

# MAINE STATE LEGISLATURE

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Public Documents of Maine:

BEING THE

ANNUAL REPORTS

OF THE VARIOUS

Public Officers *and* Institutions

FOR THE YEAR

1892.

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VOLUME II.

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AUGUSTA :

BURLEIGH & FLYNT, PRINTERS TO THE STATE.

1892.

FIRST ANNUAL REPORT

OF THE

FOREST COMMISSIONER

OF THE

STATE OF MAINE.

1891.

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AUGUSTA:

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1892.



## STATE OF MAINE.

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*To the Honorable E. C. Burleigh, Governor of Maine:*

The Forest Commissioner respectfully submits his first annual report, as required by the act of 1891, chapter 100, creating a Forest Commission.

CYRUS A. PACKARD,

*Forest Commissioner.*



# STATE OF MAINE.

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## CHAPTER 100.

AN ACT to create a Forest Commission and for the Protection of Forests.

SECT. 1. The state land agent is hereby made forest commissioner of the state of Maine, and in addition to the salary now received by him as land agent, he shall receive as compensation for his services as forest commissioner two hundred dollars per annum, and his actual traveling expenses incurred in the performance of his duties, an account of which shall be audited by the governor and council.

SECT. 2. It shall be the duty of the forest commissioner to make a collection and classification of statistics relating to the forests and connected interests of the state, and to institute an inquiry into the extent to which the forests of Maine are being destroyed by fires and by wasteful cutting, and to ascertain so far as he can as to the diminution of the wooded surface of the land upon the water sheds of the lakes, rivers and water powers of the state and the effect of such diminution upon the water powers and on the natural conditions of the climate. The information so gathered by him, together with his suggestions relative thereto shall be included in a report to be made by him annually to the governor on or before the first day of December.

SECT. 3. The selectmen of towns shall be, ex-officio, forest fire wardens therein and shall divide said towns into three districts, bounded as far as may be by roads, streams of water, or lot lines, and assign to each of their number the charge and oversight of one district as district fire wardens therein. A description of each district and the name of the fire warden thereof shall be recorded with the town clerk. The services of such selectmen acting as said fire wardens, shall be paid for at the same rate as is paid for their other

official services. It shall be the duty of the fire warden of the district in which a fire is discovered to take such measures as may be necessary for its control or extinction. For this purpose he shall have authority to call upon any persons in the territory in which he acts for assistance, and such persons shall receive such compensation not exceeding fifteen cents per hour as said selectmen may determine, the same to be paid by the town. But no town shall be holden to pay for extinguishing forest fires in any year an amount greater than two per cent upon its valuation for purposes of taxation. If any person so ordered to assist, and not excused from said service by said forest fire warden on account of sickness, disability or some important business or engagement, shall neglect to comply with any such order he shall forfeit the sum of ten dollars, to be recovered in an action of debt in the name and to the use of the town, by the treasurer thereof.

SECT. 4. County commissioners of each county in which there are unorganized places shall annually appoint, when they deem it necessary, such number of fire wardens as they deem necessary not exceeding ten, for all such unorganized places in any county, whose duties and powers shall be the same with respect to such unorganized places as those of the fire wardens of towns, and they shall also have the same authority to call out citizens of the county to aid them in extinguishing fires, that town fire wardens have to call out citizens of the town. The compensation of such fire wardens shall be paid by the county, and the compensation of persons called upon by them as aforesaid, to render aid shall be the same as that provided in the case of towns and shall be paid one-half by the county and one-half by the owners of the lands on which said fires occur.

SECT. 5. Any person who shall build a camp or cooking fire in or adjoining any woods in this state, shall, before leaving such camp, totally extinguish such fire, and upon failure to do so, such person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine not exceeding one hundred dollars, or by imprisonment in the county jail not exceeding one month or by both such fine and imprisonment, provided, that such fires built upon the sea beach in such situation that they cannot spread into forest wood or cultivated lands or meadows, shall not be construed as prohibited by this act.

SECT. 6. It shall be the duty of selectmen in towns within thirty days after this act shall take effect, to cause to be erected in a con-



spicuous place at the side of every highway as they may deem proper, and at suitable distances alongside the rivers and lakes of the state frequented by camping parties, tourists, hunters and fishermen, in their respective towns, notice in large letters to be furnished by the forest commissioner, substantially in the following form. Camp fires must be totally extinguished before breaking camp, under penalty of not to exceed one month's imprisonment or one hundred dollars fine, or both as provided by law. Signed, Forest Commissioner. The forest commissioner shall furnish owners of wood lands situated within this state when called upon so to do, notices of similar tenor to be posted at the expense of said owners upon their respective lands.

SECT. 7. All persons engaged in hunting game on any of the wood lands within any town or unincorporated place in this state, shall use non-combustible wads in the loading of firearms used by them.

SECT. 8. It shall be the duty of municipal officers in towns, and county commissioners, the latter with respect to unorganized places, to proceed immediately to a strict inquiry into the cause and origin of fires within wood lands; and in all cases where such fires are found to have originated from the unlawful act of any person, to cause the offender to be prosecuted without delay.

SECT. 9. The selectmen of towns in which a forest fire of more than one acre in extent has occurred, and the county commissioners where a forest fire of more than two acres has occurred in any of the unincorporated places in any county, within a year, shall report to the forest commissioner the extent of area burned over, to the best of their information, together with the probable amount of property destroyed, specify the value of timber as near as may be, and amount of cord wood, logs, bark or other forest product, fencing, bridges and buildings that have been burned. They shall also report the cause of these fires if they can be ascertained, and the measures employed and found most effective in checking their progress. Blanks for the reports required in this act shall be furnished by said forest commissioner at the expense of the state.

SECT. 10. Every railroad company whose road passes through waste or forest lands, shall during each year cut and burn off or remove from its right of way all grass, brush or other inflammable material, but under proper care and at times when fires are not liable to spread beyond control.

SECT. 11. All locomotives which shall be run through forest lands, shall be provided with approved and efficient arrangements for preventing the escape of fire and sparks.

SECT. 12. No railroad company shall permit its employes to deposit fire, live coals or ashes, upon their track in the immediate vicinity of wood lands or land liable to be overrun by fires, and where engineers, conductors or train men discover that fences along the right of way or wood lands adjacent to the railroads, are burning or in danger from fire, it shall be their duty to report the same at their next stopping place which shall be a telegraph station.

SECT. 13. For all damages caused to forest growth by any person employed in the construction of any railroad hereafter to be built in this state the company owning such road shall be primarily liable to the person or persons so damaged. During the construction of such roads through wood land, there shall be kept posted in conspicuous places on each line of the road ways at distances of two hundred feet, abstracts of the laws relating to forest fires. Any person employed in the construction of such railroads, who shall set or cause to be set any fire along the line of said roads, shall, before leaving the same, totally extinguish said fires, and upon failure to do so, such person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not exceeding five hundred dollars or by imprisonment in the county jail not exceeding sixty days, or by both such fine and imprisonment. It shall be the duty of all persons having charge of men in the construction of such railroads, to see that the provisions of this section are carefully complied with, and any negligence or want of ordinary care on their part in relation to the same shall constitute a misdemeanor, and upon conviction thereof, they shall be liable to the penalties imposed by this section.

SECT. 14. Any railroad company violating the requirements of this act, shall be liable to a fine of one hundred dollars for each offense.

SECT. 15. The forest commissioner shall take such measures as the state superintendent of common schools and the president of the state college of agriculture and the mechanic arts may approve, for awakening an interest in behalf of forestry in the public schools, academies and colleges of the state, and of imparting some degree of elementary instruction upon this subject therein.

SECT. 16. The forest commissioner shall prepare tracts or circulars of information, giving plain and concise advice for the care of wood lands and for the preservation of forest growth. These publications shall be furnished to any citizen of the state upon application.

SECT. 17. It shall be the duty of the forest commissioner to cause, at the expense of the state, copies of this chapter and all other laws of the state relating to forest fires to be printed and freely distributed to the selectmen of all the towns of the state, whose duty it shall be to post them up in school houses, saw mills, logging camps and other places, and similar copies shall be furnished to owners of forest lands, who may apply for them, to be posted up at the expense of such owners. Any person viciously or wantonly tearing down, destroying or defacing any such notices, shall on conviction therefor, be punished by a fine of five dollars.

SECT. 18. All acts and parts of acts inconsistent with the provisions of this act, are hereby repealed, but none of the penalties proposed by this act shall be considered as substitutes for or as repealing the provisions of existing laws, making persons guilty of acts of trespass or liable for civil damages to persons injured by such acts.

[Approved March 25.]



## REPORT.

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The Forest Commissioner presents his first Annual Report with considerable embarrassment, as the work was entirely new in this State and nearly so all over the United States. The law was approved the 25th day of March, 1892. But little aid could be obtained from the reports of forest commissioners of other states as it was not in many instances in other states the *great* object to protect growing timber. It is somewhat doubtful whether the average citizen really and truly estimates the

### IMPORTANCE OF PROTECTING OUR FORESTS

from *the* great enemy "Fire." The great and important industry of Maine, except agriculture is our lumber interest. In nearly all the states except New England and New York no account is made of *growing* timber, when once cut over the timber is gone. But in Maine our growing timber is nearly all we have. It may be safely said that one-third of our population are dependent upon the products of our forests for employment. Our whole line of frontier towns from New Hampshire line to New Brunswick are largely maintained by the lumbering interest, in fact many of our little back towns would never have been settled but for the lumbering interest. Lumbermen furnish nearly all the market the farmers in these towns have for their surplus products. If the lumbering industry should by any unforeseen calamity be permanently ruined, abandoned farms would be the rule on our frontier.

We have a large amount of land in this State entirely unfit for cultivation that can be made very useful by growing timber on it. The great enemy that our forests have to contend with is "Fire." It is regarded by all that have interested themselves in the question of forestry that the protection of our forests from fire is the first, great and important duty of the State towards our wild lands. If fires are kept out of the forest the work of restoration goes on whenever and wherever the larger growth is cut out for any of the purposes that wood or timber is used. Nature is always ready to aid the work, and in a few years the forest that has been stripped of the larger growth presents a thrifty appearance. Our forests do not present a uniform growth. Trees of all sizes are growing in the same vicinity, and when the largest ones are removed the smaller make a much more rapid growth.

It is not always good economy to allow the old growth to remain; after the tree has matured it may be for the interest of the owner to have it removed, thereby giving the smaller a chance to grow. To make our forests profitable they should be kept in a growing condition. The great crop growing on our unimproved lands is of great value, equal to, if not exceeding, any other crop growing upon our soil. But if fires are allowed to follow the axe the crop is ruined, and in case of a hard fire the soil is nearly ruined to. We often hear the remark made about forest fires, that they are running in "old burnt land" and are "not doing any damage," the land has been burnt over once and condemned as being always worthless. The writer calls to mind a tract of land of about five hundred acres that was burned over in the "great fire" of 1824 or 1825. The first growth, judging from what was standing near, was hard wood mixed with a small per cent of spruce. The second growth was nearly all poplar and white birch. No care was taken of this tract, and every few years fire ran over it for the next thirty years, when it was looked after and fires kept out. A few years ago the poplar was sold for pulp, and the owners realized about three dollars per

acre and have a good growth now coming up to be of value. Another tract that was burned over about the same time and was burned several times, but for the last forty years was protected from the ravages of fire, and was covered with a white birch growth. This last named tract was worthless for cultivation but the owners realized about four dollars per acre and left a growth of small trees on this tract that in fifteen or twenty years will yield as much more. There is no time when fires running over forest lands (whether the trees be large or small) do not injure the land or growth. Our second growth white birch has been cut for spools within the last few years and has brought large sums of money into the State and given employment to laborers. I understand that this timber usually grows where fires have run many years ago, but have been protected from a second burning.

This question of protecting our forests from fires is a great one, and one that we can not easily grasp without careful study of facts. There is an alarming indifference upon the subject among the people, because they do not investigate the facts sufficiently to learn the importance of it. It is but a few years since the clearing away of the forests and getting rid of the timber by the easiest means possible was the only way for civilization to advance.

It was well said by the late ex-Vice President Hamlin that "the forests and the savages were the two elements which the early settlers had to contend with." Now the condition has changed — the savages have retreated before "advancing civilization" and we begin to see that the forest is needing our special care or it will retreat to our sorrow. The first and most important thing to do is to educate the people up to the importance of preserving our growth. Farmers that are successful and pursue their avocation as they ought, have looked upon the encroachments of the forest, upon their fields and pastures as an invasion of their premises to be resisted, and it is not easy for them to appreciate fully the importance of protecting, in the proper place, this old enemy. It will

require long, patient and persistent work to educate the masses in this matter. We hear sometimes of the great amount of "waste lands" in Maine meaning such land as can not be cultivated. There are thousands of acres of such rocky land that is growing a more valuable crop than the average of farming lands, and that too without the aid of cultivation or fertilizers, all the demand this land makes upon us is to be let alone.

There is not one acre of land with any forest growth upon it that is not justly entitled to the protection of law. There is no doubt that the time is coming when our people will fully appreciate the importance of protecting our forests, but the question is, whether the note of warning can be sounded loud enough and long enough to arouse public sentiment in season to avail ourselves of what we now have but are liable to lose. A forest fire may burn for weeks in some localities in this State and hardly attract attention because it is taken for granted that it is an unavoidable circumstance. A settler will set fire to his clearing or perhaps to a brush pile at a time when he knows that he is exposing thousands of dollars of forest growth to the ravages of fire, and look upon the devastation he has caused as inevitable.

The devastation of a forest fire is usually underestimated. Fires occur in our cities destroying ware houses that are occupied for business purposes, the blackened walls remain for a time to mark the spot where once stood a busy mart. The owner either sells to others or with the aid of his insurance builds better than before and the result is a better appearance than ever and the waste is repaired and improved. Suppose a forest fire occurs destroying an equal amount of property, what is the result? The owner cannot protect himself by insurance but must stand the loss, that is the result as far as he is interested, but what is the appearance of the tract thus deprived of all its beauty. The pride and glory of our State is its splendid forests not burned over, but clothed in their natural robe of green. Who ever visited our State



to see its ruined forests? It is anything but inviting to roam over tracts of forest devastated by fire. A careful examination of all the facts will lead any one to conclude that no fire is so injurious to our State as a forest fire. It is confidently asserted that many forest fires are set so that the young sprouts that may come up from the roots of trees thus destroyed will attract deer to the spot where they may be slaughtered. Such wanton destruction of property seems hardly credible. Another class of forest fires are set so that the burnt district will produce blueberries, as that is known in some localities to be the result.

Early in the season circulars were sent out to selectmen and county commissioners calling their attention to the law and their duties under it. Notices were printed as called for in the law and sent to those places where needed or called for. A circular was sent to county commissioners, selectmen, fire wardens and land owners containing a list of questions which they were requested to answer. A few answers were received that are contained in the "tables of returns of fire wardens." A very large majority made no return whatever.

Section four of the law creating a "Forest Commission and for the Protection of Forests" reads as follows: "County Commissioners of each County in which there are unorganized places shall annually appoint, when they deem it necessary, such number of fire wardens as they deem necessary not exceeding ten," etc., etc. This act leaves it with the county commissioners to exercise their own judgment in the matter. It may be thought best to make it mandatory so that each county may have the benefit of whatever protection the wardens may afford. There are eight counties with "unorganized places" in them, viz: Aroostook, Franklin, Hancock, Oxford, Penobscot, Piscataquis, Somerset and Washington. Wardens were appointed as follows, viz:

AROOSTOOK COUNTY—John Dunbar, No. 7, R. 8; Avon D. Weeks, Smyrna; Geo. L. Byron, Linneus; E. R. McKay, Ashland; Haws, Ashland; Neal McClain, Ft. Frances; John

A. Grant, Dyer Brook; John McAlwee, Presque Isle; Millard Filmore, Mapleton; A. B. Smart, Houlton.

HANCOCK COUNTY—Sumner W. Leighton, Cherryfield; Alfred Archer, Aurora; Nahum Jordan, Aurora; John R. Shuman, Great Pond; Joseph Clark, Ellsworth; George Watts, Beddington.

OXFORD COUNTY—Frank P. Thomas, Andover; Fred A. Flint, Wilson's Mills.

PENOBSCOT COUNTY—Geo. F. Burleigh, Patten; Geo. W. Fiske, Mattawamkeag; Frank L. Scammon, Lowell.

PISCATAQUIS COUNTY—Leonard Hilton, Chesuncook; Geo. C. Luce, N. E. Carry; J. W. Ham, Day's Academy; Alphonso Bradeen, Lilly Bay; Thomas C. Hamlin, Lake View; Charles H. Randall, Katahdin Iron Works.

SOMERSET COUNTY—David Butler, Flag Staff; H. Lincoln Colby, Jackman.

If fire wardens were appointed by the county commissioners of Franklin and Washington counties the forest commissioners were not notified. During the last summer forest fires did not prevail to any great extent. Except a few days the last of May and first of June when the forests were in condition favorable for fires, the forests were not so dry as to endanger them to fires generally. It is suggested by some that the movement for a forest commissioner and the appointment of fire wardens has in a small degree had its effect already. There are some suggestions in the reports of selectmen and fire wardens that may be useful and it was thought best to publish them in this report. The fourth item is one that will meet with favorable consideration from all that have any interest in the beauty and welfare of our State.

EXTRACTS FROM REPORTS OF SELECTMEN AND FIRE  
WARDENS.

“A fire started in this town in the month of August that, but for prompt attention of local fire warden, would have caused large damage ; as it was little damage was done.”

“Early each spring we should have printed posters to put in conspicuous places by the side of roads where the danger is most apparent, such as the rains will not destroy.”

“There have been no forest fires in this vicinity for some time. We believe the fire notices are a great preventive to forest fires if they are liberally posted, and we have posted them along the forest roads on trees, old camps and other conspicuous places.”

“Impress upon the people the benefit of keeping the forests green.”

“The people have been careful, and when a fire started in the woods they then turned out and extinguished it. I wish and hope that effect of a forest commission may be to impress upon the people the need of immediate and prompt and vigorous action by the entire community whenever a forest fire originates. Nearly all the destructive forest fires might have been checked if taken when first discovered.”

“We have had no forest fires here to do any damage for nearly or about twenty-five years. We got quite badly frightened then and have kept a close watch ever since.”

“The land burned over had been heavily cut and the great amount of brush on it was why the fire (supposed to be incendiary) was set at that point. We ditched around the fire and staid by it for a few days and thus saved a large amount of young valuable timber on adjoining land.”

“This fire was in an old chopping with green timber on all sides of it. It did no particular damage to the chopping because it was kept under control ; had it not been, the dam-

age might have been great. It cost the town \$8 and individuals about an equal sum."

"A fire was caused by parties gunning on Sunday, but was put out by the owner of the land before doing much damage, but he was a good deal stirred up for several weeks each Sunday for fear something worse would happen."

#### EXTRACTS FROM REPORTS OF LAND OWNERS.

Our worst risk comes from irresponsible parties fishing along the streams. We do not include in this sportsmen who hire guides of their own, but natives without guides.

The notices furnished by the forest commissioner were posted liberally along the highways and streams frequented by fishermen and hunters and I have no doubt were of great service in causing extra care. The law of last winter is proving a great educator in this section, and as our people on this river (Penobscot) are nearly all directly or indirectly interested in lumber they hail with pleasure this first real attempt on the part of the State to give relief from the scourge of fire which has for so many years devastated our forests.

Where fires like this (settlers clearing land) are set by any one upon their own land at an improper time it is a good preventive measure for the future to make such party pay for the damage done.

In my judgment an appropriation to employ a good, smart, active young man as "fire warden" to wander from place to place and ascertain the names of parties leaving fires when leaving the camp ground, and punish them to the full extent of the law. Said person to be employed from July 15th to October 15th of each year if a dry season and fires are liable to spread; if not, relieve him from his duties at a proper time.

The following is in regard to a fire which destroyed timber to the amount of fourteen thousand dollars, and cost five hundred fifty dollars to fight it from spreading further.

It seems to me perfectly plain that if wardens had been appointed last spring this fire would not have cost \$50 and done no damage.

The returns of forest fires made to the commission showed the cause of the fire if known or suspected. About twenty-five per cent were caused by clearing land or burning brush piles. This showing accounts for the unwillingness of holders of timber lands to sell farm lots. It too often exposes their timber to the ravages of fires set to clear up land and not properly cared for. Nearly twenty-five per cent were set by parties that were camping out as fishermen, sportsmen or tourists. Ten per cent were set to burn over the forest to facilitate the growth of blueberries, or food for deer, or from a desire to destroy property, perhaps for revenge. About thirty-five per cent are reported as unknown. A table is annexed hereto showing a condensed schedule of the returns received.

The appendix contains papers written by various persons on the subjects therein named at the special request of the forest commissioner.



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RETURNS  
OF  
Selectmen, County Commissioners  
AND  
FIRE WARDENS,  
FOR THE YEAR 1891.

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AROOSTOOK COUNTY.

Town.	Acres burned.	Severe or light fire.	Portion in green timber.	Portion burned before.	Years since previous burning.	Kinds of timber burned at latter fire.	Amount of each kind.	Amount of damage.	Whether put out or not.
17, R 5 .....	1500	Medium,	400 acres	1100 acres	18	{ Spruce, cedar and small pine and hardwood .....	50 M spruce, 100 M cedar, 30 M pine .....	\$600	Died out.
16, R.4 .....	100	Medium.	50 acres	50 acres	2	{ Spruce, cedar, hemlock and hard wood .....	40 M spruce, 6 M cedar, 6 M hemlock, 13 M hard wood...	150	Died out.
16, R. 3 .....	1000	Severe ..	400 acres	400 acres	11	Spruce and cedar ..	100 M spruce, 100 M cedar..	1000	Died out.
Masardis, 9, R. 4 & 10, R. 4	500	Light...	10 acres	490 acres	18	Cedar and small growth .....	Not much but fencing .....	250	Died out.
Amity .....	15	Severe ..	All .....	-	-	Spruce and hard wood .....	-	75	Put out.
12, R 5 .....	2	Light ...	All .....	-	-	Spruce and hard wood .....	4 M of each .....	25	-
Caswell Pl .....	400	Severe ..	One-half.	Half .....	15	Spruce and cedar .....	-	300	Died out.
L. and G. ....	15000	-	-	-	-	Spruce, cedar and ash .....	-	3000	-
Moro Pl .....	100	Severe ..	All .....	-	-	Spruce, pine and cedar .....	-	100	Died out.
Silver Ridge Pl .....	60	Light...	15 acres	45 acres	12	Spruce, cedar and hard wood ..	10 M spruce, 10 M cedar ...	70	Died out.
Ludlow .....	5	Light...	All .....	-	-	Spruce and hemlock .....	3 M spruce, 2 M hemlock...	20	Put out.
Monticello .....	100	Severe ..	All .....	-	-	Spruce, cedar and fir .....	-	-	Died out.
Van Buren .....	15	-	-	-	-	Spruce and cedar .....	-	50	-

FRANKLIN COUNTY.

Chesterville .....	20	Light...	None .....	-	-	-	Very little .....	20	Put out.
Eustis .....	300	Light...	100 acres	200 acres	4	Spruce and fir .....	25 M in all .....	50	Died out.
Freeman .....	40	Light...	-	-	-	-	-	60	Put out.
Letter E and No. 2 .....	200	Light...	Nearly all	-	-	-	-	50	Died out.



HANCOCK COUNTY.

Franklin.....	300	Severe..	All.....	Nearly all	30	Pine and spruce.....	-	500	Put out.
No. 27 and 28 .....	150	Light..	100 acres	All .....	28	-	-	100	Put out.
No. 28 .....	50	-	-	Nearly all	-	-	-	25	
Aurora .....	100	-	-	-	-	Pine, spruce and white birch	-	100	
No. 10.....	100	Light...	Nearly all	Nearly all	20	Mostly white birch .....	-	50	Died out.

KENNEBEC COUNTY.

Benton .....	100	Medium	10 acres	-	-	Hard wood .....	-	40	Put out.
Manchester .....	150	Light...	All.....	-	-	All kinds .....	-	50	Died out.
Winslow.....	4	Light...	None...	-	-	-	-	-	Put out.

KNOX COUNTY.

Warren.....	20	Light...	All.....	-	-	Spruce and birch .....	-	50	Put out.
Warren.....	10	Light...	All.....	-	-	Soft wood .....	-	50	
Washington.....	200	Light...	All.....	-	-	Beech .....	-	25	Put out.

OXFORD COUNTY.

Brownfield .....	200	Severe..	Half ...	Half ...	12	Second growth hard wood ..	-	300	Put out.
Paris .....	-	-	-	-	-	-	-	200	
Parkertown .....	100	-	-	-	-	Spruce and a camp .....	-	1500	

PENINSULA COUNTY.

Towns.	Acres burned.	Severe or light fire.	Portion in green timber.	Portion burned before.	Years since previous burning.	Kinds of timber burned at latter fire.	Amount of each kind.	Amount of damage	Whether put out or not
Clifton . . . . .	75	Light...	50 acres	All. . . .	30	Birch and pine . . . . .	-	\$75	Died out
Detroit . . . . .	10	Light...	-	-	-	-	-	25	Put out.
Eddington . . . . .	8	Light...	-	All. . . .	10	-	-	-	Put out.
Milford . . . . .	1	-	-	-	-	Hard wood . . . . .	-	30	-
Milford . . . . .	150	Severe	All. . . .	-	-	Pine, spruce and cedar. . . . .	-	500	Put out.
Prentiss . . . . .	100	Light...	None . . .	All. . . .	6	Bushes and fences . . . . .	-	25	Put out.
3, R. 7, W. E. L. S. . . . .	5	Light...	All. . . .	All. . . .	30	Pine and juniper . . . . .	-	10	Put out.

PISCATAQUIS COUNTY.

Gore A 2 . . . . .	2	Light...	All. . . .	None . . .	-	Young spruce . . . . .	3 M spruce . . . . .	10	Put out.
Day's Academy . . . . .	12	Light...	All. . . .	None . . .	-	Spruce . . . . .	-	50	Put out.
Day's Academy . . . . .	2	-	-	-	-	Spruce and cedar . . . . .	-	8	-
Middlesex . . . . .	-	-	-	-	-	Scrubby growth. . . . .	-	10	-

SOMERSET COUNTY.

Skowhegan . . . . .	5	Light...	All. . . .	None . . .	-	Small pi e . . . . .	-	25	Put out.
Holeb . . . . .	400	Severe..	300 acres	100 acres	-	Spruce, cedar and hard wood	-	4000	Died out.
4, R. 5, W. K. R. . . . .	2000	Light...	Little..	Nearly all	5	Spruce . . . . .	300 M spruce . . . . .	600	Died out.

WASHINGTON COUNTY.

No. 24, M. D. ....	4500	Severe..	Half....	Half....	30	Spruce and pine .....	-	14000	Put out.
Jonesboro' .....	4	Severe..	-	-	-	Small growth .....	-	25	Put out.
Whiting .....	6	Light ..	4 acres	2 acres	20	Spruce, pine and birch .....	-	30	Died out.

YORK COUNTY.

Wells .....	200	Severe..	Nearly all	None .....	-	-	-	4000	Put out.
North Berwick .....	5	-	-	-	-	Birch .....	-	50	-
Hollis .....	900	Medium,	Nearly all	Nearly all	30	Pine .....	140 M pine .....	500	Put out.



# APPENDIX.



## PRESERVATION OF OUR FORESTS.

By Prof. F. L. HARVEY, Maine State College.

Following is the paper read at the meeting of the Forestry Convention, in Bangor, by Prof. F. L. Harvey of the Maine State College :  
*Mr. Chairman, Ladies and Gentlemen of the Convention :*

It may be pertinent to ask ourselves why a forestry convention has been called in Maine at this time. The question will certainly be asked us by others. Maine has such magnificent forest areas, that many intelligent citizens believe our forests capable of yielding a supply of timber equal to the demand for an unlimited time, and therefore regard forestry conventions and discussions of forestry questions of no importance to the present or even future welfare of the State or nation.

Let us for a few minutes consider the importance of forestry matters to the State.

Topics relating to forestry and timber supply have claimed the attention of farmers' clubs ; agricultural and horticultural societies ; lumbermen's conventions ; local forestry associations and scientific organizations. There is at present a forestry section in the American Association for the Advancement of Science, and a Forestry Division in the United States Department of Agriculture. Certainly a subject claiming such extended and distinguished attention, must embrace considerations of importance to the American people.

Our country is comparatively new, and the forest area taken as a whole, still yields a supply equal to the demand.

Public attention has not been generally called to the subject of timber supply and demand, and but little is known regarding the extent or resources of our forests. Those who make a special study of such questions, and look beyond the present to consider the welfare of future generations, know that the demand for lumber and other forest products is increasing. Each year lessens the area of virgin forests in the United States to supply the demand, while the encroachment of farms lessens the permanent available forest area.

A State that has to import its timber, from a want of virgin forests, is unfortunate, but the State once covered with magnificent forests, which has now to import lumber for home consumption, is in a deplorable condition.

States once thought to have an unlimited supply of timber have now to import more or less from other states. Even Maine with her boasted unlimited forests has to bring hard pine from the South, white pine from the Northwest, and other lumber from various places. Of the one hundred and eighty millions of white pine cut on the Penobscot in 1886, the most of it was first-class lumber that would now bring forty dollars per thousand. Of the twenty-nine millions cut in 1887, only about ten millions was first-class lumber, the remainder being second growth timber only suitable for box board lumber.

Most of the prairie states have imported their timber from the beginning. To supply this increasing demand inroads are being made upon the forest areas of such states as still have more than enough for home consumption. This is the condition of affairs in Maine. The increasing demands upon our timber to supply the wants of other states has drawn our lumbermen into the pitfall of devastating forests and destroying the conditions necessary for natural reforestation in the hope of present gain, until the future of our forest has become a matter of State concern. Maine is one among the sisterhood of states and should be interested in all measures for the good of the nation.

Prof. B. E. Fernow, Chief of the Forestry Division of the Department of Agriculture, in his annual report says: "It has become evident in spite of the enormous supplies which seemed to be available, that our natural forests are being rapidly reduced, both by an increased demand and by wasteful practices, and it is now safe to say that the annual consumption of wood and wood products is at least double the amount reproduced on our present forest area. The forest under proper management is capable of furnishing continuous crops, and therefore as a source of constant supply demands national legislation."

"It has become evident that with the unrestrained scourge of fire and the destruction by herding and other malpractices now prevalent, and in the absence of all rational forest management not only is the remaining forest deteriorated in material value, but large tracts of land are converted into absolute deserts or useless barrens. A



sound land policy therefore demands that the nation should give earnest attention to forest management."

Because the question is of national importance it demands State consideration.

If Prof. Fernow's statements are true, then it becomes a matter of the most vital importance to *Maine*; to so preserve and care for her forest lands, that they will maintain or even exceed the present yield, and thus become a source of perennial and increased wealth to the State.

Let us admit for the sake of argument, what is most improbable, that the forests of Maine are in no danger of being deteriorated and will continue to yield the present supply.

Still there are many phases of the forestry question of interest to the State. Proper forest management would greatly augment the supply and increase the yield.

The most wasteful methods of cutting and yarding logs are practiced. Trees are cut too high, tops are not utilized, and many small trees are destroyed.

Our forests are scourged by fire and devastated by insect pests. The State should enact stringent laws to prevent the former, and institute a study of the habits of the latter with a view of checking their ravages.

The effects of deforestation upon rain fall, river flowage, health, and climate, should be systematically studied, and reliable data collected. The æsthetic phase of the question, relating to the planting of trees about our homes, highways, school and public grounds, is also worthy of consideration.

There are numerous agricultural societies in the State and agricultural conventions are common. The agricultural interests of the State are headed by a secretary of agriculture whose duty it is to study the problems of the farm and disseminate information to the public. There is a State Pomological Society which holds regular meetings to discuss questions relating to successful fruit culture. Stock breeders hold meetings and manufacturers find it to their interests to assemble in convention. Are the forest interests of the State of so little importance in comparison with general agriculture, fruit culture and manufactures as not to deserve consideration? There should be a State commissioner of forests who would study the forestry problems of the State and disseminate information. Statistics tell us that the forest area of Maine is twelve million acres,

nearly two-thirds the entire area, and that the annual yield is about 500 million feet of lumber which is worth, ready for market, at least six million dollars. The lumber industry, therefore, is of the greatest importance to the State.

It is of the utmost concern to owners of timber lands, or those in any way connected with the lumber industry, that they inform themselves upon all matters relating to forest management and the care of lumber after it is cut, so that the greatest returns be realized from the money invested. There should be in the State a permanent forestry organization and it is a matter of surprise that one has not been formed before this. Such an organization would serve a good purpose in directing and moulding public opinion in reference to the proper management and preservation of our forests; by co-operative study give a more exhaustive consideration of the forestry problems of the State and suggest to the legislature more efficient laws to protect our forest areas from wanton destruction and increase their productiveness. This convention is therefore opportune and should result in a permanent organization and the appointment of committees to take into immediate consideration matters pertaining to the forestry interests of the State.

Let us now turn our attention to a consideration of some of the forestry questions of Maine.

Our country is so new, and so little data has been collected, that it is difficult to discuss the problems with as much positiveness as has been done in the foreign countries. Having suffered to their fullest extent the evil effects of forest denudation, and also having enjoyed the good effects of reforestation, the experience of foreign countries will be valuable to us.

It is to these countries we must go to learn the capacity of forest lands to yield a perpetual supply, and the benefits to accrue from a proper management of forest areas. History tells us that countries once populous and productive, have been converted into barren wastes, by cutting forests from the sources of streams. Also, that by reforestation, barren, unproductive areas, have been reclaimed, made fertile, and capable of sustaining a dense population. By a proper system of cultivation, and a rational forestry policy, foreign governments have made forest lands exceed the natural production, several fold. To a limited extent, the evil effects of deforestation, and the benefits of planting trees, have already become apparent in this country.

The longer experience of the older countries must convince all thoughtful men of the dangers of deforestation, and also point out the benefits to accrue from a wise forestry policy, that would maintain our forest area and increase its productiveness. We would not for a moment take the ground that the present forest area of Maine is not enough to provide forest products for home consumption for an unlimited time. The question that concerns Maine is not lumber for home consumption, but lumber for export, bringing revenue to the State, and prosperity to our State commonwealth.

The most of the forest lands in Maine have passed from the control of the State, and belong to individuals or corporations. The State has relinquished her right, without repurchase, to control only in a general way, for the general good, the forests of the State.

The future of our forests and their ability to yield a continuous revenue is largely in the hands of individuals and corporations.

The question for our lumbermen is whether they will adopt the selfish policy of devastating forests for present gain, or whether they will be satisfied with the annual growth, and bequeath them to future generations with their original productiveness.

Perhaps it is asking too much of the average man to consider the welfare of unborn generations.

To guard the future welfare of the nation against the narrow, selfish policy of the present generation, is more appropriately a matter for the consideration of statesmen and states.

A man is guarded in his life, liberty and property by the State, and has no right to use the land deeded him in such a way that it will be worthless for future purposes and bring disaster to the commonwealth. Forest lands in the foreign countries are largely owned and controlled by the government. Even private forests are under state control, and in some of the countries the owners of land cannot cut wood without the consent of the government.

The policy of business men in great enterprises is to keep their capital intact and be satisfied with a reasonable interest. It is to the interest of forest owners not to destroy the productiveness of forest lands, but so manage them that the annual growth will give a continuous return. Those who have had experience in the management of large timber tracts, in reference to a perpetual supply, know that the annual growth will give an interest on the money invested as great as most business enterprises.

What would you think of the business capacity of a man owning a woolen mill, which by proper management would yield him a reasonable interest and a comfortable living for all time, who should immediately destroy the plant and sell the machinery for the ready money it would bring? The same lack of business sagacity is shown by the owner of a timber tract, which by proper thinning, replanting and care could be made a source of perpetual income, who should in his greed for present money, so destroy conditions for reseeding and a second growth, as to convert his timber lands into a barren waste.

To those informed upon the subject I need not say, that this disastrous policy has governed the operations of lumbermen over the whole country in the past and to a large extent is the basis of operations to-day. Any policy adopted by the citizens of a State that lessens the permanent annual exports and converts what might be a source of perennial wealth into an unproductive waste is a matter of State concern and for State control.

#### CLIMATIC EFFECTS.

So far as we know there is no reliable data showing that forest denudation has in any very appreciable way affected the climate of Maine. We have no comparative data upon our river flowage and cannot tell whether the main streams have been affected by the cutting of forest, though instances of smaller streams being affected are well known.

The area of forest is yet large and the time of observation short. Maine has a copious rainfall and the effect would not be so readily observed. It is generally understood that deforestation along the coast does not affect the climate so much as it does in the interior, or in localities where the climate is continental in character. There have been no observations upon the silt deposited by the Maine rivers by which one could study the effects of erosion and transportation due to deforestation. The cutting of forests along the coast of Maine would expose the northern part of the State more directly to ocean winds and northern blasts, and probably result in more sudden rains and snows, and interfere with the distribution of rainfall if not the amount. The tendency would be toward more sudden storms along the coast endangering shipping.

The cutting of our forest would allow the northern current to gain the ascendancy earlier in the fall, thus producing earlier frosts.

Observations kept at the Maine State College for nearly twenty years, show no changes in climate or atmospheric precipitation that cannot be accounted for by yearly fluctuation. There is great need of data on the above important subjects, and we hope that an early effort will be made by the State to have systematic observations taken. Statistics show that our State is growing rapidly in manufactures, and the maintenance of our water power is of great importance.

It is well known that the cutting of forest from the head waters of streams has in many of the states already seriously affected the distribution of water supply for milling and other purposes. "In Central New York, streams that thirty or forty years ago kept the ponds well filled for the saw-mill and grist-mill, and furnished a never failing supply for the farm, are now dry in summer, excepting here and there a stagnant pool."

The rivers of Maine are comparatively short. Our rainfall is copious. The extensive swamps, and the spongy leaf mold and moss in our evergreen forests act as reservoirs to hold back the moisture and dispense it slowly during the dryer summer months. If the forests are cut the swamps will dry out, the moss die, the vegetable mold wash away, and our summer reservoir be destroyed. The effect will be to produce floods in the rainy months, and at the season of melting snows, and come drouth and decreased flowage in the summer time. Perhaps the reason why the effects have not been so apparent in Maine is that deforestation began at the mouth instead of the source of our streams. Lumbermen are each year encroaching upon the sources of our water supply. The interests of a growing industry demand a careful study of this question.

#### RELATION OF AGRICULTURE TO FORESTRY.

There is a general impression that Maine is not adapted to agriculture, and that the farm area will not be greatly increased.

We find by a study of statistics, that in the western part of the State the farm area is not increasing and that the increase is mostly in Aroostook county.

In the early settlement of the State, farms were largely opened upon the uplands and tillage was difficult. The policy now in the western part of the State; is to drain the low, rich, swampy lands; convert them into productive fields and allow the more rugged upland

to return to forests. This policy will help restore the productive forest area and not lessen the acreage in farms.

There is a tendency throughout the State to better culture and greater productiveness on a given area. Statistics show a gradual increase in the size and number of farms and the value of farming lands.

Statistics tell us that the products of the farm bring a higher price in Maine than in any state east of the Pacific slope, also that in production of grains, roots, grass and fruits, our soil will compete well with other states.

In consideration of the above facts we cannot subscribe to the gloomy idea entertained by many, that Maine competes at so great a disadvantage in agricultural pursuit with her sister states. Farmers in Maine have more comfortable homes and seem more prosperous than in the West and South.

We believe that agriculture should bear a certain relation to other industries so as not to result in over production. The reason farm products now bring such a good price is the demand for them for home consumption, and our remoteness from other competing sources of supply.

The waning of our forests will bury agriculture and the lumber industry in a common grave. One is the life of the other. The inauguration of a wise forestry policy would not only help restore a declining industry to its former prominence and give a larger product as a perpetual supply from a smaller area, but would permit more of our acreage to become productive farms without destroying the equilibrium.

If our agriculture shows any waning tendency, it is not attributable to our climate or to the sterility of our soil, but to the devastation of our forests and the decline of the lumber industry decreasing the demand for farm products.

#### LUMBER INDUSTRY WANING.

That the lumber industry is waning in Maine can be shown by a study of lumber operations on the Penobscot. In 1856, the cut was about 180 million feet; in 1860, 201 million feet; in 1866, 237 million feet, and in 1872, it reached its maximum at 246 million feet. Since that date it has never reached the cut of 1856. It has fluctuated very much since. In 1877, it fell to 117 million feet. Since

that time it rose to 172 M., in 1882; fell to 125 M., in 1884, and in 1887 the yield was about 150 million feet.

Statistics show that since 1863 the production of spruce and other woods has been more uniform, and that the falling off has been mostly in pine, from 101 million in 1856, to only 29 million in 1887.

The above estimate does not include cedar for shingles nor pulp-wood, only lumber recorded in the Surveyor General's office in Bangor. Mr. Walker informs me that about 3 M. feet of unsurveyed box-board lumber is annually consumed at the Basin Mills.

To secure the present supply, lumbermen have to go farther each year toward the head waters of the streams; cut trees much smaller and poorer in quality, construct roads and dams, and avail themselves of timber lands, a few years ago regarded practically inaccessible. Yet regardless of these facts and figures, we find many who assume that there is more lumber grown in Maine each year than is cut.

If the annual growth is equal to the demand our forests should continue a supply of lumber in quantity and quality equal to the virgin growth. One has only to compare the logs driven down the Penobscot now with those cut twenty years ago to convince himself that not only the quantity but the quality of the lumber has greatly deteriorated. Logs now cut will not average much over one hundred feet, while twenty years ago they would average several hundred feet.

The virgin forests are being rapidly preyed upon and even now the area accessible to the streams is small and railroads are being constructed to reach the remainder. The annual supply is now largely cut from second and even third growth, and the time is approaching when the entire yield will have to come from forests once cut over. The first growth pine has been practically cut, reducing the yield from 101 M. in 1856 to 29 M. in 1888. There are only limited areas in Maine where pine follows pine, and when it does the second growth is inferior. The second growth spruce which took its place is now being rapidly cut. The hemlock growth once cut is practically exterminated.

The large trees of our virgin forests were from 150 to 350 years old. We are now cutting timber the accumulated growth of the length of time. The forests once cut over then the supply will have to come from small trees and a much greater number will be required. A considerable part of the forest area of Maine has been so closely

cut already that the future supply will be practically what grows annually, and the time is not far distant when all of our forests will be reduced to this basis.

We are naturally led to enquire whether the annual growth of lumber in Maine is equal to the annual demand, thus insuring a perpetual supply. Let us approach the subject by the aid of such statistics as we can command.

There are about nineteen million acres of land in Maine, twelve million of which is in forests. This *includes swamps, mountains, poorly timbered areas, and all lands not included in farms.*

The annual yield of surveyed lumber is about 500 million feet, board measure. This excludes cedar, cut for shingles, pulpwood, firewood, etc., not surveyed, which would greatly augment the amount. Dividing the yield, 500 million by the acreage, twelve million, we get 42 nearly or the number of feet of lumber each acre must produce annually to supply the present demand.

To find out the present yield per acre of our forests the opinion of experienced scalers has been obtained. One scaler who has just surveyed a township estimated about 3,000 feet of marketable lumber to the acre and thought it would hold out. Said he did not believe there was a township on Penobscot waters that would average over 3,000 feet of marketable lumber, and regarded 2,000 feet a good average. Another said that taking the State it would not average over 2,000 feet. Another experienced scaler estimated 1,500 feet per acre. Another thought 1,000 feet per acre for the State would be enough. The writer averaged the pine in one of the Southern States for the tenth census and placed it at 2,500 feet per acre. His impression of Maine forests is that the yield would be considerable less. To be on the safe side let us take the highest estimate 2,000 feet. That would give twenty-four billion feet as the marketable lumber now ready to cut.

At the present rate of consumption, making no allowance for annual growth, or wood cut for other purposes than lumber it would last about forty-eight years. If 1,500 feet is more nearly correct, it would last only thirty-six years, if 1,000 feet then only twenty-four years.

The question reduces itself to whether the annual growth in forty-eight years would amount to twenty-four billion feet, and thus keep up the present supply. To get some idea of the time required for forest trees to grow to marketable size, observations have been made



upon juniper, pine and spruce. To be on the safe side and give the advantage in favor of rapid growth we have examined the butts of trees and from the heart to the bark on the side showing the most rapid growth, and have selected as much as possible second growth trees. The average of quite a number of observations are given.

To produce a juniper one foot in diameter would require about 120 years, or ten years to make one inch of wood. One trunk thirteen inches in diameter was 131 years old. In juniper there seems to be a check in the growth after the trunk is six inches in diameter; up to that time it takes only about 6.5 years to make one inch of wood. Besides many others, two pines were especially examined, one with the finest grain that could be found. It was eighteen inches in diameter, 351 years old—growth, one inch of wood in 18 years. The other, the coarsest grain that could be found. It was nineteen inches in diameter in 155 years old, a growth of one inch of wood in 8.4 years.

When these trees were one foot in diameter, their ages were 216 and 84 years, respectively. Perhaps a safe average for pine trees one foot in diameter would be about one inch in eight years.

There seems to be good reason for believing that under favorable conditions of isolation, soil and situation, that white pine trees make a more rapid growth than one inch in eight years. In our opinion, such high rate of increase cannot be relied upon in estimating the yield of forests. There is always a relation between the foliage of a tree and the amount of wood made. Thinning gives to the trees light, more circulation of air, more room for spread of top and more soil from which to grow. Under such conditions the rate of growth could be increased.

The most favorable conditions for making long and first quality of lumber are found in the dense forest, where the foliage is confined to the top of the trees. In the struggle for existence the tree pushes its head skyward, the rings of annual growth would be narrow and the wood free from knots because largely made on a branchless trunk.

Compare the quality of such a tree, that would bring when cut thirty to forty dollars per thousand, with one of our rapidly grown, sappy pines, with its short trunk, broad top and branches reaching nearly to the ground, that would not, when cut, be worth any more than hemlock. If we wish to grow first-class pine we must secure the natural conditions for it, and be satisfied with slower production.

The average of many examinations of spruce gave one inch in ten years. One tree twelve inches in diameter was 133 years old. Another, fifteen inches in diameter, was 150 years old. We may safely conclude that to produce trees of the above species, of good quality, one foot in diameter, would require from 80 to 120 years. It took much more than 100 years to grow the virgin forests of Maine, as many trees in the original growth were much more than one foot in diameter. Experienced scalers, inform us that, taking the whole State, the virgin growth would not have averaged over four thousand feet per acre of marketable lumber.

To get the average rate of growth, advantage has been given in favor of rapid production; the highest estimate of yield of our forests taken; no deduction has been made for trees over one foot in diameter, nor any allowance for deterioration by fires or improper management, yet the conclusion is inevitable, that to *grow* the twenty-four billions which, at the present rate of consumption, would be exhausted in forty-eight years, would take from 80 to 120 years. In foreign countries, where the conditions are made the most favorable for rapid growth, it takes 120 years to grow trees to a profitable marketable size. We doubt whether, by ordinary care, our forests can be made to yield as much marketable lumber in 100 years per acre as was found in our virgin forests.

The production on an average of four thousand feet per acre in one hundred years, would no more than supply the present demand, and if a more rapid growth can be relied upon, why has the productiveness of our forests decreased? Our forest since the State was settled has been reduced from about eighteen million acres to twelve million acres, and the present amount of standing timber is estimated by experienced scalers as only half the virgin growth.

This is a gloomy conclusion for those who hope by preserving the conditions for reforestation equal to those in nature to restore the lumber industry.

The only hope of restoring the lumber industry in Maine is to adopt a wise forest policy that will protect the young growth; arrest the wanton destruction of timber and control the forest fires. Such a system would increase the annual growth; but we have grave doubts whether our forests can without more than ordinary care be made to grow fifty billion feet of marketable lumber in one hundred years and supply the demand for other forest products.

No estimate has been made of the timber lands upon farms, which by replanting, proper care and thinning could be made a source of income to the owners and augment to some extent the lumber supply of the State.

According to our estimate the annual growth is 240 million feet, and the annual cut 500 million feet. This would require 260 million feet each year from the marketable timber now ready to cut. To reduce the resources of our forests to that of annual growth would require ninety-two years, without taking into account growing trees too young for market which would extend the time.

Different observers may differ in their estimates of the marketable lumber and the rate of growth, but the most extravagant estimates will not help us escape the conclusion, that our forests are waning, and it is only a matter of longer or shorter time when our lumber industry will decline, unless by the adoption of a wise forestry policy we avert the evil and so restore our forests to their original productiveness and maintain then a source of perpetual or augmented wealth.

## THE RELATION AND IMPORTANCE OF OUR FORESTS TO SUMMER TOURISTS, SPORTSMEN, Etc.

By GEORGE F. GODFREY, Bangor, Me.

*Hon. Cyrus A. Packard, Forest Commissioner, Augusta, Me.:*

DEAR SIR:—The question to which you refer in your letter of the 10th inst. (“the relation and importance of our forests to summer tourists, sportsmen, &c.”) is undoubtedly of great importance; not alone to the owners of wild land, but to all those who are benefitted by the lumber industry of the State.

It is said that the wealth of Switzerland consists in its natural scenery, and there is no doubt that in a degree Maine, in this respect resembles that beautiful country. A great amount of money comes here from other states during the summer and autumn months, brought by pleasure seekers and sportsmen, and many people are benefitted thereby; but, while we recognize this fact, we must also remember that our inland country has a permanent value far greater than that derived from its natural beauties, its trout streams, or its herds of deer.

The great necessity for the protection of our forests from fire has not been given sufficient consideration by our law-makers. Game and fish laws have played a very prominent part in State legislation for some years. The State controls all the inland waters and owns all the game. It invites all the world to come here and navigate the lakes and streams, catch the fish, to make temporary habitations upon private land, to cut trees for camps and camp-fires and to kill the game. In other words the State pastures its cattle on the land of individuals and protects it for the benefit of alien sportsmen, but gives no protection to the owners of the property. It has the past year put an enormous and unjust tax on wild land, while it has given no adequate protection from the devastations of the thousands of people who wander through it solely for purposes of pleasure.

The annual cut of timber from the forests of Maine is about five hundred millions of feet. From the time the tree is cut in the winter, hauled to the river bank, driven to the mills, manufactured into boards, shingles, boxes, spools, pulp and the thousand and one

articles of commerce, to the time it is shipped by vessel or railroad to its destination, a vast amount of labor is employed and many hundreds of thousands of dollars change hands. To destroy this industry would impoverish a great part of the State, to partially destroy it causes great damage, not alone to the land owner but to the many industries which rely on this raw material for support. That considerable portions of forest land are annually destroyed by tourists and sportsmen is a fact. A great deal of the destruction is due to carelessness and much of it to ignorance. Camp-fires are carelessly left burning in dry weather or are only partially extinguished, and everyone who has any knowledge of the woods knows the result. Thousands of acres of valuable land are often so destroyed. Probably several thousands of people annually traverse our forests, and the number is constantly increasing. Whole families from distant states frequently locate for the season in some well chosen spot, and without let or hindrance cut the trees about them for fuel, or peel the bark from spruce trees to build their camps. This intrusion, in single instances, does not amount to much, from a pecuniary point of view, but in the aggregate it is large, and is growing larger every year. The shores of some of our most beautiful lakes are already marked with the depredations of these itinerant settlers, and every year new invaders come in large and small parties and help themselves to everything within reach of the ax. It is not uncommon for a dozen people to locate together for several days on some favored spot, and often much larger parties pitch their tents on private land without permission.

It is evident that some action must be taken to stay this growing danger. The appointment of a forest commission is a start in the right direction, but much remains to be done to make its work effective.

The protection of game and fish and the consequent encouragement of visitors to our State is undoubtedly of some importance.

Is it, however, of enough importance to put in peril the forests and the great industries which depend upon them for support?

Fires are frequently set by settlers while clearing land and occasionally by the carelessness of river drivers; in many such cases where the persons are responsible they are liable, but with respect to fires being set by tourists and sportsmen, as matters now stand, there is little chance of getting damages, no matter what the respon-

sibility of the person may be, for the reason that the offender cannot be found.

It has suggested itself that a law could be framed which might to some extent remedy this difficulty; viz.: That every person going into the woods should leave with an officer, at a station appointed for that purpose, his name and permanent address, as well as the route which he proposes to take and the place, if any, where he intends to locate while in the woods. This might, at first, appear to be impracticable, but if such a law would not be unconstitutional, it need not be difficult to put in operation. Take for instance the North East Carry at the head of Moosehead Lake, which is a thoroughfare for hundreds of tourists who each year take their canoes down the Penobscot and through the various branches of that river. An officer stationed at this point would have no difficulty in enforcing the law. It would be the same at the various other points of departure throughout the State, nearly all of which are well known. These officers should be paid by the State and as their services would be required only a few months in the year the expense would not be great.

The constitutionality of such a law is a question which the proper authorities could decide, but as it is well known that nearly every one of these travellers is going to make his temporary abode upon private property without the consent of the owner it appears as if some way might be devised to locate him in the event of his destroying valuable property. It is believed that there have been instances of hunters setting fires for the purpose of starting a young growth and making a feeding ground, to assist them in still-hunting deer. Such vandalism can only be prevented by great vigilance.

The question of giving licenses to efficient and trustworthy men as guides is worthy of consideration.

## ECONOMICAL CUTTING OF OUR FORESTS.

By WILSON CROSBY, Bangor.

*Hon. C. A. Packard, Forest Commissioner, Augusta, Me.*

DEAR SIR: In reply to your request for some suggestions as to the wasteful cutting of the forests of this State or the economy that might be practiced in the matter, it may be said that, aside from the wanton destruction, the spirit of which seems to possess a certain class of persons the moment they enter the woods, even in the legitimate cutting of timber for logs, a very wasteful system is pursued and that a great saving might be made by a little change in methods.

This waste occurs, first, from the cutting of trees unsuitable for lumber which are unnecessarily cut for the purpose of getting at other trees or for worse reasons, and which, being unsuitable, are left to decay in the woods; and, secondly, from the taking from the trees cut for lumber, so small a portion of the wood and leaving so large a portion.

The first of these sources of waste can be largely stopped by abandoning the use of "wagon sleds" to haul from the stump. As a team of horses with a "wagon sled" (consisting of two pairs of runners, *i. e.* a pair of bob-sleds, set the proper distance apart, one behind the other) can haul a much larger load than the same team could haul on one sled, the temptation is to use them, particularly when the logs have to be hauled a long distance to the water or the mill.

The cutting and keeping open of roads is expensive and hence, of course, it is advisable to have as few of them as may be, but as these sleds will take large loads it is well to put on them as much as possible. Hence a road is cut, the logs adjacent to it are loaded on, and those that stand further back are cut and *rolled out* from where they fell, to the sled in the road, all of the small growth standing between the fallen tree and the sled, that would be in the way of the rolling, being cut down and, if too small for lumber, after serving as skids for the rolling, being left on the ground. When this process has been carried so far back from the road as to make it, in the opinion of the man in charge, unprofitable to roll any farther, another road is laid out a little farther back and the same

thing repeated, rolling from both sides towards the new road, and so on till, at the end of the season, if the growth was thick, it looks much as though the tract had been either exposed to a hurricane or chopped for a clearing, and the effect is the same in either case; viz., that on that ground there will be no more timber cut until a new crop grows from the seed or from the sprouts that were so small as to be rolled over and thus escape the cutting. If this wasteful system had not been practiced, in the course of a few years another cutting might have been had from the same ground, from trees that were a little too small to be cut the first time but which, after the first cutting, might grow more rapidly than before while crowded by their larger neighbors.

The second source of waste mentioned—the leaving in the woods so large a portion of the tree cut, is an evil, probably much in excess of what it has usually been considered. Heretofore our forest supplies have been so abundant and so apparently inexhaustible that small economies in the use of them have not seemed to be necessary. Now, however, the other side of the question begins to appear, and it is seen that with the best efforts that can be made there will soon be need of all the lumber that grows.

Few people, that have not made a special study of the subject are aware of the additional amount of lumber that might be obtained from almost any tree cut in the ordinary way.

As the tree is usually felled, there is left standing, a stump whose top may be anywhere from one and one-half to six or eight feet above the ground, the height depending somewhat upon the depth of snow at the time of cutting, but also very much upon the ideas of the chopper and of his employer.

Next above the stump, there is wasted in the time of cutting of the scarf, from one-half foot to one and one-half feet in length of the tree, the larger and more valuable the tree, the greater the length thus wasted. If the length lost by the stump and scarf be taken as no more than say two and one-half to three feet it is fully ten per cent of the average length of the log obtained.

Farther up where the trunk begins to be pretty knotty, the tree is topped off and all above that is left in the woods furnishing a breeding place for insects and worms, and fuel for fires, obstructing the growth of other trees and being a hinderance to future lumbering operations.



When the tree is sound at the bottom, the lumber thus wasted in stump and scarf is by far the most valuable portion of the tree, foot per foot—the largest, clearest and best—the part that is most likely, either by itself or in connection with some of the adjacent part above, to yield or add to the number of clapboard cuts from the tree.

The remedy for this waste at the bottom is to *saw* the tree down as low as possible before the snow falls.

The knotty top, although less valuable than the same amount of lumber in the smooth bole, is for some purposes, just as useful and, at any rate, has some merchantable value even if it be a small one.

As this lumber is of a poorer quality than that from lower down, the lumberman cannot afford to take much of it at the same stumpage price as he pays for the latter, but he can afford to take it at a less price and can do so with profit to both parties—the land owner and himself.

As an instance of the saving or gain that might be effected by this method of cutting, a case that occurred on the Penobscot last winter may be cited.

In this operation, owing to the great depth of snow that prevailed, the trees, although sawed down, were not sawed as low as they should have been by about a foot, and more lumber was left in the tops than it was intended to have left, but notwithstanding this, on a total scale of 602 M of pine there was lumber to the amount of 400 M of trunk logs, and 202 M of logs from the tops, or a gain of more than 50 per cent in quantity, from the tops alone. Besides this, there was a gain of about 5 per cent in the measurement of the trunk logs, due to the saving of the usually scarfed portion.

The stumpage on this lumber was a proportion of the price it brought when sold, the proportion being different for the different qualities :

340 M of 1st class pine from trunks at \$5.76 .. . . .	\$1,958 40
60 “ “ 2d “ “ “ “ “ 2.92½ .. . . .	175 50
202 “ “ 2d “ “ “ tops “ 2.92½ .. . . .	590 85
602	
Totals .. . . .	\$2,724 75

These same trees, if *well* cut in the ordinary manner, in but a slight depth of snow, would have given as follows :

324 M of 1st class logs from trunks at \$5.76 .. . . .	\$1,866 24
57 “ “ 2d “ “ “ “ “ 2.92½ .. . . .	166 72
381	
Totals .. . . .	\$2,032 96

221 M gain as actually cut . . . . .	\$691 79
221	691.79
— = 58 per cent ratio of gain,	— = 34 per cent.
381	2,032.96

If in these same trees the stumps had been cut as low as they might have been, and all of the lumber in the tops, equal in quality to that hauled, had been taken, the yield would have been as follows :

358 M of 1st class logs from trunks at \$5.76 . . . . .	\$2,062 08
300 " " 2d " " " tops at \$2.92½ . . . . .	877 50
<hr/>	
658 " Totals . . . . .	\$2,939 58
381 " by ordinary good cutting, as before . . . . .	2,032 96
<hr/>	
277 " Gain . . . . .	\$906 62
277	906.62
— = 73 per cent ratio of gain	— = 45 per cent.
381	2,032 96

If the results of good cutting by the ordinary method be taken as the standard of comparison, as above, a brief summary shows, for the same trees, and at the same stumpage prices, as follows :

Good cutting, ordinary methods, yield 381 M ; stumpage, \$2,032 96  
 Actual cutting, new methods, yield 602 M ; stumpage, 2,724 75

Gain in yield . . . . . 221 M ; stumpage, \$691 79  
 Ratio of gain in yield, 58 per cent ; stumpage, 34 per cent.

As they might have been cut, yield, 658 M. ; stumpage, \$2,939 58  
 Gain in yield . . . . . 277 M. ; stumpage, 906 62  
 Ratio of gain in yield, nearly 73 per cent ; in stumpage, 45 per cent.

This was perhaps, an unusual opportunity for this kind of an operation, and in another pine growth the tops might not afford so much lumber ; while in spruce, since the bole of the tree constitutes so much larger fraction of the whole, the proportion of gain would be less.

There are no statistics, known to the writer, of the total amount of lumber annually cut in this State, or even in the Penobscot valley, but the books of the Surveyor-General at Bangor show that for the past ten years—1881 to 1890, inclusive—there have been *surveyed at this port* an annual average of a little more than 29,000 M. of pine, and 109,000 M. of spruce, besides other lumber, and besides lumber of these kinds cut in this valley, that were not reported to that officer.

Some of this may be so far off, or so badly situated, that it might be better to lose the inferior portions of it, rather than incur the expense of getting it to market. If, allowing for this, the *available* saving by this method on the whole quantity of the annual cut of pine and spruce be taken at 30 per cent for the pine, and 15 per cent for the spruce, the average annual saving on these two kinds of lumber cut for the Bangor trade *alone* would be :

On the pine, 30 per cent of 29,000 M.....	8,700 M.
On the spruce, 15 per cent of 109,000 M. ....	16,350 M.
On both. ....	<u>25,050 M.</u>

By reason of the inferior quality of a portion of this, taken from the tops, calling the average stumpage price of the pine saved, \$2 per M, and that of the spruce, \$1 per M, gives as the gain in stumpage :

On 8,700 M of pine at \$2.00... ..	\$17,400 00
On 16,350 “ spruce at 1.00.....	16,350 00
<u>25,050</u> both	<u>\$33,750 00</u>

or on the cut of pine and spruce for the Bangor market, a saving each year in stumpage merely of enough to buy a township of land.

If the yearly saving that could be effected by this method of cutting, for all woods and for the whole State, could be ascertained, it would probably be found to add \$250,000 or more to the stumpage, or enough to pay for two townships of the *best* timber land in the State, even at the prices fixed by the Valuation Commission.

But this is not all, for it is evident that by getting, say, twenty-five per cent more lumber from the trees cut, in order to procure the same amount of lumber as would have been obtained in the ordinary way, it will be necessary to cut only four-fifths as many trees of the same size or, in the same density of growth, to cut over only four-fifths as much land. This is a material decrease in the rate of deforesting the State, while it also affords a hint to the lumberman of a saving to him in the amount of swamping to be done, which he can reckon as an offset, more or less complete, to any additional cost, *if any there be*, that might otherwise be incurred in the sawing of the trees, or the working of the tops. This saving of swamping also effects a still further saving of the forest by avoiding the cutting of so many trees now useless for lumber.

The immediate limits of the subject now under consideration, and the space already occupied, prohibit the saying here of much that might be offered with regard to the effect of the conservation of this one-fifth of the forest area, on the climate, health, water supply and the various industrial and other interests of the whole State.

## FOREST PLANTING AND MUNICIPAL OWNERSHIP OF FOREST LANDS.

By GEORGE F. TALBOT.

*To Hon. Cyrus A. Packard, Forest Commissioner:*

SIR —In answer to your communication addressed to me of December 10th inst., asking me for a paper, to be embodied in your report, on the theme, "How shall our waste lands, that have been denuded of forest growth, be re-timbered?" I beg you to accept my thanks for the opportunity to urge upon the legislature and the people of the State the immense importance of this question.

The rapidity with which we are consuming the enormous natural wealth stored in our forests, and the near approach of the period when Maine, once called the Pine Tree State, will be as treeless as Spain, forces upon every intelligent and public spirited citizen the consideration of the problem: How is this natural wealth to be restored and perpetuated? How is the greater portion of the surface of our State, but little fitted for profitable agriculture, to be covered again with those magnificent woods which once adorned and enriched it?

The cutting and clearing of our forests have been greatly facilitated and stimulated by the recent opening across the center of the wooded part of the State of the Canadian Pacific Railroad, soon to be connected with our own sea-board system of railways by intersecting lines, and to be fed by similar intersecting lines, that shall bring the forest products of our most northern and eastern frontiers into the great markets of the United States. The remarkable facilities for transportation that railroads furnish, have rendered profitable and greatly stimulated the lumber business. No longer dependent on obstructed streams and precarious freshets, nor hindered by long hauls to lakes and drivable streams, the large operators are able to hold out inducements in offered freight to railway corporations to extend their branch lines into forest regions heretofore practically inaccessible.

The manufacturer of barrels and packing cases, of wooden ware, matches, agricultural implements and furniture have made a constantly increasing demand, chiefly for those kind of growths which

the lumberman rejects. Cedar has been every where sought for railway sleepers ; white birch for spools, poplar for paper, hachmetack for ship's beams and knees, and nearly every kind of hard wood for furniture, the interior finish of buildings and vessels, for agricultural and other tools, and for exportation for fruit boxes. The discovery of solvents, and the invention of ingenious machinery for grinding the fibre of various trees have unduly stimulated the manufacture of paper and pulp. Wealthy men, in and out of the State, combining their capital, have recently erected mills on a large scale for the manufacture of paper fabrics that will require an enormous forest growth to keep them supplied with raw material.

Although this business, if ancillary to the older lumber business and using only its waste products, would be not only profitable to the operators, but advantageous to the State, it is questionable if its temporary gains to owners compensate for its economic waste to the people at large, when it appropriates so much of the live forests, which a few years' growth would enlarge into valuable timber. It does not seem a wise economy, if the necessities of coming generations are considered, to grind into pulp, or whittle into matches, or split into laths straight and thrifty pine and spruce trees, the resource for timber and lumber of our children, especially where it is known that materials equally valuable for such productions, are annually burnt at our mills or thrown into our rivers.

All these usual and unusual operations, besides the number of trees they destroy for which some compensation is obtained, fill the forests everywhere with the waste tops, with the accumulating brush of small growth destroyed in clearing and opening roads, and, where all this *debris* has become dry, sparks from the locomotive that effects the transportation, kindle it into a conflagration that takes from the woods annually without compensation as much in value as as had been taken by the lumberman's axe.

The effect all these operations with their necessary concomitants are having in the restriction of the forest area of the State, may be seen by the casual traveller in the wider openings of the general landscape, in the shrinkage of streams and rivers and in the deterioration in quality and size of the logs floated every season down our great rivers. The summary of the surveys seems to indicate that the annual cut of logs in the State is as large by cubic measurement, perhaps larger, than ever ; but where it is considered that now it takes ten trunks to make a thousand feet, whereas fifty years ago

it took only three trunks, and that for every merchantable tree trunk taken away, ten other smaller tree trunks must be cut and wasted in swamping and road clearing, we can understand that the diminution of the myriad trees that compose our forests is going on at a rate increasing by an arithmetic, if not geometric progression.

When it is remembered that it was the magnificent forests, that once lay in a continuous body from the seaboard to the northern boundary of Maine, that attracted to it its first settlers; that the various branches of the lumber business give employment still, as they always have done, to a large fraction of our people, and that our agriculture has depended largely on this leading business for its markets, our railroads and commercial marine for their freights, our local trade for its circulating medium and commodity of barter, we are forced to confront the question: Can our population stay within our borders after this magnificent heritage has been exhausted? If we may judge by those movements of population from Canada and the Maritime Provinces, climatically similar to Maine, and by what the national census has for three decades exhibited as to the waning or stationary populations of New Hampshire and Vermont, we must conclude that an intelligent people cannot be induced to maintain their permanent homes in a region where so large a part of their income must be expended in maintaining an artificial climate under which human life is possible, after the inducement that brought their ancestors and kept their fathers here, no longer invites them.

The legislature, whose function it is to look wisely after the interest of coming generations, to restrain the inordinate acquisitiveness of the strong in maintaining the rights of the weak in the struggle for life, must therefore face with some wise and salutary provision, the problem of how to save, how to restore to its profitable maximum, the forest area of the State.

It may be that human ingenuity, aided by an ever expanding science, may be able to invent or discover some material which will supply the place of wood in all its multifarious uses. There are examples, where a providential invention has come in, just in time to correct and relieve the wasteful and improvident practices of men. But have we any right to anticipate any such invention or discovery? To any practical anticipation the loss of our forests now looks like an irreparable loss; and we are compelled to consider with solicitude, what methods are open and practicable, to preserve the relics of that splendid domain, we have so imprudently managed,

and to restore it to something like its original value and productiveness.

The method seems obvious enough. If we would have trees, whether apple trees, oak trees or pine trees, when we cut one down we must plant another. Happily, nature comes to correct the results of our own unthrift. When a pine or other indigenous tree is cut down, she does not ask us to plant another. She will do that by the energy of her own productiveness. But she does ask us not to murder or mutilate it, and to allow it to perfect itself in size and value before we set our destructive hands to it.

But nature may be helped by the wise hand of man. Nature will plant trees wherever we destroy what have been produced, but she may plant firs where pines would grow as well, and alders, where oaks or birches would be more valuable. By planting the more valuable woods, by discouraging the inferior growths, man can make nature work most effectually to his advantage.

The first and principal difficulty in the way of any large and general replanting of trees, is private ownership. In favorable situations certain trees may come to maturity in fifty or sixty years; but for the most valuable growths, and for the poorer lands, which alone can be dedicated to timber, we must expect to wait a century before the artificial plantation shall become the source of a steady annual income.

In this country men do not generally achieve large properties in lands or other values until they have reached the confines of old age. To expect of men whose prudent judgment has led them to fortune, to make investments in enterprises, from which no substantial return is to be expected until after the lapse of a century, is making too large a demand upon the disinterestedness of human nature. Nearly the whole area of forest land in this State is owned by individual citizens, and that is a condition of things likely to be permanent. All that the legislature can wisely do is to pass such laws, as will be most likely to encourage private proprietors in so managing their forest lands, that they shall be kept in the highest condition of productiveness, and be for them and their heirs a source of perpetual income. Two causes are constantly urging timber land owners to strip and denude of trees their holdings. One is the liability of their being devastated by forest fires, and the other is the pressure of an onerous taxation.



All well-considered legislation that results in preventing the setting and checking the destructiveness of forest fires, the greater number of which are caused by preventable carelessness, and such adjustment of taxation as takes note of the great public interest there is in the preservation of our woods, will tend to such prudent cutting of timber lands as shall maintain their productiveness. It would not seem to be impossible to effect by judicious legislation and the support of public opinion, such a condition of things, that it would be just as much the interest of the owner of a remote township in our northernmost frontier, to take off only the mature growth of the standing timber, as for the farmer to keep up the fertility of his farm, and the moneyed man not to spend the principal of his investments.

For any but the merest amateur tree-culture, we must look to some corporation more permanent than the life of individual man. While man is a transient entity, the state, the town and other political corporations are permanent. A hundred years, that outspans the nearly universal human term, is but a decade in the longer life of a country, a state, a town.

It is to these corporations that we must turn for aid in all that is sought to be done for the welfare of the people as a whole, for the benefit of posterity.

While it would be impossible to engage our practical people in any chimerical or visionary enterprise, the nucleus and beginning of a scheme of re-forestation on a small scale lies immediately within our reach in a slight change of our laws regulating taxation. In nearly every town in the State, more or less land, stripped of its living growth by the axe or by fire, and not adapted to culture or pasturage, is abandoned by the proprietor and sold at auction for the taxes and charges upon it. I have appended to this paper a sketch of a bill providing, that such land instead of being sold for non-payment of taxes shall be forfeited to the town, and shall remain permanently as municipal land, and be devoted to the growth of timber and wood, under the management of the principal municipal or county officers.

To guard against excessive local taxation, the bill does not permit anything to be expended in the care of said lands, or in planting the same in excess of the income derived from them, and ten per cent of the value of them raised by taxation in any one year.

The state of New York had a tax law like ours. It has been changed exactly in the method that I have recommended. Under the operation of the amended tax laws, New York has already acquired title to a territory, mostly in the Adirondack forests, of about 1,000,000 acres, and is prosecuting, under the direction of state forest commissioners, experiments in tree planting with a view of preserving the water supply of large rivers, and restoring the natural beauty of a region much frequented by tourists.

In this, as in many other enterprises, it is only the first step that costs. If a single town should begin in an intelligent way, either by encouraging the natural growth or by artificial planting, on however small a tract, the nucleus of a new forest, it would stimulate other towns to follow the example, especially if a favorable local public opinion could be created by the visit and lectures of the forest commissioner, and by a dissemination of his reports. It would not be long before the citizens would come to feel how much the preservation and increase of the woods had to do with the enhancement of the natural beauty of their homes, making them attractive to visitors, with the shelter they afford for game birds and beasts, and with those climatic conditions necessary to successful agriculture and manufacturing.

The municipal forests would constantly tend to increase, first by the operation of the same law that, exempting church property from taxation, as in Mexico, gradually attracts all lands into that proprietorship; second, by annual forfeitures for non-payment of taxes, and third, by the free gift of wealthy citizens in their lives, or by devise to operate after their deaths, of waste lands, unsalable and yielding no income, and subjecting the owner only to taxation and trouble. As soon as the town officers had developed a reasonable prudence in the management and preservation of such lands, it is believed that there would be a strong tendency on the part of the owners of waste lands to donate them to such public uses.

After the experiment of re-forestation had gotten hopefully underway it might be aided by the annual payment by the State of one hundred dollars to be paid to that town in each county, which after ten years could show the best and most thrifty growth of new forest under such management; the premium to be awarded by the forest commissioner, and the amount to be expended in improving, planting or enlarging the municipal forest lands.

The selectmen of each town, in which such forest plantations had been begun, should once in two years make a report to the forest commissioners of the acreage of said plantation, the character of the surface, whether level, mountainous, rocky or swampy, whether sterile or fertile, the natural and artificial growths upon it, and the kinds and sizes of the trees, the fires that had occurred and the losses resulting since a previous report, the amount expended in planting, fencing and caring for the same; and the forest commissioner should recapitulate and tabulate the substance of said reports in his own report to the legislature.

In ten years perhaps permits might be given for some compensation in rent, to remove from the plantations, dead trees, superfluous and inferior growths; and in twenty years some kinds of fuel might be sold from it, the removal of which would enhance the growth of the more valuable trees. In thirty or forty years, the time being determined by the character of the soil and its condition when first acquired by the town,—the timber trees carefully removed at maturity, and, where cut clean, their places supplied by fresh plantations, might become the source of revenue to the town and abate the burden of general taxation.

If timber lands, exposed to devastating fires and subjected to regular taxation, have always been in this State a favorite investment and the basis of large private fortunes, it is hard to see why, when exempted from taxation, and prudently cared for by vigilant oversight, they may not prove a permanent source of municipal revenue.

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AN ACT PROVIDING FOR THE FORFEITURE OF LANDS FOR  
THE NON-PAYMENT OF TAXES.

SECTION 1. That whenever taxes shall remain unpaid on any lands of resident or non-resident proprietors in incorporated and unincorporated places, for the times prescribed in chapter 6 of the Revised Statutes, and such lands are not tillage or meadow land, a part of or appertinent to a homestead or farm, nor lots fronting on a street of a town or village, or on the falls of any river or stream, and likely to be used as the site of buildings or mills, instead of

such lands being offered for sale, as is now provided in said chapter, such lands shall be forfeited, if within any city or town, to such city or town, and if within any plantation or other territory outside the limits of any city or town, to the State.

SECTION 2. All the notices required in said chapter to be given, all records and conveyances and other proceedings required to be had, shall be changed in accordance with this requirement of forfeiture; and all the provisions of said chapter as far as they direct and require a sale at public auction of any lands for non-payment of taxes, and so far as they affect any lands herein before described, and all other parts of said chapter 6 or of any acts subsequent thereto and inconsistent with the provisions of this act, are hereby repealed.

Provided that the owner or tenant or any authorized person shall have the same right and for the same time to redeem any such lands after said forfeiture that he would have had under previously existing laws after the sale of the same.

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AN ACT PROVIDING FOR THE STATE AND MUNICIPAL OWNERSHIP OF FOREST LANDS AND FOR THE MANAGEMENT OF THE SAME.

SECTION 1. Whenever any lands under the provisions of chapter 6 of the Revised Statutes, as amended by the act of 1893, have been forfeited to the State or to any city or town for the non-payment of taxes, and whenever any lands shall have been acquired by the State or by any city or town by gift, devise, dedication or grant, and are not devoted to some other special use, by the terms of said gift, devise, dedication or grant, all such lands shall remain the property of the State or of the city or town in which they are situated, and shall not be sold, leased or mortgaged without the express authority of the Legislature approved by the Governor; provided that if any territory in which the State may have acquired any lands in the modes herein declared shall be hereafter incorporated into a town, the State may convey such lands to such incorporated town, upon such terms and conditions as the Legisla-

ture shall prescribe, and the Treasurer in behalf of the State shall execute deeds of conveyance of the same.

SECTION 2. All lands of the State and of any city or town acquired in either of the modes named in the foregoing section shall be exempt from taxation.

SECTION 3. The County Commissioners of each county shall have the care and oversight of such lands when owned by the State, and the Aldermen of cities, and the Selectmen of towns, shall have the care and oversight of said lands when owned by cities or towns; and they shall be required to devote the same to the growth of timber and wood; to protect them from trespasses, from the depredation of browsing animals, and from destruction by fire.

Where valuable timber or wood is not already growing, or is not likely to grow spontaneously, the municipal and other officers before named, shall cause the said lands to be sown or planted in such manner as the Forest Commissioner shall advise, with such seeds or stocks of valuable trees adapted to the soil and climate, as the Forest Commissioner shall deem desirable, and may expend in moneys raised by taxation not exceeding in any one year ten per cent of the value of said lands, to be estimated by the assessors.

SECTION 4. The municipal and other officers aforesaid may from time to time issue permits to persons offering the highest sum therefor, to cut and carry away from said lands such mature trees as a prudent owner would select for timber, fuel or any other commercial use, and also to cut down and remove any decayed, inferior or superfluous trees, the removal of which would promote the growth and enhance the value of the rest; provided that in all cases where said lands are wholly or partially cleared, they shall be, as soon as possible, replanted, where such replanting cannot be expected by natural processes, and the productive growth of said lands shall be perpetually maintained; provided also that all permits for such purposes shall be in writing, in a form prescribed by the Forest Commissioner, and shall contain stipulations returning a lien on all wood or timber cut as security for the payment of agreed rent therefor, and as compensation for all strip or waste in cutting or removing such timber or wood.

SECTION 5. The said municipal and other officers in addition to the sums authorized by section 3 of this act to be expended in sowing and planting said forestry lands, may at their discretion expend

for the same purposes and for the purchase of additional lands to be dedicated to the same uses. such sums (if any) as they may have received for timber and wood rents, above the total amount expended in the care and management of said lands.

SECTION 6. The said municipal and other officers may make by-laws for the regulation and management of the forestry lands in their care, and when the same shall have been approved by the Forest Commissioner, and sanctioned by the Legislature, they shall have the force of public laws.

## THE DEPRECIATION OF OUR FOREST GROWTH AND ITS EFFECTS UPON OUR VARIOUS IN- DUSTRIES.

By JOHN E. HOBBS, North Berwick.

*To Hon. Cyrus A. Packard, Forest Commissioner :*

Sir: In answer to your letter of December 10th, requesting a paper to be embodied in your first report as Forest Commissioner on the topic: "The depreciation of Our Forest Growth and Its Effects Upon Our Various Industries;" I have to thank you for this opportunity of calling the attention of the Legislature and the people of the State to a question which is exciting so much interest among thoughtful persons throughout the nation.

Lumbering has been a leading industry in Maine from its first settlement. Even before the erection of saw mills, the first settlers had begun to utilize the large oaks and tall pines, the growth of centuries, riving the oak for pipe staves and the pine for clapboards.

The first saw mill in Maine, and, perhaps, the first on this continent, was erected in 1634 at the falls of the Newichawannock at the head of tide water, near the mouth of the Great Works river in South Berwick.

On the 18th of July of this year, the ship *Pied Cowe*, from London, arrived in the Piscataqua, having as a part of her cargo two saw mills, and as passengers a party of carpenters to set them up. Both the men and material were sent by Capt. John Mason, one of the earliest promoters of colonization on the New England coast. After discharging her cargo at Newichawannock and taking part of her lading on the river, the ship sailed for Saco on the 18th of August, where she completed her loading with "cloave boards" and pipe staves. This ship with the barque *Warwicke*, had made a voyage to the Piscataqua in 1631, returning, probably, with a similar cargo.

Saw mills soon began to multiply and their capacity was enlarged. In 1650, a mill carrying eighteen saws moved by one wheel,—which must have been a gang-saw,—was erected on the Great Works river about one mile above the one erected in 1634. We learn that

in this later year Richard Leader was granted by a court held at Kittery, on the 11th day of March, "all the right to the privilege or mill power on the little river known as Newichawannock, with the liberty and like property in all timber not yet appropriated to any town or person." It is said that the magnitude of Mr. Leader's operations gave the name of "Great Works" to the place, which afterwards became the name of the river.

In 1654 there were granted to him "all the pine trees up the little river so far as the town bounds went, for the accommodation of his mill." For the privilege of cutting all this pine timber he was to pay the town an annual tax or royalty of £15 currency.

About this time grants were made of timber lands on all the branches of the Piscataqua. Just then so great activity was manifested in the development of lumbering as an industry that laws were required for the protection of the forests. To provide against waste, it was ordered in 1656 that if any inhabitant should "fall any pipe stave or clapboard timber and let it lie unused up one month, any other inhabitant might improve it as his own property."

At a town meeting of the inhabitants of Portsmouth in 1660, "a penalty of five shillings for every tree was imposed upon any inhabitant for cutting timber or any other wood from off the common, except for their own building, fencing or fire wood."

Stringent regulations, designed to guard against damage to the woods by fire, were made by several of the New England colonies previous to 1650. Belknap tells us "that as early as 1668 the government of Massachusetts, under which the provinces of Maine and New Hampshire then were, had reserved for the public use all white pine trees of twenty-four inches in diameter at three feet from the ground. In King William's reign a surveyor of the woods was appointed by the crown, and an order was sent to the Earl of Bellomont, to cause acts to be passed in his several governments for the preservation of the white pines. In 1708, a law made in New Hampshire prohibited the cutting of such trees as were twenty-four inches in diameter at twelve inches from the ground without leave of the surveyor, who was instructed by the Queen to mark with the broad arrow those which were or might be fit for the use of the navy, and to keep a register of them. These regulations, however, were easily evaded by those who knew the woods and were concerned in lumbering, though sometimes they were detected and fined." If the wise laws so early established by the first settlers



had been continued and enforced by their successors throughout the United States to the present day, there would be less occasion for fearing a timber famine in the near future.

In the locality of these earliest lumbering operations in the New World, are yet to be found many huge stumps of the towering pines then standing, which must have attained to large proportions long before the time of Columbus. There is good reason for believing that some of them are stumps of trees reserved for masts for the royal navy, and marked with the broad arrow in Queen Anne's reign. These stumps, if undisturbed, are destined to remain yet another century, unimpeachable, though silent witnesses to the fact of the depreciation of our present forest growth, in age, in size, in strength and enduring qualities.

The vast forests that then covered and adorned the continent, and which had often been renewed by the processes of nature, have since been largely displaced by the hand of man, which in hewing down these forests has so far outstripped their natural reproduction that the present generation is compelled to consider the best methods of protecting what now remains.

"We consume yearly" in this country, according to late estimates of Prof. Fernow, Chief of Forestry Division in the Department of Agriculture at Washington, "not less than twenty billion cubic feet of wood. This amount is made up in round numbers in the following manner: 2,500,000,000 feet for lumber market and wood manufactures; 500,000,000 feet for railroad construction; 500,000,000 feet for fence material, etc.; 250,000,000 feet for charcoal; 17,500,000,000 feet for fuel. To this it will be safe to add for wasteful practices and for the destruction of yearly conflagrations, at the least, twenty-five per cent." Without adding anything for that which is wasted and burned up, we find the consumption of timber to be about fifty-six cubic feet per capita, and of cord wood 283 cubic feet.

Prof. Fernow estimates that it would require 100,000,000 acres, —an area five times as large as the land surface of Maine—of well stocked thrifty forests equal to the best managed German forests, to produce continuously that which is used for railroad construction, (fifty cubic feet per annum being the estimated product of such forests) and 500,000,000 acres to supply the lumber market, etc. On this basis, it would require 100,000,000 acres to produce the fence material. Allowing a yearly increment of 100 cubic feet of cord

wood per acre, 175,000,000 acres will be required for this purpose, making a total of 875,000,000 acres of well stocked thrifty forest, which are needed to furnish a continuous supply of forest material at the present rate of consumption. This is equal to about fourteen acres for each individual of our present population.

Maine, although in extent larger than the other five New England States combined, yet comprises only a one-hundredth part of the land surface of the Union, excluding Alaska and the Indian Territory, but contains one-fortieth part of the forest area.

It is obvious that this State has an abundant supply of forest when compared with her own requirements for forest material, but when considered as a part of our common country, the combined forests of which should be placed against the combined demands of the same for forest products, there appears to be a great deficiency of forests.

There are now more than 163,000 miles of railroad in the United States which have made the exchange of commodities possible to those of our people who are most widely separated, so that to-day, so bulky and cheap a product as lumber is transported by rail from the gulf to the lakes and from the Pacific to the Atlantic. Therefore, the prospective depreciation of our forest growth should be considered from the commercial stand point of demand and supply, placing the forest area of those states in which our lumber and wood pulp are likely to find a large market, against the consumption of forest material in the same states.

Now, let us apply these figures to the sixteen states north of the Potomac and Ohio and east of the Mississippi rivers, for these states will, in the future, take a large part of the surplus forest products of Maine. (We are mindful of the fact that these states are not confined to their own limits for their supply of lumber, but are now taking large quantities from the Southern States and from the Dominion of Canada.)

In 1890 the population of this group of states was 32,084,262. The number of acres of well cultivated forest necessary, on the basis of fourteen acres per capita, to furnish a continuous supply at the present rate of consumption, is 449,179,678. If to this we add twenty-five per cent for wasteful practices in cutting and for the loss by forest fires, the area required will be larger than the entire forest area of the country in 1880, which was 489,280,000 acres. The entire land surface of this group of states is 267,798,-

000 acres, of this 87,880,000 acres was wood land in 1880. Thus it will be seen that to furnish continuously the wood substance now consumed in them, would require about five times the extent of forest area they now possess.

If our estimate of the annual growth of 100 cubic feet of cord wood per forest acre for the entire country be correct—and we think it is approximately so for Maine, on well stocked land—the only other uncertain elements in the foregoing computations is respecting the area of land to be devoted to the production of fence material and the deduction which should be made for waste wood from lumbering where such is utilized. I have allowed for this waste 250,000,000 cubic feet which is used for charcoal.

In the census of 1880 all land not classed as cleared or barren is termed forest. In this State thousands of acres sparsely covered with scrub oak, dwarf pitch pine and worthless shrubs, are counted as such. In that year the ratio of forest cover to cleared land was about one to three for the entire country. The percentage of forest to total area varies widely in different states and territories. Nevada having the smallest, 2.8 per cent, and Maine the largest, 62.7 per cent.

Our present knowledge of the extent and condition of the wood lands of our own and other states, as well as of the forests owned by the general government is very indefinite.

It is believed by good judges, however, that the pine lands of Michigan, Wisconsin and Minnesota must be exhausted in twenty-five years. A prominent Chicago lumberman who was familiar with the condition of the forests of the Northwest was quoted by *The Timberman*, a leading journal, devoted to the lumber trade, as saying: "In twenty-five years from this time (December, 1887), a pine tree will be as much of a curiosity in the Northwest as an elephant is now." This man voiced the opinion of the leading lumbermen of that section of the country.

That the enormous amount of material annually drawn from the forests of the country is rapidly diminishing the forest area, is evidenced by the forestry statistics of Ohio, where the condition of the forests from year to year has been better known than in any of the other states, the assessors reporting annually, of late years, the number of acres covered with wood. An examination of these reports shows a constant diminution of the forest area of that State.

In 1870, the wood lands covered 38.51 per cent of her entire area, and in 1884 only 17.39 per cent thus indicating a decrease in her forest cover of more than fifty-four per cent in fourteen years.

An examination of Volume 9 of Census Reports of 1880, which gives the product of wood and lumber for the whole country by states, shows a larger production per forest acre in some of the states than is shown in Ohio,—notably so, in New York and Pennsylvania.

In 1880, Maine ranked as seventh in the lumber production of the country. There were then 848 establishments for its manufacture with an invested capital of \$6,339,396, giving employment to 9,836 hands, whose wages amounted to \$1,161,142. The product was 566,656,000 feet of lumber, 184,820,000 laths, 426,530,000 shingles, 62,376,000 staves, 3,312,000 sets of headings, 13,426,000 feet of spool and bobbin stock, which with other forest products valued at \$182,682 had a total value of \$7,933,868. The amount of wood consumed for domestic use was 1,215,881 cords, valued at \$4,078,137, the value of wood and lumber combined, being \$12,011,005. This product of various kinds of lumber reduced to board measure amounts to about 739,146,000 feet.

As we have 12,000,000 acres of wood land, this is sixty-two feet per acre.

Many townships in the State, however, cannot be profitably operated at present on account of the cost of transportation, the average cut per acre, therefore is much larger than this on the lands where lumbering is carried on. If the wood used for fuel had all been cut from the farm wood lands as most of it must have been, the average per acre would be about fifty-two cubic feet.

There seems to be good reason for believing that so large a cut of wood and lumber from this class of our wood lands is tending to their exhaustion.

It is believed by experts that in less than fifteen years instead of less than twenty tons a day of pulp and paper output, present amount, it will reach 500 tons on the Penobscot river and its tributaries alone. With the advantages of plenty of spruce in the vicinity and a fine water power, the industry is bound to grow very rapidly.

As spruce trees are worth more as pulp wood than as saw logs, and as much smaller trees are available for this purpose, it looks now, as if a spruce tree large enough for a bridge pile will be as

much of a curiosity in Maine fifty years hence as a pine will be in the Northwest at that time.

A potent factor in hastening the cutting of immature patches of second growth white pine which now form so large a portion of the forest growth of the earlier settled parts of the State, is the portable saw mill. The ravages of this monster are fearful to contemplate.

Such a mill is set up in a large clump of young pines which may have been the most prominent and attractive feature in the landscape for miles around, and in a few weeks nothing is left to mark the spot which it had so long adorned, but a huge pile of sawdust.

This wasteful practice is going on all over New England, at the present day, with the result of keeping the market glutted with lumber suitable only for box boards, and yielding but a small return to the owner of the land.

In these tracts of growth, where but few of the trees are more than a foot in diameter at the stump, and all above four inches go through the mill, it would be idle to expect any of the smaller trees to grow, if they were left standing. Having only a few feeble limbs to crown a long, slender stem which has a slight hold on the soil, they would be scorched by the sun and easily prostrated by the winds.

Owners of these mills tell me, that, in order to get business, they are now compelled to set up their mills in timber much smaller than that which they sawed ten years ago. The time is not far distant when many of them must cease work for want of material to saw.

It needs not the prevision of an inspired prophet to tell us, that a pine tree one hundred years old fifty years hence, will have double the value that such a tree has to-day. In the light of our present knowledge concerning the area and condition of the forests of the country, what manifest folly for the owners of sapling pine growth to sacrifice it in the way it is being done now everywhere.

We believe that thrifty white pine growth, a patch of which is to be seen on nearly every farm in the older settled portions of the State, will yield a far larger return to the owners, if the weaker and less valuable trees are removed, in order that the larger and more thrifty trees may have the light and room essential to their rapid growth.

That such management would give a better financial result, even at present prices, for large timber, than that of total clearance, when the largest trees are no more than a foot in diameter at the

stump, is evidenced by the history of a piece of land in my own town. The land was that of the late Mr. James Junkins, who sold in 1881 the pine timber standing on about six acres in one body, amounting to 300,000 feet, which netted him \$3,300, or about \$550 per acre on the stump. This timber was transported by railroad to Saco, about twenty miles distant, where it was manufactured into lumber.

Mr. Junkins' father settled upon the farm, of which this tract was a part, about 1809. This patch of pine trees then contained about nine acres, and was the only wood land on the farm, and some of the trees were large enough to split for fence poles. From that time to about 1860, a large part of the fire wood consumed and all the lumber used in repairing the fences and buildings on a well managed one hundred acre farm, were furnished from the thinnings of this lot. About 1855, \$200 worth of timber was sold from the thinnings at one time and there were sales at other times.

This lot was systematically thinned and trimmed for the seventy-two years, care having been taken to break off the dead limbs, a long pole with a hook on the end being used for the purpose. These trees had increased in diameter slowly the last twenty years of their life. Some had made only two inches at the stump in seventeen years or seventeen rings to the inch. They were from twelve to thirty or more inches in diameter. But the outside ring on one of these old trees contained a much larger amount of wood than did a ring of double its thickness when the tree was half as old.

By an examination of the following diagram, schedule and copy of the record of one of many trees measured by me, and by comparing the growth of one year with another this fact will be obvious. By the examples given, it will be seen that the increment of wood in any year while the tree was growing, can be approximately computed.

These measurements were made for use in the Monograph, on the white pine by Prof. Spalding of Ann Arbor, Mich., who in his report says: "The plan for taking measurements and recording external conditions and surroundings, devised by the Chief of the Forestry Division has proven to be admirably adapted to the end in view, and my main regret is that it was impossible, through lack of competent assistance, to measure a larger number of trees under different conditions of growth" This Monograph is in print and will soon be issued by the Department of Agriculture at Washing-

ton. The diagram, etc., here given, was printed in the Report of the Division of Forestry for 1887.

That the cutting of sapling pine growth to which we have alluded is an unwise and improvident policy, is clearly shown in the history of this tree. To illustrate :

Let the number of inches on radius represent as many series of years, and, let the rings in each series represent hollow cones one inch thick, the length of the tree at any given age, one inside another, like a nest of measures.

The superficial contents of these cones, can be approximately determined by multiplying one-half the circumference of the base, in inches, and dividing by twelve, the result will be the measure in feet b. m. of the increment of wood for that series of years. This divided by the number of rings in that series will show the yearly growth.

For example : Our outside cone will be 107 feet long, the length of the tree ; this multiplied by thirty-four and one-half inches,—half the circumference of the first section—which is twenty-three inches in diameter, and divided by twelve gives 307 feet board measure, this divided by fifteen, the number of rings gives twenty and one-half feet, b. m., as the average annual growth for that series.

To be more exact in the measurement, the average annual growth is twenty-one and one-half feet, for this series. If this tree had been cut when it was fifty-eight years old and sixty and four-twelfths feet high, then our outside cone would have numbered eight rings—the diameter of the first section was then thirteen inches and the amount of wood added fifty-four feet or six and three-fourths feet per annum. Thus it appears that this tree added to its bulk, three times more wood in its 122d year than it did in its fifty-eighth year.

If a tree one foot in diameter is twenty-four years old, each ring is one-fourth inch in thickness. If it adds a ring of the same thickness each year it will contain eight times as much material at forty-eight years of age and twenty-seven times as much at seventy-two years as at twenty-four. If, however, it adds an annual ring of only one-eighth inch in second twenty-four years, and one-sixteenth inch in the third twenty-four, then at forty-eight years, it will contain, approximately, three and one-half times, and at seventy-two years five and one-half times as much material as at twenty-four years. Under average conditions it will probably do better than that.

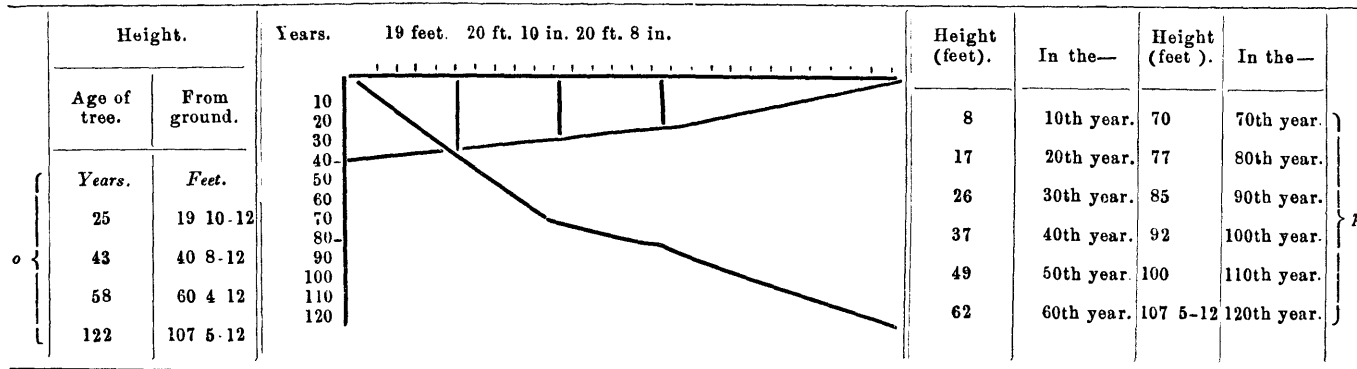
TREE No. 15.

[POSITION OF CROWN: FREE, PARTLY FREE, CROWDED; ASSOCIATED SPECIES: OAKS.]

a		b		c		d		e		f		g		h		i		k		l										m													
Diameter breast high.		Length of timber.		Diameter below crown.		Length of crown.		Length of leader for last five years.		Stump.		Sections.										Thickness of bark at top.																					
								Height.		Diameter at top.		Age.		No. rings on stump		No.		Length.		Diameter at top.		No. rings at top.		No. rings in sap.		Thickness of sap.		No. rings for every inch on radius.															
In.		Feet.		Inches		Feet		Inches		In.		In.		Yrs.				Feet.		Inches		No. top.		No. sap		Inches		1 2 3 4 5 6 7 8 9 10															
23		51 7 12		16		55		30		10		27		5		117		19		20		97		29		2		15 14 13 10 9 8 8 8 8 4½										½ inch					
2		20 10 12		17 1-2		79		24		1 3-4		16		14 10 10		7 6 6 7 3½																						¼ inch					
3		20 8 1 2		14		64		19		1 1-4		13		13 7 8 9 8 6																													
n		At ..... (feet) ..										4		8		12		16		20		24		28		32		36		40		44		48		52		56		60		64	
		Diameter ..... (inches)										23		21½		21		20½		19		19		19		18½		18		17½		16		16		15½		13½		13		12	



[ AGE OF TREE, 122 YEARS; TOTAL HEIGHT, 107 5-12 FEET; SPREAD OF CROWN, 27 FEET ]



The instructions for measurements of the schedule contain the following points: Number trees measured in same camp and conditions consecutively. Underscore the word denoting position of measured tree, whether standing free or crowded, and give surrounding species. Use 4-foot rule and gauge. In all cases, if possible, take two measurements of diameter at right angles and note average. (a) Take diameter about 4½ feet from ground (breast high), or from the collar of roots if soil has sunk away. (b) Timber: From butt to first limb of crown. (d) From first crown-forming limb to top. (e) Found by cutting leader off and back until only five rings can be counted. (f) Height: Taken from ground or collar. Age: Supposed number of years for the young tree to have attained height of stump (three to ten years). (h) Sections are numbered, beginning with butt section. (l) Count along a rule laid across the heart of the cut, beginning from outer circle; note number of rings at each inch. If radii are of different lengths, as is often the case, then find average radius to count on. (m) Measure diameter with gauge and the wood with rule; difference will give double thickness of bark. Age of tree is found by adding columns *f* and *g*. Heights, by adding columns *f* and *b* and *d*. (o) Ages found by deducting each count in *k* from age of tree. Heights, by adding to (height *f*) lengths in *h*, consecutively. (p) Found on graphic chart by interpolation.

With all the forces now at work hewing down our forests, were it not for the humidity of our climate which is favorable to tree growth, we should soon suffer the penalty visited upon other portions of the earth which have been denuded of forests,—once fertile areas becoming deserts unfit for the habitation of man.

Dr. Felix L. Oswald states: "Since the beginning of the sixteenth century the population of the four Mediterranean peninsulas has decreased more than 55,900,000, the loss of a larger population than that of the United States in 1880, and the value of their agricultural products by at least sixty per cent. He attributes this remarkable decline to the destruction of their forests which in this region were more essential as a protective influence from excessive summer heats than in other portions of Europe." Some of the most fruitful portions of Asia. Asia Minor and Northern Africa have undergone the same experience.

It is a well known fact that the flow of water in rivers which drain large areas of forest land is more constant during the dry months of the year than it would be if the forest was swept away.

The State of New York at one time owned some five million acres of wood lands covering nearly the entire area of the Adirondack and Catskill mountains, where the principal rivers of the State, especially the Hudson, take their sources. The state sold the most of these forest lands for any price they would bring. Now that the lands have been stripped of their forest cover exposing the thin soil on the mountain sides to the washing rains, it is found that the Hudson is in danger of becoming unnavigable at Albany from the *débris* and earth carried down the river. The State has recently changed its policy. In 1885, the lands then unsold about 800,000 acres, were made a "State Forest Preserve," and instead of selling, the State is now buying land to add to this Preserve. It will require a large expenditure of money and a long period to correct the mischief already done.

The government, in order to facilitate navigation, has already spent more than ten million dollars on the sand-bar formed at the mouth of the river.

The source of rivers that in their descent to the sea furnish the power for large manufacturing establishments giving employment to many operatives, and which may be navigable for a greater or less distance inland, should always be under State control.

The alienating of the public forest lands comprising nearly one-half the area of this State was a stupid blunder as we look at it now.

Our largest rivers have their source in these lands. Under State ownership this vast forest, equal in area to the States of Massachusetts, Rhode Island and Connecticut combined, would ever have remained, as it now is, the most extensive and attractive fish and game preserve in the world.

It is believed that under a wise forest management the ripened timber could have been made to pay the entire running expenses of the State government forever. By cutting only ripened timber the flow of water in the rivers could always be maintained at the highest possible point during the dry months of the year. This would give a far greater value to the undeveloped water power in these rivers than it now possesses. The water power of rivers is always impaired by clearing away the forests along their course. We need not go out of our own State for examples of this.

I append herewith a letter from Gov. Davis, giving a case in point, that of the Kenduskeag. Many such are to be found in this State and throughout the group of states in which we have included Maine. It is useless to multiply them here, when we have one so strong and well authenticated as this.

As before stated, our product of lumber in Maine in 1880, appears to have been equal to about sixty-two feet b. m., per forest acre. The average annual growth of lumber trees per acre in the spruce forests of the State can be approximately determined. The result shows that the cut of 1880 was largely in excess of the average annual growth in these forests.

As an illustration: Take a well timbered township, such as Gov. Davis cites in his letter. Suppose that 2,000,000 feet per year be cut from it for twenty years, and that after an interval of twenty years rest, 2,000,000 feet per year be cut for another twenty years, the product will be 80,000,000 feet in sixty years, an average of 1,333,333 feet per annum, and fifty-three feet per acre for a township, containing 25,000 acres. It is evident, however, that our period should have been extended to eighty years, so as to include the following twenty years of rest, and this gives an average product of 1,000,000 feet per annum and forty feet per acre. Cutting of an average of 100 feet per acre per annum has been regularly carried on for years in some of the townships, apparently without diminishing the supply, but this seems to be far above the average annual accretion per forest acre.

It may be stated as an axiom that as the means of support diminish population will decline. Emigration from Maine has already assumed large proportions. The tenth census showed the number of persons born in Maine and then residents of other states and territories to have been 182,277. "Maine is the best State in the Union to live in" said the late Hon. Lot M. Morrill to the writer soon after his return from a tour of the southern tier of states as a member of a congressional committee in the reconstruction period. To that sentiment I most heartily assent. But why, then, are our people leaving it in such numbers? For the same reason that controls emigration everywhere,—a desire to improve their physical condition.

We are scarcely holding our own. From 1870 to 1880 our population increased 3.51 per cent, and from 1880 to 1890 only 1.87 per cent. It is evident that if the tide of emigration from the State is to be stayed it will be the result of the development of our enormous water power, of which we have a larger amount than can be found in the same extent of territory anywhere else in the world. Prof. Walter Wells estimated it at about 2,000,000 horse powers, only 75,000 of which were utilized in 1880.

The lack of transportation facilities have hitherto prevented the development of this latent wealth of the State. But this lack, we predict, is soon to be overcome by the construction of electric railways.

The importance of maintaining the highest possible stage of water during the dry months of summer in all the large rivers of the State cannot be over estimated. This can be accomplished by maintaining the largest forest cover possible at the source of these rivers. Hence the necessity of the State's affording every encouragement in its power to induce a wise forest policy on the part of all land owners.

The discussion of our subject cannot be complete without a consideration of some of the means that can be adopted by the states, and the general government by which the wasteful cutting and careless burning of our forests may be lessened.

We know that in the matter of economy nothing can be expected of the individual owner of wood land, that does not tend to his private advantage. He will generally manage his timber land in that way which promises the largest financial return either present or prospective, regardless of any interest the public may have in the matter.

*First.* As an encouragement to timber land owners to let their trees grow until they are mature, the forests of every state should receive the most ample protection the law can possibly afford against fire, their most destructive enemy.

*Second.* It is a matter of prime importance that we have a trustworthy account of stock taken of the forests of the country giving their area and condition.

This should be taken by the general government at every census. Such statistics will prove to be of incalculable value to the owners of wood lands, manufacturers of lumber and all consumers of forest material, as large a number of our population as are interested in any other class of statistics. Let these statistics be accessible to every owner of timber land small and great. If one knows the indispensable demands of the public for material to be cut from a given area, the condition of which is also known, it will be a simple arithmetical problem for him to determine whether the financial result will be larger by letting his trees grow to maturity or by cutting them before that time.

It is to be regretted that in taking the eleventh census no provision was made for collecting such forestry statistics as were taken in the tenth census.

The forestry convention at Bangor in December 1888 appointed a committee to memorialize Congress with reference to enlarging *these* forestry statistics in the next (last) national census. This committee consisting of Hon. G. F. Talbot of Portland, Dr. A. C. Hamlin of Bangor and Prof. Harvey of the Maine State College attended to that duty. We deem it a great misfortune to the nation that their suggestions were unheeded.

In dealing with the subject of the depreciation of our forest growth, the enormous waste suffered from great fires deserves mention. One vital step in the prevention of this pest is the cultivation of an enlarged sentiment in respect to the worth of our forests. Many a one who would hesitate to set a fire that would endanger a hay stack will wantonly expose to the flames unbounded tracks of valuable wood land. It is hoped that the interest already awakened in this State in the subject of forestry which manifested itself in the enactment of the forestry law by the last Legislature will have a tendency to create a more tender care than has hitherto been felt for our woods.

BANGOR, ME , January 11, 1892.

*Hon. John E. Hobbs:*

DEAR SIR: I received your communication of January 9th. You ask me hard questions. I will answer the last one first. As to the diminution of the flow of water in the large rivers of the State, I can give you no accurate information, but as an illustration of what the result will be when the forests are swept away, I can give you an instance with which I am well acquainted, to wit: that of the Kenduskeag stream which empties into the Penobscot at Bangor. In fact, the city of Bangor is about equally divided by said stream. This stream rises some thirty miles from its mouth, one branch in the town of Dexter, and another in the town of Corinna. I am told that fifty or sixty years ago there was a continuous flow of water the year round in this stream, and at the town of Kenduskeag, twelve miles northwest of Bangor, were situated large lumber mills on both sides of the stream. The water flow was sufficient to carry them the year round. But during the past half century, the land along the shores of the stream has been cleared throughout the greater part of its course. The result is that we have heavy spring freshets, also heavy freshets in the fall, sometimes doing much damage. I recollect a dozen years ago or more, when living in the town of Corinth through which said stream flows, almost every bridge on the stream was carried away in the month of March. Now, after the spring freshet subsides, the water falls rapidly until it dwindles to a very small stream, not one-half the amount flowing during the summer months that did fifty years ago.

The old settlers have informed me as to this fact, and from personal observation, I have obtained much of it, and at one time—some fifteen years ago—the whole matter came out in a law suit regarding the right to the water belonging to the mills at said Kenduskeag village. I was attorney for plaintiff in the case.

I reason this way. If our forests are cut down or burnt over at the head waters of our great rivers, the same result in a few years would follow as in the case of the Kenduskeag river. We should have very heavy and dangerous spring and fall freshets, while the summer flow would not be more than one-half what it is at the present time. This would certainly apply to all great rivers in the State.

As to your other question, I will say that here in the eastern part of the State where there is so much timber land, it is utterly impos-

sible to cut on every township each year; in fact, I do not think that one-fourth of the townships on the Penobscot and St. John rivers are operated to any extent every year, and as a rule the operations are not large on each township. We now and then have an instance of a man or a number of men buying a township of land and cutting it continuously until it is all cut over. But this is the rare exception rather than the rule

As an illustration, I am interested in one township on the headwaters of the Penobscot, which I have owned in since 1874, and have never taken off enough stumpage to pay the interest. Another half town, we own on Chesuncook lake and have owned it about four years; here, we have taken off just about enough to pay the interest. Another township we own with Mr. Coe, on the east branch, pretty well up toward the headwaters, which had not been cut for twenty years previous to our buying into the town. We bought into the town four or five years ago and have taken off stumpages two years. Last year we cut some fourteen hundred thousand, I think, and the year before not quite so much; this year, we may cut a little more. This has all been done under permits, by parties who are operating the town. But take townships close by markets, or in other words what we term handy lands, where we can get logs, railroad ties, cedar posts, stave timber and cord wood, as well as pulp wood, we are apt to cut them too fast. I know of townships in this part of the State, some isolated cases, that have yielded very great revenues, but take the timber lands as a whole, in the State of Maine, I do not think to-day they are paying six per cent on the valuation put upon them by the last Valuation Commission. No, I do not think they are paying four per cent. But, to come right down to the point, I will give this as my judgment, that a man can take a township of land and by devoting his attention to it, can cut, if the town happens to be well timbered, two million feet per year, for fifteen years—perhaps in some cases for twenty years. But if the trees were *all* cut down to twelve or fourteen inches at the stump, it would not be wise nor economical to operate the same territory again in ten years. In lands that are gone over once in ten years, the rule has been with us that the operators do not cut nearly all the large trees—they leave many trees between their roads, and the operator who happens to go on in ten years after the first operation for instance, takes all of the large trees left by the first operator, and many of the smaller ones during the ten

years have become, meanwhile, quite respectable looking logs, and so are cut.

But from my own observation, it takes from one hundred to a hundred and fifty years to produce a mature spruce tree, and I have examined many that were two hundred years old. Sapling pine will mature very much faster as they are a more rapidly growing tree.

I have no data from which I can give you any accurate information, but only in a general way as I have done. On our river, we cut lands differently from what they do in some other sections of the State, that is the owners permit to operators who go on and cut under the terms of the permit, and the operations are looked after by the scalers who are appointed by the land owners. It is rare that the owners themselves operate the lands.

I don't know as I have succeeded in giving you any information of value, but it is all that I can do.

Very respectfully yours,

D. F. DAVIS.