in the White Mountains, the Government can lead the way to the right management.

He recommends an appropriation of $1,250,000 for the purchase of, not to exceed, 600,000 acres in the White Mountain district, $6 per acre being fixed as the average price for cut-over land, and, in addition, $250,000 for the purchase of timber in its present condition surrounding the five important recreation points. In the Southern Appalachian region it is recommended that not more than 5,000,000 acres be purchased, the limit of the average price being fixed at $3.50 per acre, and an appropriation of $3,500,000 be made for this purpose.

A bill (S. 2985) was introduced in the Senate by Mr. Gallinger, authorizing an appropriation of $5,000,000 for the purpose of securing the Southern Appalachian and White Mountain forest reserves, as recommended by Secretary Wilson, and we trust our members will aid in securing this important legislation.

Forestry Reservation on the Monongahela River Watershed.

EARLY last year Congress passed a law providing for an investigation of the watersheds of the Southern Appalachian and White Mountain watersheds. On request the Secretary of Agriculture included the Monongahela river watershed in this study.

Mr. Wm. L. Hall, of the U. S. Forest Service, who had charge of this special investigation, addressed the Chamber of Commerce, of Pittsburg, in January, and abstracts of his remarks, embodying the results of this study of the Monongahela watershed, which appeared in the *Pittsburg Press*, are given below·

In a stream which, like the Monongahela, has its main sources in the high mountains, there are several distinct influences which make it especially subject to irregular flow. Elevation increases the precipitation; likewise it makes the climate cooler, so that there is less evaporation. In consequence of this there is more water to be discharged from the mountains. The whole upper part of the Monongahela watershed is made up of steep slopes which allow the water to escape rapidly, unless held back by some other influence. Furthermore, in the Monongahela watershed, as in the watersheds of all the Southern mountains, there are no natural lakes to form storage reservoirs and thus equalize the distribution of the water.

There is but one conserving factor on a watershed of this kind—the forest. Under the original conditions it covers the valleys, the mountain slopes, and likewise the ridges, with a continuous mantle of forest. Its influence is so great that to a large extent it is able to counteract the influences which tend to hasten runoff. The forest, with its heavy cover of tree tops, its undergrowth, its heavy mulch of leaves and litter, its roots which go deep into the ground, turns the water which falls to underground rather than surface streams. Consequently, it appears in the form of springs and seepage and flows gradually and regularly away during the whole year, even during the most prolonged drought.

The forest on any watershed makes a reservoir system almost equal, if not quite so, to a vast system of lakes.

Wherever the forest is removed, the soil becomes hard and baked by the sun. In this condition it does not readily receive the rainfall, but resists its entrance, and turns it away over the surface. It results in surface rather than underground drainage. In this manner is produced those great and excessive flows of water which cause floods. The water from many slopes rushes into the small streams and results in the floods which are so common in the Monongahela as well as in all other Eastern rivers.

Furthermore, when the forest is removed and the soil becomes baked and hardened, erosion begins. There is little or no erosion in the forest even on the steepest slopes. The water goes down instead of flowing away on the surface, and where there is no surface flow there can be no erosion. The soils of the Monongahela watershed, while not subject to such violent erosion as the soils of the watersheds farther south, are nevertheless easily washed away where the slopes are steep and the forest cover lacking. As an element of damage, erosion is second only to floods themselves, because erosion endangers work which may be constructed to make the rivers useful. Erosion fills the river channel with sand, silt and gravel, and it endangers any reservoirs which may be constructed.

If the forest could be restored to the entire Monongahela watershed, floods would be infrequent and generally inconsequential. Of course, it can not be entirely restored. The larger part of the watershed must always be used for some other purpose than the growing of forests. The Forest Service has carefully considered what proportion it would be practicable to attempt to keep in forest. It finds that only about 25 per cent. can be considered as permanently of greater value for forest than for other purposes; the rest must largely be cleared; in fact, the rest is largely cleared at this time. This 25 per cent. lies at the headwaters of the main tributaries of the river, such as the Youghiogheny, Cheat, Tygerts Valley, Buckhannon and West Fork. This area would have a large influence in maintaining an even flow of the main stream, a larger influence, in fact, than any other area of the same size, because of the greater amount of rainfall which it receives, and of the steeper slope upon which this rainfall comes. This area of 25 per cent. will not, however, entirely prevent floods, though it will have a favorable influence upon them. It must be supplemented by some other feature. Forest preservation is, however, the first step to be considered; without it, nothing else is practicable. Any works upon the river, whether they consist of locks and dams, or of reservoirs, will inevitably be endangered if not made absolutely useless, if the headwaters of the stream are not thus protected.

On the Monongahela watershed the forest has now largely been removed from all except the higher or more inaccessible portions, on the extreme headwaters of the river.

The department finds that if the forests on the headwaters of the Monongahela are reserved it would be possible to establish a system of storage reservoirs on the tributaries of the river that would gather the excessive waters in times of flood, and hold them until they are needed during drought, to provide a sufficient stream for navigation. Leaving out of consideration the Youghiogheny, that there are reservoir sites on the various tributaries in West Virginia, which, if utilized, would hold upwards of 35 per cent. of the waters which drain from the entire watershed during the course of a year.

With 35 per cent. of the Monongahela waters absolutely under control, the problem of floods in Pittsburg would be solved so far as the Monongahela is concerned. When the periods of heavy rainfalls come the water could be held in check, increasing the height of reservoirs until they were full, if necessary, and then afterwards it could be gradually released and no harm would be done.

Another great benefit of such a conservation system would be its influence in keeping the river navigable in times of prolonged drought. The Geological Survey has found sites for eleven large reservoirs on the river system in West Virginia. With these reservoirs full, the low water stage at Morgantown could be increased by five feet for 179 days; with the reservoir half full, the space could be maintained for 90 days. At McKeesport, with the reservoirs full, the low water stage could be increased five feet for 200 days; with the reservoirs half full, for 100 days. It is readily seen, therefore, that such a system of reservoirs would make the Monongahela navigable even during the most severe drought ever known. Forest preservation is fundamental to a reservoir system and to the use of the river for navigation even by the present system of locks and dams. If the high mountains are cleared so that erosion may take place on the steep slopes, the sand that fills in the river will constantly increase, making the cost of keeping the channel clear many times greater than in the past.

[If the proposed Southern Appalachian forest reserve extends in West Virginia close to the Pennsylvania line, many of the improvements suggested by Mr. Hall would be available, and the State Forestry Reservation Commission of Pennsylvania could be counted upon to protect as large an area of the Monongahela River drainage in Pennsylvania as possible.—ED.]

Timber Used for Cross Ties.

IN the construction of new track and for renewals, the steam and street railroads used, in 1906, over one hundred million cross-ties. The average price paid was 48 cents per tie. Approximately three-fourths of the ties were hewed and one-fourth sawed.

Oak, the chief wood used for ties, furnishes more than 44 per cent., nearly one-half of the whole number, while the Southern pines, which rank second, contribute about one-sixth. Douglas fir and cedar, the next two, with approximately equal quantities, supply less than one-fifteenth apiece. Chestnut, cypress, Western pine, tamarack, hemlock, and redwood are all of importance, but no one of them furnishes more than a small proportion.

Oak and Southern pine stand highest in both total and average value; the average value of each is 51 cents. Chestnut ranks next, followed by cedar. Hemlock, at 28 cents, is the cheapest tie reported.

More than three-fourths of all ties are hewed; and with every wood from which ties are made, except Douglas fir and Western pine, the number of hewed ties is greater than the number sawed. About ten times as many Douglas fir ties are sawed as are hewed. Of the oak ties a little over one-sixth and of the Southern pine ties less than one-third are sawed. In contrast to the Southern pines is the Western pine, of which more than one-half the ties are sawed. In general, when lumber has a relatively low value the proportion of sawed ties increases, because the market for ties is always active, while that for lumber is frequently sluggish. All Western species are affected by this condition, for stumpage is abundant and its value relatively low.

Ten per cent. of the ties purchased were treated with preservatives either before they were purchased, or at the treating plant of the railroad company. At least ten railroad companies are operating their own plants for the preservation of their construction material.

Of the many forms in which wood is used, ties are fourth in cost, sawed lumber being first, firewood second, and shingles and laths third. It has been calculated that the amount of wood used each year in ties is equivalent to the product of 600,000 acres of forest, and that to maintain every tie in the track two trees must be growing.

With nearly 300,000 miles of railroad trackage and approximately 2,800 ties to the mile, there are over 800,000,000 ties constantly subject to wear and decay. The railroads report that in the form of ties cedar lasts eleven years, cypress ten years, and redwood nine years. These woods, however, lack the desired weight and hardness, and, what is more important, they are not available in the region of the trunk lines of the Central and Eastern States. When it is considered, then, that the service of the longest-lived tie timbers in general use—chestnut, white oak, tamarack, spruce, and Douglas fir—is but seven years, while with some, as the black oaks, it is but four years, whereas a treated tie with equipment to lessen wear will last fifteen years, it is apparent how much the railroads can save if the preservative treatment of ties is universally adopted. The saving in the drain upon the forests is of even greater moment.

Details of the consumption of ties in 1906 are contained in Circular 124, just issued by the Forest Service in co-operation with the Bureau of the Census.

A box hedge takes as long in the making as a gentleman—and when they are done, the two are much of a sort. No plant in all the garden has so subtle an air of breeding, so gentle a reserve, yet so gracious a message of sweetness for all of the world who will stop to learn it. It keeps a firm dignity under the stress of tempests when lighter growths are tossed and torn; it shines bright through the snow; it has a well-bred willingness to be background, with the well-bred gift of presence, whether as back-ground or foreground. The soul of box is an aristocrat and the sap that runs through it is the blue-blood of vegetation.

Copied for FOREST LEAVES, and is by Mrs. Mary R. S. Andrews.

ELIZABETH P. SMITH.

Larch, Tamarack, Hackmatack (Larix Americana, Michx.).

TWO species of larch are more or less familiar to all of our readers. In fact, they appear so much alike that it is not always easy for the ordinary observer to distinguish them. The cones of the European larch are an inch or more long, while those of the American larch, which we are now considering, are less than an inch long. As seen in our northern regions this larch is a straight tree, usually about sixty feet high and seldom more than eighteen or twenty inches in diameter. The bark is red or reddish-brown in color and made up of thin, appressed flakes of an inch or two in length. The leaves arise in clusters on the grayish-green or light-brown branchlets. They are beautifully light-green when they first appear in spring. As the season advances they become deeper green and fade into yellow before falling in the autumn. There are but two of our native, cone-bearing trees which shed all of their leaves in the fall, —*i. e.*, the larch and the bald cypress, the former characteristic of our northern forests and the latter of the southern.

The small scarlet cones form a beautiful addition to the appearance of the tree when they appear in the spring along with the leaves. Growing in the forest, the larch forms a small, roundish pyramidal head, but seen in the open, where room for expansion is offered, it pushes out more slender, often drooping, graceful branches.

Important as this tree has been in the past in ship-building, because of the strong durable "knees" which it furnished, it promises to be even more valuable in the future as a source of supply of railroad ties. It is for this purpose neither so strong as the oak nor so resisting to the crushing weight of heavy trains, but has come into use because the supply of oak is so nearly exhausted. The experiments recently conducted prove that by treatment with zinc chlorid, after proper seasoning, larch wood may be protected for a longer time against decay, though the injected chemical seems to add nothing to the strength of the tie, or to its resistance to train weight or motion.

The American larch thrives well on lawns, even in dry places, in Pennsylvania, though when found growing naturally, in this State, it is in the coldest and highest bogs of the northern part of the commonwealth. For lawn planting it is more desirable than the European larch, which produces a greater number of larger and very unwelcome cones.

Essentially a tree of the north it extends across the continent to or beyond the Arctic circle, and forms with the spruce and arbor-vitæ dense and gloomy forests. So far as I know its present furthest southern limit in Pennsylvania is in the "Tamarack swamp," of Leidy township in Clinton County, though it is also found in Pike County, growing in swamps where the spruce has taken the place of white pine.

The larches (American and European) have grown into favor for forest planting purposes. They are fairly rapid growers, and are adapted to a wide range of soil conditions. Because the native larch is found with us naturally in swamps, this simply proves that it will grow where other trees cannot, and does not indicate that it cannot grow elsewhere. It should be said, however, that larch plantations last longer if these trees are associated with other trees, say, for example, white pine or red oak. And it is to be observed that even if larch will endure a swamp and thrive in it, one should not make a larch plantation in a swamp if a drier place can be found. The European larch is, for commercial purposes, a better tree than the American, even if less desirable on a lawn.

Apropos of the name Michaux (the younger) remarks that "the numerous descendants of the Dutch in New Jersey call it Tamarack." The name of Hackmatack seems to be more local than either of the other popular names for the tree.

The larch, owing to its durability in the soil, is quite valuable for telegraph and telephone poles and for fence posts.

Its physical properties may be stated thus: Specific gravity, 0.6236; relative approximate fuel value, 0.6215; percentage of ash, 0.33; weight, in pounds, of a cubic foot of dry wood, 38.86. In order of strength *Larix Americana* stands 94 on a list of 310 species of our American woods.

J. T. ROTHROCK.

As we go to press the American Forestry Association is holding its annual meeting in Washington, and we hope to give some of the details in our next issue.

The Pennsylvania Lumberman's Association held its Sixteenth Annual Meeting in Philadelphia, January 26th to 29th. Much of the session held on January 29th was devoted to the consideration of forestry conditions in Pennsylvania, and there was a discussion on methods of preventing waste. The officers chosen for the year were, *President*, T. J. Snowden; *Vice-President*, S. C. Creasy; *Secretary*, B. F. Laudig; *Treasurer*, O. M. Brandow.

LARCH, TAMARACK. (LARIX AMERICANA, MICHAUX.)
PIKE COUNTY, PENNSYLVANIA.

FOREST LEAVES, VOL. XI., NO. 7.

TRUNK OF LARCH, TAMARACK. (LARIX AMERICANA, MICHAUX.)
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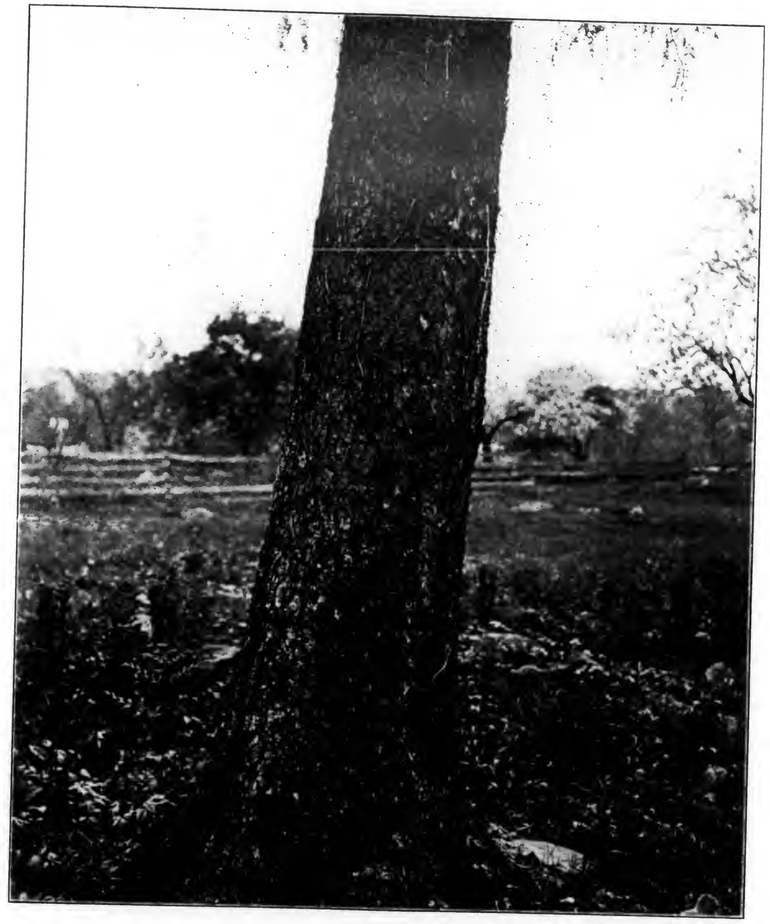

TRUNK OF LARCH, TAMARACK. (LARIX AMERICANA, MICHAUX.)
PIKE COUNTY, PENNSYLVANIA.

Annual Meeting of the Colorado State Forestry Association.

THE State of Colorado was among the first to take cognizance of the necessity of protecting its forests.

On coming to Colorado the pioneers found approximately 36,000 square miles of forest area, much of it heavily wooded with valuable timber —the heritage of centuries, waiting for the miner, the farmer and the builder of cities, with promise of plenty for generations to come.

From a historical sketch we copy the following:

The woods were free for all and at once became the prey of insatiable avarice and waste. Since that time, by fire, use and abuse, nearly 30,000 square miles of our primeval forests have been destroyed. The enormity of Colorado forest destruction is without parallel, for under no sky in any land, by any people civilized or uncivilized, was there ever so much forest waste, by a like number of inhabitants in so short a time.

At the end of twenty-five years the situation had become so alarming that a call was issued for a public meeting of the friends of forestry over the State to convene in Denver on the 18th and 19th of November, 1884, to discuss conditions and take such steps to protect the forests from fire and wasteful lumbering as might seem feasible and necessary.

This meeting, which was largely attended, resulted in the formation of the Colorado State Forestry Association, which has maintained an active existence to the present time. The organization has no connection with either the State or the General Government. It receives no financial assistance from any source except membership fees, dues and voluntary contributions.

Article 2 of incorporation (1906) says: "The objects for which our said corporation is formed and incorporated are the conservation, management, extension and renewal of forests, the encouragement of the planting and cultivation of trees for useful and ornamental purposes, the collection and dissemination of forest statistics and information concerning growth, protection and utilization of forests and trees and concerning the evils resulting from wasteful forest destruction, in the decrease and unequal distribution of available water supplies; the advancement of educational, legislative or other measures tending to the promotion of these objects; the establishment and maintenance of Forest Reserves on our watersheds, and the co-operation as far as possible with the work of the United States Bureau of Forestry, and that of the American Forestry Association."

During the last three years the Association has distributed a large amount of forestry literature over the State.

In 1903–4 it undertook to secure the extension of the Forest Reserves in Colorado. At that time their area was 2,903,460 acres, very little of which covered watersheds of the eastern slope. The petitions sought to have the forests, at and above 8,500 feet at the headwaters of all streams contributing to irrigation and water supply throughout the State, set apart as Reserves, the altitude named being too great for settlements of *bona fide* homes. Nearly forty petitions were sent to the Department, with what specific effect we cannot say, but at this time the area is 12,695,825 acres, with 198,000 acres withdrawn to be added to the Fruita Reserve.

Within the last year the Association has given much attention to tree-planting, auxiliary to the State Agricultural Experiment Station, which has undertaken an experiment with farmers and land owners over the State. Under this experiment 30,900 utility trees were set last spring. The part taken by the Colorado Forest Association led to the planting of 16,500 of the above number.

It was our pleasure to attend the Twenty-third Annual Meeting in Denver, Colorado, on January 22d. At this meeting, which consisted of three sessions held in one day, there were a number of papers presented.

Mrs. Jean K. Hinckley, of the Clio Club, Denver, spoke on "Forestry a Practical Question," being a *résumé* of forest conditions in the United States. Dr. B. B. Creighton, of Manitou, gave an address on "Some Forestry Experiments of the State Experiment Station," detailing the development of tree planting on semi-arid plains. "What Women are Doing in Forestry" was selected as a subject by Mrs. Henry F. Brooks, Secretary of the Forestry Committee of the State Federation of Woman's Clubs, detailing how women had assisted in employing lecturers and awakening interest in Forestry. Dr. Wm. C. Sturgis, Dean of the College, made an address on "The Colorado School of Forestry at the Colorado College." This institution was endowed by General William J. Palmer, who, with Mr. Bell, gave 14,000 acres for an experimental park at Manitou. Dr. B. O. Aylesworth, President of the College, spoke on "The State Agricultural College and Forestry," stating that the College has a short course in forestry. Hon. Jacob Fillius, President of the Park Board, described "What the Denver City Park Board is Doing with Trees," instancing the planting of forty-five varieties of exotic trees. Ex-Gov. C. S. Thomas, of Denver, presented the "Report of the Forester, December 1, 1950." This paper was suggestive

of the conditions which would prevail in 1950 on the assumption that the present policy of forest protection had been abandoned by the Federal Government. It was ably written, but its salient features were affected by sharp political aspersions or fulsome praise.

It was a pleasure for the President of the Pennsylvania Forestry Association to be able to extend greetings to another State organization, and to congratulate it upon the achievements which had followed persistent effort for nearly a quarter of a century. J. B.

German Forest Revenue.

COLONEL William C. Teichman, of Eibenstock, reports how the public forest reserves in Germany are made to yield splendid returns:

Official figures recently compiled by the Saxon government for the year 1906 demonstrate a net revenue of $2,126,037 obtained from the cultivation of 443,105 acres of governmental forest land. The total area of the kingdom of Saxony amounts to 5,789 English square miles, of which almost one-half is covered with private and governmental forests. The total quantity of timber cut during the year is estimated at 1,231,472 solid cubic yards, 210,947 cubic yards representing wood used for fuel only, and 1,020,525 sold for all other purposes. To this must be added a yield in brushwood, cut and sold for fuel use principally, of 190,415 cubic yards, raising the total quantity of timber and brushwood cut and sold in 1906 to 1,421,887 cubic yards, for which the sum of $3,374,385 was obtained, which amount was still increased by additional revenue from the leasing of meadows, hunting privileges, and other rights to the total of $3,483,617.

Deducting from this total figure the cost of forest cultivation (with salaries and wages of the entire service included) amounting to $1,357,580, the net profit of $2,126,037 was added to the state treasury in 1906. There is nothing unusual in this result, as the ten preceding years show equally high figures, a few slightly exceeding the revenue of 1906, others being lower to a very small degree. The same comparison applies to the area cultivated and timber obtained in ten years.

Similar results have been obtained in other German States by systematic forest cultivation. Nearly 50,000 square miles of German soil, representing about one-fourth of Germany, have been adapted to foresting, the value of the wood gained therefrom being estimated at $60,000,000 per year.

The gradual increased cultivation of pine forests in the mountainous region of Saxony has been followed by a remarkable development of industries using the wood of the red pitch pine, the most rapidly growing and best adapted mountain pine, selected by the Saxon government because more profitable than other species that can be cultivated in the climate and in the altitude. It has been established that 80 per cent. of the trunk of the *pinus picea* is available for industrial purposes alone, in addition to its use for fuel.

In manifold uses the *pinus picea* ranks superior to any other tree. It is used in mine construction, for building purposes, sash, floors, shingle roofing, barrels, boxes, matches, bottoms and covers for musical instruments, resounding boards for pianos, wooden wiring for table covers and window shades, toys, excelsior, furniture, cooperage material, poles, ladder beams, bean and hop poles, vine props, laths of all kinds, etc.

With the ascendency of wood-pulp and cellulose manufacturing the usefulness of the picea was increased still more. An example of how industries follow the preservation and cultivation of forests is furnished by the fact that in 1890 as many as 534 wood-pulp factories existed in Germany; 239 of these were located in Saxony, where they consumed 575,960 cubic yards of picea wood, representing a value of $1,190,000. The beginning of this industry only dates back to 1843, when Friedrich Keller, a Saxon, invented the process.

Since 10 per cent. of the trunk of this tree is composed of bark available for tanning, it is also used for such purposes. It is easily scaled in summer, and even trees which have been felled in February and March can be thus utilized so long as the sap circulates, if the trees are stripped of their branches immediately when cut down. This scaling is considered an advantage to the rapid drying of the logs and also in a measure a protection against the ravages of the bark beetle, *Scolytus*, the arch enemy of the picea. Formerly the resin from this tree obtained a good price, but the much cheaper American article has entirely displaced the Saxon gum in the European market, although a superior quality is claimed for the Saxon species.

The picea's value to forestry is greatly enhanced because it flourishes where deciduous forests are greatly hampered, viz., in mountainous regions with altitudes varying from 1,500 to 4,500 feet. The Saechsische Erzgebirge, a range of mountains separating Saxony from Bohemia, has been transformed from a region non-productive, except for small yields of rye, oats, and potatoes, to one covered with pine forests of the finest growth. Saw mills, wood-pulp, paper, and manufacturing establishments in prosperous condition are located throughout this section. About 4,000 manufacturing establishments, employing close to 60,000 people, have been created in connection with the Saxon forests.

The connection of forestry with irrigation has been studied in Germany for years. One authority on the subject, Professor Ebermayer, has conducted extensive experiments, with the result of estimating that evaporation of soil water in forests amounts to 85 per cent. less than outside of them. While the forests do not create water springs, they feed and sustain them, in addition to the preservation of soil moisture resulting from protection against drying winds and the rays of the sun. Wherever forests are absent, drought, storms, and sudden floods can create conditions less frequent in well-forested countries.

Forest Preservation in France.

REPLYING to inquiries in regard to French forestry, Consul-General R. P. Skinner states, in the December, 1907, Consular Report, that in no country in the world is the work of conserving and reconstituting the forests carried on with greater energy and skill.

The extensive denudation of the primeval forests began on a large scale in this country during the early centuries of the Christian era and continued so unremittingly that Colbert, the great minister of Louis XIV, exclaimed in the seventeenth century; "France will perish for lack of wood." The damage wrought in this country by forest destruction had far exceeded that which is now deplored in the United States when it was realized, and systematic attempts were begun to correct it. As early as 1824 the National School of Waters and Forests was founded at Nancy, for no other purpose than to provide recruits for the higher branches of the public forestry service, and at the present time this service has within its comprehensive grasp every portion of the Republic, which for forestry purposes is divided into thirty-two "conservations."

The work is directed from the ministry of agriculture (78 Rue de Varenne, Paris) by a director and three administrators. Their duties include the conservation, exploitation, and amelioration of public forest lands; the fixation of dunes upon the maritime littoral; the replanting of trees in mountains and the correction of mountain torrents; the regulation of the pasture lands of the communes, and the utilization of water in pastoral and forest regions, and the surveillance of river fishing and fish culture.

Each of the thirty-two conservations is in charge of a conservator, aided by an adjutant-inspector. The conservations are divided into "chefferies," each administered by an inspector or adjutant-inspector, and these are again subdivided into "cantonnements," with adjutant-inspectors or general guards in control. Each of these higher officers—32 conservators, 200 inspectors, 215 adjutant-inspectors, 260 general guards, and 40 licentiate general guards—has appropriate military rank. They direct the transactions of a considerable army of foresters of various grades and classes, of whom 3,300 are recruited and paid by the National Government, and many more by the communal governments.

The 747 superior forestry officers are selected from the National School of Waters and Forests at Nancy, from the graduates of the Secondary School of Forestry at Barres (Loiret), and from such foresters as have had fifteen years' experience and are able to pass the severe examination. There are in France two other schools—one at Barres and one at St. Pau (Lot-et-Garonne)—where private foresters receive instruction.

At the present time a total surface of 7,429,873 acres is under the direct control of the forestry service, of which 6,771,650 acres consist of forests properly so called. The far greater proportion of the forest area—4,565,434 acres—belongs in fee to the communes, but is under the rigid control of the State, experience having demonstrated that the communal governments could not be relied upon to maintain the public property. With such success has the State carried on this supervision that I know of communes where, within six years, the municipal revenues from the forest lands have increased 300 per cent. and are still increasing.

France has definitely resolved that it shall not perish, as Colbert predicted, "for lack of wood." The work is slow—it will require probably two hundred years to bring it up to its maximum effectiveness—but the time is foreseen when existing damaged forests will be reconstituted, and when all the waste spaces will be replanted to the point of proper proportion to insure the conservation of the water supply and to furnish the timber and wood required by the population. The effect upon private forest landowners of this public work has been most salutary. The ruthless cutting down of trees has ceased, and the exploitation of private forests proceeds to a fairly large extent upon the same lines as that of the public wooded surfaces.

Where absolutely bald mountains have been replanted, very surprising local results are now visible to all observers. This is especially true in the Hautes-Alpes, which had the unenviable reputation of being "the poorest department in France," and is in fact, one of the few from

which the United States has obtained several thousand French immigrants. There are now many artificially planted forests in this department of twenty-five years' standing, and in the bottom land below conditions have so improved that a state of general prosperity prevails.

In each conservation there are numerous nurseries where seedlings are grown, each one being transplanted at the age of three or four years to its assigned place and then protected against the sun by a carefully placed stone or piece of sod, being thereafter visited regularly by lynx-eyed foresters. In general the French foresters prefer to replant with the native species. Having had success with these indigenous varieties, the ones with whom I have spoken seem not over-enthusiastic about working with our American *Pinus Banksiana*.

They replant in France with numerous varieties, according to soil, altitude, and climate. In the Alps, however, a very general use is made of the *Picea excelsa*.

Trees Cannot be Acclimatized.

TREES are fixed, almost inflexible, in their habits. For centuries, indeed as long as we have record, each species has kept in its beaten ways; insisting on the same average of temperature and refusing to grow where this could not be found; seeking and occupying certain kinds of soil and demanding certain amounts of moisture and avoiding situations where these were wanting.

The latest authorities go so far as to declare that trees cannot be acclimatized; that is, that even the ingenuity and perseverance of man are unable to induce trees to change their habits far enough to adopt a country not closely like their native habitat. For a time the forester may use various devices to surround a tree with artificial conditions by which, so to speak, the tree is deluded into feeling at home. But as soon as the forester's care is withdrawn in such cases, the tree is seized with homesickness and dies of it.

This fastidiousness in the habits of trees has its good and its bad sides. It absolutely limits the forester's choice of trees to grow in a given region. To seek to force tree growth in uncongenial conditions is entirely fruitless. But, on the other hand, there is practical certainty of results. If beech or spruce thrives where the average warmth and moisture of the growing season from year to year ranges between certain degrees, then wherever else, in the northern hemisphere at least, the same average is found, the forester may plant beech or spruce, whether or not they be not already there, with confidence that they will flourish.

The same law works both ways. If the forester finds beech or spruce or any other tree growing in a region of which the climatic conditions are not recorded, he knows within very narrow limits what the climate is, simply because he knows that at home this tree grows in such a climate. In other words, trees, especially of course those which are particularly fastidious, are very satisfactory substitutes for thermometers and barometers so far as the average temperature and moisture conditions during the vegetative season are concerned.

There is a close relation between a tree's demands upon temperature and its demands upon soil. Given the proper temperature, it will grow where the soil is unfriendly; and given the most congenial soil, it will grow where the temperature is not ideal. The colder and wetter the soil, the better will it grow with a relatively high temperature; the drier and warmer the soil, the better will it grow with a relatively low temperature. Thus, on a northern slope the forester will often find it safe to plant trees which would not thrive on the southern slope of the same mountain, because northern slopes are cooler and moister than southern ones, and this difference may suffice to offset a slight disadvantage in the general temperature of the region.

There is a wide variation among trees as to the range of temperature which they endure. Some, such as the Douglas fir, yellow pine, eastern spruce, or aspen, grow over wide areas from north to south; others, such as Mexican white pine, eucalyptus, or redwood, are more narrowly confined. But it should not be inferred that only geographic lines can be drawn for the distribution of any species. The right temperature conditions may be found outside of the geographic distribution at higher or lower altitudes. A southern species whose home is in the mountains may possess a second home in the northern latitudes of a level country, and a northern lowland species may thrive also on mountains in the south.

Frequently trees are distributed over a country not continuously but in isolated groups, like black hemlock, which occurs in the Sierras, in the Cascades, and at sea level in Alaska but not in the lower country between. This is simply because the required temperature, though prevalent in the northern part of a region, is found only in the higher altitudes as one goes farther and farther to the south.

The forester, following these broad first principles of silviculture, may work in harmony with nature and so achieve in every locality the best results with the lowest percentage of failure.

Prolonging the Life of Mine Timbers.

THE cost of every ton of anthracite coal is increased eight cents by the expense of the mine timbers. To supply these timbers requires each year the product of approximately 150,000 acres of forest. Timber is used for crossties for tramroads in the main haulage ways, as wooden rollers, and as props. A "set" of gangway timber consists of two legs, commonly 9 or 10 feet long and averaging about 13 inches in diameter, and a collar, 6 to 7 feet long. These sets are placed on an average at intervals of 5 feet; one gangway frequently contains 1,000 sets; and 10 gangways to a colliery is not an unusual number.

The average life of the timber is hardly above two years. Forty-five per cent. of the timbers are destroyed by decay, while breakage, wear, and insects destroy the remainder. By peeling the timbers and properly seasoning them, and especially by giving them a treatment in oils or chemical salts, their length of service is materially increased.

In an industry where the cost of timber is so large an item it is important to know what method of preservative treatment will give the greatest service at the least expense. To determine this, experiments were conducted in the seasoning and treating of mine timbers, principally pine, oak, and chestnut. The last two woods were investigated largely to determine their suitability for planting in the anthracite region as a source of supply of mine timbers. The results show that peeled timber is superior in durability to unpeeled timber, and if it is peeled and seasoned for from two to four months in the woods there is an additional saving in freight and in yard room at the mines. Peeling costs from 10 to 25 cents per set. With creosote at 9 cents a gallon, mine props can be treated with a brush at a cost of 1½ cents a cubic foot, or 40 cents per set. If a timber checks, however, an opening is made through the portion protected by creosote, and decay sets in. By the use of closed cylinders a very thorough treatment is secured, but at an average cost of between $3 and $4 per set of mine timbers. A method of treatment less expensive than by the closed cylinders, and yet which secures a penetration of creosote adequate to meet most conditions, is by the open tank. By this method the cost is about $2.85 per set.

The conditions which render the life of mine timbers so short, and the experiments in peeling, seasoning, and treating with creosote, carbolineum, and zinc chlorid, are described in Circular 111, of the Forest Service. The conditions which cause early decay of timber in anthracite mines are common in other mines, and the results of these experiments apply, in general, to the treatment of timber for underground use in all parts of the country.

The Waning Hardwood Supply.

ALTHOUGH the demand for hardwood lumber is greater than ever before, the annual cut to-day is a billion feet less than it was seven years ago, being, in 1906, but 7,315,491 M feet. In this time the wholesale price of the different classes of hardwood lumber advanced from 25 to 65 per cent. The cut of oak, which, in 1889, was more than half the total cut of hardwoods, has fallen off 36 per cent. Yellow poplar, which was formerly second in point of output, has fallen off 38 per cent., and elm has fallen off one-half.

We know reasonably close how much hardwood is used for the manufacture of lumber, but do not know how much is cut for other purposes, such as railroad ties, telegraph poles, posts, fuel, etc. The present lumber cut of 7⅓ billion feet represents probably not one-third of the hardwoods annually used; 25 billion feet is not a high estimate. The largest estimate of standing hardwoods is 400 billion feet, or but a sixteen-year supply.

The cut of softwoods is over four times that of hardwoods, yet it is doubtful if a shortage in the former would cause dismay in so many industries. The cooperage, furniture, and vehicle industries depend upon hardwood timber, and the railroads, telephone and telegraph companies, agricultural implement manufacturers, and builders use it extensively.

This leads to the question, Where is the future supply of hardwoods to be found? The cut in Ohio and Indiana, which, seven years ago, led all other States, has fallen off one-half. Illinois, Iowa, Kentucky, Michigan, Minnesota, Missouri, New Jersey, Tennessee, Texas, West Virginia, and Wisconsin have also declined in hardwood production. Pennsylvania, in 1906, contributed 520,162 M feet, or 7½ per cent. of the total for the United States. The cut in 1899 was the same as in 1906. The chief centres of production now lie in the Lake States, the lower Mississippi Valley, and the Appalachian Mountains. Yet in the Lake States the presence of hardwoods is an almost certain indication of rich agricultural land, and when the hardwoods are cut the land is turned permanently to agricultural use. In Arkansas, Louisiana, and Mississippi the production of hardwoods is clearly at its extreme height, and in

Missouri and Texas it has already begun to decline.

The answer to the question, therefore, would seem to lie in the Appalachian Mountains. They contain the largest body of hardwood timber left in the United States. On them grow the greatest variety of tree species anywhere to be found. Protected from fire and reckless cutting, they produce the best kinds of timber, since their soil and climate combine to make heavy stands and rapid growth. Yet much of the Appalachian forest has been so damaged in the past that it will be years before it will again reach a high state of productiveness. Twenty billion feet of hardwoods would be a conservative estimate of the annual productive capacity of the 75,000,000 acres of forest lands in the Appalachians if they were rightly managed. Until they are, we can expect a shortage in hardwood timber.

Circular 116, of the Forest Service, discusses this situation. It may be had upon application to the Forest Service, Washington, D. C.

Use of Dead Timber in the National Forests.

A STUDY of the amount, location, and quality of fire-killed timber, and of the extent to which it is used, has been made by the Forest Service in a number of the National Forests in the Southern Rocky Mountain region. This brought out very strikingly, first, that sound dead timber is valuable, and, second, that though widely used in some localities it is regarded as not worth using in others. The timber which was not being used was found to be fully as good as the other, and the only cause for rejecting it proved to be ignorance of its true value.

There are three classes of dead timber: (1) Fire-killed timber, (2) timber killed by insects, and (3) timber killed by such other causes as drying out or lightning.

Fire-killed timber, which is the best, forms by far the largest part of the dead timber in the National Forests, and is found throughout them. Insect-killed timber, though widely scattered, is usually restricted to small areas. In some localities, however, particularly in the Black Hills, South Dakota, there are many millions of feet of such timber. Dead timber of the third class is mainly met with in single trees or small groups, but the aggregate amount of it is large.

Unless otherwise stated the dead timber hereafter discussed is fire-killed timber.

The area covered by the study was approximately 13,000,000 acres. On this area there is estimated to be 500,000,000 feet B. M. of merchantable dead timber, or about 4 per cent. of the total merchantable stumpage. About 50 per cent. of this, especially of the larger dimensions, is fit for saw lumber, and all of it can be utilized in the round. There is also a large amount of cordwood, suitable only for fuel, charcoal, and similar purposes.

The principal defect of fire-killed timber is check.

Fire-killed timber should be barked soon after it is killed, in order to prevent decay of the surface. If the bark has been left on, the sap-wood is somewhat decayed.

In many places it is the popular opinion that dead timber is very much weaker than seasoned green timber. It is even held that timber which has been dead a number of years is weaker than green timber, and that the longer it stands the weaker it becomes. These views are quite wrong. By actual test it has been shown that sound timber, as a matter of fact, is almost as strong as seasoned green timber and much stronger than green timber before seasoning.

Since the principal defect of dead timber is check, it has been used largely in the round for mine timbers, coal props, telephone poles, railroad ties, and fence posts. The better grades are also used for dimension stock, which is not seriously affected by the shallow checks found in these grades. It is not much used for inch stuff, however, except as cut-up stock, because of frequent cross checks.

The chief use to which dead timber is now put is for mine timbers. For this purpose it is even better suited than green timber, because it is perfectly seasoned and is light.

For fifteen years dead timber has been used for railroad ties in the Pike's Peak National Forest, where it has proved entirely satisfactory.

Dead timber is eminently suited for making boxes and crates, because it is odorless and is perfectly seasoned. A package made from it does not shrink or warp, but remains as tight as when first made. Since dead timber, when sawed, is largely cut-up stock, it should find a wide use for such purposes.

In smaller quantities dead timber has been used for telephone and telegraph poles, dimension stuff, and fence posts.

Sound dead timber has this especially in its favor: It is perfectly seasoned, and is therefore easily handled and cheap to ship.

Dead timber, moreover, is in an excellent condition for preservative treatment, as the moisture has evaporated from the wood so there is no watery sap to act as a mechanical barrier to the entrance of the preservative.

Forest Leaves

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CONTENTS.

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The attention of Nurserymen and others is called to the advantages of FOREST LEAVES *as an advertising medium. Rates will be furnished on application.*

EDITORIALS.

SPRING Arbor Days for Pennsylvania are announced by the proclamation of Governor Stuart, which we publish in other columns; and a departure from established custom will be noted in the interval of three weeks between the two days recommended on which to plant trees.

The varied climate prevailing on the 45,096 square miles of area, affected mainly by topographical conditions which cover differences in altitude of over 3,100 feet, have demonstrated the advisability of designating early and late spring arbor days, and the interval heretofore adopted of a fortnight has been extended to three weeks.

This issue of FOREST LEAVES will reach our readers in sections where the early arbor days apply, too late to remind them to prepare for tree planting, etc., but the public press will have brought arbor day to their attention.

Those in sections in which the later date applies will have opportunity to arrange for some appropriate recognition, and we trust that this will be generally done. In former issues we have discussed the value of recognizing specific occasion for tree plantings, or exercises which encourage the young to appreciate the important functions which trees perform; and it is our firm belief that attachment for a single tree which one has assisted in planting or information concerning the value of trees, will develop into a realization that forests are necessary for the future prosperity of our State and nation.

We therefore urge each reader of FOREST LEAVES to do something towards recognizing the arbor days designated by the Governor of the State.

J. B.

* * * * *

THE first Foresters' Convention of graduates of the Forest Academy was held by the Department

of Forestry at Harrisburg on March 4th to 6th, inclusive. Fourteen papers were presented and discussed, the meeting being successful from all points of view, and forming a valuable educational feature. Those present, in addition to the graduates, were the State Forestry Reservation Commission, Mr. George H. Wirt, Director of the Forest Academy, and the Assistant Director, Mr. J. P. Wentling. These young men who have graduated from the Forest Academy are now actively employed on the various reserves, and the beneficial results obtained by this corps of trained men, which will be increased each year, will soon be made evident.

* * * * *

NOTWITHSTANDING the popular sentiment which has endorsed forest reservations, or the propaganda initiated and maintained by special publications and by bulletins emanating from the Government Forest Service, backed by official support from National and State executives, any observant traveller is constantly attracted by evidences of useless denudation, scandalous waste or reckless destruction of timber.

Even in sections where forest protection and preservation have made headway, indications of waste of this prominent natural resource are abundant; but in portions of the country where the scarcity of timber is less pronounced, the evidences are more numerous.

To those who seek recuperation or enjoyment in Florida and other Southern States, the apparent disregard of the future or even present supplies of timber cannot be overlooked, for it is ever present.

There has been considerable discussion as to the effect of tapping the yellow pine trees for turpentine, and it may be admitted that this, if judiciously done, may not injure the trees. But in many localities the method of obtaining this valuable product is far from judicious, for the price which turpentine has lately commanded developed abuses which must be patent to any observer.

Young and immature trees are tapped, and to secure as much turpentine as possible the trees are practically girdled, leaving mere strips of bark to perform the function for which this portion of the tree is intended. The result which may be expected is easy to foresee, for not only will the growth of trees be retarded or the trees killed, but the future supply of turpentine materially decreased. To intensify and make sure this destruction, the statute which permits indiscriminate firing is added. In Florida the law recognizes the rights of roving cattle over those of land owners by allowing fire to be applied during the month of March, so as to destroy the wire grass, young palmetto, and other underbrush; and, as a result to be anticipated, the period of license is illegally extended to cover a greater interval of time. These fires, unless they assume uncontrollable proportions, may not necessarily destroy trees, but when the ground flames take hold of the resinous deposit on the stripped trunk they often consume the entire tree.

The south has developed a magnificent lumber industry, but the end of this may be considered as "in sight." Will its people awaken to a realization of the value of the remnant, or will they await the practical exhaustion of the forests which enrich them by hastening the day when lumber and turpentine have become memories? J. B.

* * * * *

WHAT may be accomplished by an individual towards the advancement of interest in forest protection and good roads is in evidence in the vicinity of St. Augustine, Florida. Our readers have been given data concerning the work of Mr. Albert Lewis, a Vice-president of the Pennsylvania Forestry Association, who has, by liberal expenditures from his private purse, done much to protect growing timber from fire ravages in Luzerne County, Pennsylvania.

During an excursion to Harvey's Lake in connection with the Twentieth Anniversary Meeting at Wilkesbarre, Mr. Lewis's method of burning the tops of trees as they are felled also was practically demonstrated to our members.

Mr. Lewis's fad—if it may be considered a fad—is to lay out roads to intercept the spread of forest fires and thus protect growing timber, but he does not stop at cutting a swath through the woods and calling it a road. He makes it a good road, well-surfaced, crowned and drained, and sixty miles of these, in the vicinity of his properties at Bear Creek and Harvey's Lake, are illustrations of his method.

Mr. Lewis is following a similar course in Florida, near his winter house at St. Augustine. Here he has constructed about six miles of excellent shell-roads, leading to and through a tract of 5,000 acres. Along these roads he has planted some 6,000 cabbage palm trees, maples, etc., and is protecting the remnant of pine, cedar, live oak, sweet bay and other trees. His roads set a good example for those who have charge of public highways, and his efforts to protect growing timber are awakening the interest of others as to the possibilities elsewhere and appreciation of the value of trees.

Many expressions of appreciation of Mr. Lewis's efforts are credited to influential citizens of Florida, where the forests surely need a champion. J. B.

WE regret to announce the death of one of our life members, Mr. James W. Pinchot, of Washington, D. C., father of Mr. Gifford Pinchot, Forester of the U. S. Department of Agriculture. Mr. Pinchot has always been a friend of forestry, and was instrumental in organizing and endowing the Yale Forest School, the summer session of this School being held on his estate at Milford, Pike County, Pa.

* * * * *

THE Pennsylvania Forestry Association will hold a meeting at Chambersburg, Pa., on June 9 to 11, 1908. This town is convenient to the South Mountain reserve, and at the invitation of the Forestry Department of Pennsylvania visits will be made to the Mont Alto reserve, the Caledonia reserve, the Forest Academy, Nursery, etc. Through the courtesy of the Department of Health, the Sanatorium will also be inspected. The South Mountain reserve comprises about 42,000 acres, and is composed of the Mont Alto section, next to the Maryland State border, and the Caledonia section to the north. This will give members an excellent opportunity of viewing the results accomplished in caring for one of the State reserves, the practical methods employed, the system of educating young men as foresters, who, on graduation, will assume charge of the State reserves; also a view of a large nursery for the propagation of seedling trees, examples of tree-planting, etc. At the Sanatorium another phase of the benefits which may be secured from the forest reserves as a place for treating those suffering from incipient tuberculosis will be seen.

Meetings will be held at Thomson Hall of the Wilson College at Chambersburg, and at the Inn at Caledonia, where there will be papers, addresses, and discussions of subjects of interest to forestry.

We trust that as many of our members as possible will take advantage of this opportunity to investigate what is being done on one of the State forest reserves, and those who contemplate attendance should communicate with Mr. F. L. Bitler, Recording Secretary, 1012 Walnut St., Philadelphia, Pa., that arrangements can be made for their comfort and additional notice of the meeting sent.

A map of the Mont Alto and Caledonia reserves will be prepared for the convenience of those in attendance, and also published in the next issue of FOREST LEAVES.

A wealthy citizen of Prineville, Ill., has given 40 acres of woodland to the town, to be used in nature study for the school children.

Arbor Day Proclamation.

IN the name and by authority of the Commonwealth of Pennsylvania. Executive Department. Proclamation. The American people are on the verge of a timber famine. The annual consumption of lumber is now more than three times as great as the annual growth. At the present rate of growth and consumption, the day is not far distant when the scarcity of wood will be felt in our homes as well as in our industries. Equally serious is the waste of soil, which is due to the reckless destruction of our forests. Every time our creeks and rivers become muddy we can see the action of swollen streams in robbing the land of its fertility. Forests regulate the distribution of rainfall and lessen the frequency and destructive effect of floods and freshets.

Pennsylvania has made a commendable beginning in systematic forestry. The State now owns more than three-quarters of a million acres of forest land. Under proper tilling the farm does not lose by yielding a harvest, and under proper methods of forestry the mercantile timber can be put upon the market without detriment to the forest.

Trees are valuable not merely for use as lumber, but also for shade and for fruit. Our State occupies a foremost place in the value of its orchards and fruit-trees. The rising generation should feel a special interest in the planting of the best varieties of trees, and in their growth and protection against noxious insects and other enemies. The annual observance of Arbor Day by the schools and by the people, in cities as well as in rural sections, has helped to create public sentiment and to disseminate useful knowledge with reference to the planting and care of trees and the preservation of our forests.

In view of the benefits which result from the proper observance of Arbor Day, I, Edwin S. Stuart, Governor of the Commonwealth of Pennsylvania, do hereby, in accordance with law, issue this my Proclamation, designating Friday, the third day of April, and Friday, the twenty-fourth day of April, A. D., 1908, to be observed as Arbor Days throughout the Commonwealth. Two days have been designated, so that every section of the State may find a day for tree planting suited to its climatic conditions.

Given under my hand and the Great Seal of the State at the City of Harrisburg, this seventeenth day of March, in the year of our Lord, one thousand nine hundred and eight, and of the Commonwealth the one hundred and thirty-second. EDWIN S. STUART.

By the Governor: ROBERT MCAFEE,
Secretary of the Commonwealth.

Forestry at the Annual Meeting of the National Wholesale Lumber Dealers Association.

THE annual meeting of the National Wholesale Lumber Dealers Association was held at Washington, D. C., on March 4–5th, 1908, being well attended, and much enthusiasm evidenced.

The report of the Forestry committee was presented by its chairman, Hon. N. P. Wheeler, a member of the Pennsylvania Forestry Association, from which the following abstracts are taken, showing the interest being taken by lumbermen in forestry:

The question of forestry is such a broad one that the committee has found it difficult to determine what part of it to take up.

The earlier lumbermen had little thought of the forest, aside from cutting the best part of the best trees, and even then finding it difficult to sell the product at a price sufficient to pay the expense of marketing. Oftentimes half of the best trees after being cut down were left in the woods. This would make fuel for forest fires, with a prospect of destroying what was left standing.

Our forefathers also, when they came to this country, found it nearly solid forests, from the Atlantic coast to the prairies of what is now Illinois. They thought it necessary, and it was, in order to live, to cut down the forests and log and burn up the timber, that they might clear up farms upon which to raise corn, wheat and potatoes to support human life.

For two hundred years this destruction continued. The writer has seen the finest white pine and white oak which had been girdled or "deadened" to kill it. In fact, it was customary among the German farmers of Pennsylvania to begin to clear their land that way, wasting all the timber and using forest fires to help them get rid of the trees, and also make better grazing on other lands.

Fortunately, that day is past, except in the far West. The lands of the Middle West already free from forests were much easier to clear, and more productive than New England or New York or Pennsylvania.

It was fighting against the forces of nature to clear those strong, hilly farms, and nature will assert herself, covering again with forests those poor farms which were cleared with so much labor and so little profit.

The lumbermen also, as lumber advanced in price, became more careful of the timber, cutting close to the ground and well up into the tops. Some can remember when all pine was cut at least breast high, and then a long butt left always in the woods, in order to get rid of the shake.

The first lumbermen in any region are always wasteful. Note the cutting of the fir on the Pacific coast, often sixteen to twenty feet above the ground, to get rid of the swell of the butt of the tree. Now with the excellent care of the forest reserves by the government and the larger ownership of timber by private parties, who usually keep fire patrols of their own during the dry season, much of the former loss from forest fires is prevented.

So far State laws for the prevention of forest fires or the punishment of parties who start them have availed little in the East. Yet if we can keep the fire out of the forest the question of reforestation is nearly solved.

Almost any land that has produced timber once will again, if you give it a chance. Many lumbermen have stated that white pine will not follow white pine. The reason that it did not was that soft white pine grew in a mixed forest. The pine, being the most valuable, was cut first. Then if any pine were left to seed and the young seedlings started they were smothered out by the deciduous trees that were left standing. All coniferous trees must have the light, or they cannot thrive and soon die. The lower limbs of the pine in the forest die for lack of light, the same reason which caused the young seedling to die.

Along a road or in a field where there are any pine large enough to seed on the prevailing windward side a pine thicket will soon assert itself.

The writer can recall binding wheat for the first crop on lands which were cleared up at great expense. The crop of wheat was good. The land was used for pasturage; a few white pine stood on the hill to the northwest. That field is now covered with pine, some of it a foot or more in diameter, and a much better crop than any other that could have been secured from it—Nature was only asserting her own.

The charcoal furnaces established along the Allegheny river, in the early forties, cut the forest clean for charcoal. Much of this reforested with white pine, and surprising amounts have been obtained in late years where few supposed there was any pine at all. Chestnut and oak, suitable for railroad ties and telegraph poles, grew very rapidly, and upon rough land hardly suitable for anything else.

As I said before, lumbering is now carried on in a much more careful way than formerly. With the pine cut close to the ground, and worked up to a top of six inches, and the brakes made into shingles, the oak, chestnut, ash and cherry cut into that which brings best results, beech, birch and maple into staves or broom-handles, the hemlock, after taking off the bark, into lumber as required, the tops of all except the oak and hickory gathered up and sent to the wood pulp plant, there is very little waste and very little left to feed a forest fire. In fact, the wood pulp industry as conducted in Pennsylvania is a blessing to the forests, in taking out the refuse which otherwise would be fuel for destructive forest fires.

Excessive taxation is one influence that has compelled the cutting of timber which otherwise would be left standing; in some townships and counties the inhabitants forget the agency of the forest in preserving the water flow and its general benefit to the country, and single it out for heavy taxation, the owners frequently being non-residents. No revenue comes from a forest until cutting begins.

Several bills were introduced in the Pennsylvania Legislature last year to lighten taxation on growing forest not matured, but all failed of passage.

Alabama, Maine, Wisconsin and Iowa have some favorable laws in this direction. Our attention was recently called to some work by the Department of Agriculture through its Bureau of Entomology, which was found to be of special interest on account of its direct practical bearing on the determination and prevention of one of the features of serious loss to the lumber business.

It will doubtless be new to many that the injury to standing timber, crude and manufactured products by bark and wood-boring insects has been the subject of exhaustive study during the past seven years. The experts who have been conducting the investigation have a store of additional information of the greatest practical value, which is now available for immediate utilization by the private owner or manufacturer.

Timber does not mature in one man's lifetime; each man wants to get something out of his property while he lives, and as we can only entail land to the second generation in this country there is very little inducement to plant or preserve that others may reap.

The subscription cards signed two years ago for a chair of forestry at Yale University, conditioned on a certain amount being raised, which amount was not secured, have been returned to the subscribers.

The homestead law, as applied to timber land, is ridiculous. A homesteader taking up 160 acres of timber land on the Coast range, in his lifetime, and he would starve to death while he was doing it, the clearing would be pure waste of what some day would be valuable timber. He is forced to do just what the government intended he should do, sell to some one financially strong enough to hold it and wait. We believe the homestead law, as applied to timber land, should be repealed.

In regard to the White Mountain and Appalachian forest reserves, which our association has approved, we report slight progress. A resolution has passed Congress asking the Judiciary Committee to decide whether we have authority to make such reserve and condemn and acquire land for that purpose. The government owning the land could easily make the reserve; whether it would have the right to acquire land of private owners which they might not wish to sell at prices satisfactory to the government is an important question which may delay matters for a time.

We approve the forest reserve policy of the government in retaining the forests for the benefit of future generations, and offering only for sale such timber as can be disposed of without detriment to the continuance of the forest. Under such management the forest should continue forever to furnish material for the homes of men, to preserve the waterflow and shed its beneficial influence over the plains and rivers below.

This, with the growing interest in forestry generally, the greater care of lumbermen to prevent waste of their timber holdings, the protection of the wood lot and windbreaks by the farmer, and the natural reforestation of abandoned farms that never should have been cleared are hopeful signs that our forests will still be preserved.

The Annual Meeting of the American Forestry Association.

THE annual meeting of the American Forestry Association was held at Washington, D. C., on January 29th. The morning session was opened by the Hon. James Wilson, President of the Association, who, after welcoming the members, spoke in part as follows:

The American people are learning with regard to actual conditions concerning the forests of the country. It will be a work of years before everything is done that should be done along these lines. When the Pilgrims founded New England there were forests, and for hundreds of years it has been considered the proper thing to be a good axman, cutting down trees. They have succeeded in cutting down trees and destroying woods until it has become a question with us now what we are to see in the future, and what those who follow us shall see in the future with regard to woods.

Anybody can take a spade and plant a tree, if he can get a young tree. It does not take a great deal of research to ascertain how to germinate a seed, but to reforest the bare lands in the forests of the United States there must be a new plan of doing things.

Instead of planting as many trees as a man can plant in a day, one man must plant four or five

hundred acres in a day. Machinery must be adapted to the planting of tree seed. How tree seed can be planted by machinery must be wrought out. The American problem is not so much getting hold of cheap labor as the making of intelligent labor.

Take the headwaters of the New England rivers, take the headwaters of the great rivers of the South. The people are cutting woods away up to the top there. There are four or five inches of soil, and just as soon as they get the wood cut the soil begins to wash and destroys the limited belt between the mountains.

Are we to lose the use of our great rivers? We are taking care of things measurably well in the great West. I do hope our representatives will carefully consider the wisdom of making beginnings along the line of stopping the cutting of the woods and the mountain tops, both in New England and the Appalachian range.

There is nothing more noble than the rehabilitation and preservation of the forests. You are not only doing it for the present generation, but you are doing it for all future generations. Forests are something that should go on and on, and become historic for thousands of years.

Mr. Thomas E. Will presented his report as Secretary, showing a satisfactory growth.

Mr. Gifford Pinchot, Forester of the Department of Agriculture, spoke of the natural resources of the country, which he divided into two classes, the renewable and the non-renewable. The supplies that come from the interior of the earth are not renewable, while many of those obtained from the surface, such as the forests and waters, are renewable. The coal of the country will in time be exhausted, and future manufacturing depends upon water-power, which in turn depends upon the preservation of the forests.

Dr. J. T. Rothrock, Secretary of the State Forestry Reservation Commission, and also of the Pennsylvania Forestry Association, gave an interesting account of the purchase of lands for forest reserves in Pennsylvania, much of which is now worth twice what was paid for it. He also urged earnestly that young forests should not be so taxed as to force their owners to cut them down.

Addresses were also made by Mr. James S. Whipple, of the Forest, Fish and Game Commission of New York; Mr. Frank W. Rane, State Forester of Massachusetts; Mr. John A. Walker, State Forest, Fish and Game Commissioner of Alabama; Messrs. John W. Noble, W. A. Reeder, W. S. Harvey, Rutherford P. Hayes, Geo. W. Cook, Frederick S. Underhill, George K. Smith, S. B. Smith, Mark Packard, James A. Pack, J. Horace McFarland and others.

The following officers were elected: Hon. James Wilson, President; Vice-Presidents at large, Dr. Edward Everett Hale, Dr. B. E. Fernow, James W. Pinchot, N. J. Bachelder, George F. Peabody, Gov. George W. Pardee, R. P. Hayes, Albert Shaw, W. W. Finley, Dr. J. T. Rothrock, George T. Oliver, and Dr. Chas. R. Van Hise; Treasurer, Otto Luebkert. The board of directors is composed of Hon. James Wilson, W. L. Hall, George P. Whittlesey, James H. Cutler, Henry S. Graves, F. H. Newell, H. A. Pressey, George K. Smith, William S. Harvey, A. F. Lever, P. W. Ayres, Robert Garrett, Ligon Johnson, Filibert Roth, and W. J. McGee.

Forestry on the Girard Estate.

As a part of the course in Forestry at the Pennsylvania State College, the advanced students on January 24th and 25th made a trip of inspection to locust plantations put out by the Pennsylvania Railroad and to the Stephen Girard Estate, located twelve miles north of Pottsville in Schuylkill and Columbia Counties, Pennsylvania.

The work of protection and planting which was begun in 1877 on lands belonging to the Girard Estate has been carried out over watersheds approximating an area of 10,000 acres. These lands were stripped of their timber at an early time in the development of coal and iron, and as with almost all such tracts in Pennsylvania fires ran over this ground every two or three years and sometimes annually. For instance, it was estimated that in April and May, 1899, fires burned over 5,530 acres of land. The estimated value of the timber burned that year was $9,967.50. The two watersheds upon which most of the planting has been done are rather level table-lands ranging from 1,400 to 1,780 feet altitude. Springs arise here and there over the tract, and the run off is being held in reservoirs as a water supply while the surplus discharge feeds Shenandoah and Catawissa Creeks.

Plantings on the Estate.—Plantings were begun in 1877 with 500 seedlings, and from 1881 were continued almost annually until 1899, when 252,050 seedlings had been put out. The varieties planted were about as follows: European larch 143,750, Catalpa speciosa 24,500, Scotch pine 42,100, white pine 32,900. From 100 to 3,000 of the following species were also put out: wild black cherry, Russian mulberry, white oak, Austrian pine, Norway spruce and Douglas fir.

Seedlings were used almost entirely, and the cost of seedlings and plantings varied from year to year. In 1899, 15,400 white pine seedlings were put out at the following cost: Trees per thousand, $4.00; planting per thousand, $2.00; cost of trees per acre, $10.89; cost of planting per acre, $5.42; total cost per acre, $16.31. From what could be learned from reports of planting operations, untransplanted stock one year old was used almost entirely. Results after 30 years do not seem to justify even the small expense of putting out one year old stock. Much better results have been obtained where two or three year old transplants were used. A greater number of trees would be standing to-day, greatly increasing probable returns, if fewer but larger trees had been used originally.

Of the various species planted the white pine and European larch have been most successful. The white pine has shown great ability to succeed on very barren, burned over areas, while results seem to show that the European larch must have a fairly good, well-drained soil to succeed. The Scotch pine, while making an excellent growth for the first 15 years, is now failing rapidly, proving itself of little value except during early life. This is the same conclusion reached with the Scotch pine throughout the middle prairie States of the country. Whether the bringing in of better seed or seedlings of the Scotch pine will give different results is yet to be determined. Both the Austrian pine and Norway spruce are proving to be longer lived than the Scotch pine, but the old trees of both species are beginning to show signs of failure, and under conditions existant on the Estate have probably passed their period of maturity. A large part of the Catalpa still remaining show signs of injury by the soft rot (Polyporus versicolor).

In November, 1899, two bushels of white oak acorns were planted on a little over three acres of ground. The seed cost 98 cents per acre and planting $7.07, making a total cost of $8.05 per acre. Results have not justified the use of acorns. The dense growth of weeds and underbrush has greatly stunted the seedlings, which have not made half the growth that red oak or chesnut would have made under the same conditions.

Forest Protection on the Girard Estate.—In a report made in 1899 by Prof. H. S. Graves, then Superintendent of Working Plans in the Division of Forestry, the following statement is made: "The work by the Girard Estate along this line (planting) is the most interesting of any forest experiments by private concerns which I have seen in the United States." Prof. Graves stated further: "The whole problem of forest management depends on the possibility of protecting the land from fire. So long as the forest is burned over repeatedly, it is not business policy to invest any money in planting or even in careful thinning." It is safe to say that not only is the work in planting on the Girard Estate an interesting experiment, but there is probably no better example of protection of forests by fire lanes in the United States. So necessary and desirable was it to protect the two watersheds from fire that they have been completely surrounded by a stone wall 5 feet high. This wall is over 6 miles in length, and was built at a cost of from $0.84 to $2.80 per running yard. This wall has been very efficient, not only in stopping fires but in preventing the entrance of trespassers who are responsible for a large percentage of the fires. In several instances, however, fires have crossed the wall, showing the necessity of either burning over the highways which border the wall or cutting away the brush for at least a rod on the outside of the wall. One of the watersheds inclosed in the wall has three broad fire lanes extending entirely across the tract from wall to wall. These lanes were at first made but 10 to 15 feet wide. It was soon found that fires would leap across a lane of this width and that they were really of very little use. Gradually the lanes were increased in width until they are now 100 to 150 feet wide. These are burned over each year, and within the past two years have been very effective in preventing fires. Several narrow lanes have been run through intervening spaces, but the Superintendent in charge states that these are of little value when a severe surface fire is running.

As the practice of forestry in Pennsylvania is absolutely dependent upon fire protection, the experience of developing fire lanes on the Girard Estate will be of tremendous value in developing a system of fire protection for State and private forests. Unless an efficient ranger service or fire patrol can be maintained, it will hardly pay to build fire lanes or roads of ordinary width. It would be much better to have a few lanes from 100 to 150 feet wide kept clear of brush and débris than to have a great many narrow roadways and paths through our forest land.

In the progress of forestry work in this State, it will soon be seen that we owe a great deal to those who have carried out so efficiently the work of forestry on the Stephen Girard Estate. They have actually been carrying on experiments for the past 30 years, the results of which cannot help being of tremendous value to prospective tree planters and woodlot owners, either private or public.

HUGH P. BAKER.

The West Virginia Forestry Association was formed in February.